



**UNIVERSIDADE FEDERAL DE SÃO CARLOS
CENTRO DE CIÊNCIAS AGRÁRIAS
PROGRAMA DE PÓS-GRADUAÇÃO EM
PRODUÇÃO VEGETAL E BIOPROCESSOS
ASSOCIADOS**

**ANÁLISE DE SEQUÊNCIAS DE GENES DE LIMONENO SINTASES EM GENOMAS DE
CITROS**

FRANCISCO INACIO PAIVA FERREIRA

**Araras
2020**



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CITROS

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RESUMO

O limoneno, um terpeno encontrado em óleos essenciais extraído da casca de citros, tem grande aplicabilidade na indústria. Sabe-se que existe grande diferença de concentração de limoneno entre as variedades de citros, sendo, o principal componente dos óleos essenciais do grupo. Nesse estudo, hipotetizou-se que diferenças genômicas poderiam estar relacionadas às variações de limoneno observadas entre as diferentes espécies. Para isso, fez-se uma análise *in silico*, onde buscou-se sequências de genes codificando limoneno sintase no genoma de *Citrus sinensis* variedade “Valência”, disponíveis no banco de dados de citros “Citrus Genome Database”, que foram usadas para obtenção de sequências com alta similaridade das espécies: *C. sinensis* (laranja doce “Ridge Pineapple”), *C. reticulata* (tangerina), *C. ichangensis* (papeda), *C. maxima* (toranja) e *C. medica* (cidra). Os resultados indicam que existem treze sequências de genes codificando limoneno sintases em Valência. As treze sequências foram alinhadas. Os resultados dos alinhamentos serviram para se ter uma ideia inicial da semelhança real entre as sequências, vemos que há regiões conservadas em diversos dos alinhamentos realizados, que implica que as variedades possuem relações filogenéticas, o que é esperado já que todas pertencem ao mesmo gênero. Em nenhum momento, as sequências foram 100% idênticas, o que se mostra um resultado interessante, afinal estudos já comprovaram que variedades/espécies diferentes possuem quantidades diferentes de limoneno em seus óleos essenciais. Há alta similaridade de sequência entre laranjas doce, *C. maxima* e *C. reticulata*, o que na realidade, confirma a origem dessas variedades pois *C. sinensis* é um híbrido entre *C. maxima*, *C. reticulata* e uma espécie desconhecida de citros. Também foi feita uma busca por similaridade usando a sequência traduzida das treze proteínas de limoneno sintase de “Valência” com as mesmas variedades. Esta análise de proteínas mostrou o mesmo padrão de similaridade entre *C. sinensis*, *C. maxima*, e *C. reticulata*, e a análise de filogenia confirma esses resultados. A análise da região promotora não mostrou as semelhanças encontradas na análise de sequências gênicas e protéicas, o que pode ser o resultado esperado, essas diferenças entre os promotores podem estar relacionadas com a regulação dos genes e com isso explicar a diferença de limoneno sintases entre espécies e variedade de citros. Porém, o ideal neste caso seria um estudo mais aprofundado com tais regiões promotoras, para resultados com melhor clareza, afinal a análise de promotores eucarióticos é um dos problemas mais difíceis na genômica computacional.

SEQUENCE ANALYSIS OF LIMONENE SYNTHASES GENES IN CITRUS GENOMES

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ABSTRACT

Limonene, a terpene found in essential oil extracted from citrus peel, has great applicability on industry. It is known that there are great limonene concentration differences among citrus varieties, however, limonene remains the principal component of essential oils from this group. In this study, it was hypothesized that genomic differences could be related to the variations of limonene observed between different species. In order to prove this, an *in silico* analysis was performed and limonene synthase sequences were searched on *Citrus sinensis* variety "Valencia" genome, available on "Citrus Genome Database". Those results were used to obtain highly similar sequences from species such as *C. sinensis* (sweet orange "Ridge Pineapple"), *C. reticulata* (tangerine), *C. ichangensis* (papeda), *C. maxima* (pomelo) and *C. medica* (cider). Results indicate that there are thirteen gene sequences coding for limonene synthases in Valencia. Those thirteen sequences were aligned. The results of the alignments served to have an initial idea of the real similarity between the sequences, we see that there are conserved regions in several of the alignments performed, which implies that the varieties have phylogenetic relationships, which is expected since they all belong to the same genus. At no time, the sequences were 100% identical, which shows an interesting result, after all, studies have proven that different varieties/species have different amounts of limonene in their essential oils. There is high sequence similarity among the sweet oranges, *C. maxima* and *C. reticulata*, which confirms the ancestral origin of those varieties, since *C. sinensis* is a hybrid among *C. maxima*, *C. reticulata* and another unknown citrus species. Another analysis that was performed was a sequence similarity search using the translated sequence from the thirteen limonene synthase proteins from Valencia against the same varieties used on genomic similarity search. This analysis resulted the same pattern of similarity among *C. sinensis*, *C. maxima* and *C. reticulata* found on genomic similarity results, and the phylogenetic analysis confirmed those results. The analysis of the promoter region did not show the similarities found in the analysis of gene and protein sequences, which may be the expected result, these differences between promoters may be related to the regulation of genes and thereby explain the difference in limonene synthases between species and variety of citrus. Although eukaryotic promoter analysis is one of the most difficult computation problems, an in-depth study of the referred promoter regions is needed to elucidate our interpretation of genomic and proteomic comparisons.

1. INTRODUÇÃO

Citrus é um grande gênero pertencente à família Rutaceae, diversas espécies cultivadas e de grande importância econômica estão inclusas nesse gênero como *Citrus sinensis* (laranja doce), *Citrus reticulata* (tangerina), *Citrus limon* (limão), *Citrus grandis* (toranja) e *Citrus paradisi* (pomelo), que são conhecidas pelas cores atrativas além do sabores e aroma agradáveis, sendo, portanto, comercializadas no mundo todo como frutas frescas e também na forma de sucos. As frutas cítricas possuem atividades antioxidantes e são ricas em vitaminas A, C e E, minerais, flavonóides, cumarinas, limonóides, carotenóides, pectinas e outros compostos, trazendo diversos benefícios a saúde humana. As plantas cítricas também são notáveis por sua fragrância e são usadas como fontes de sabores e fragrâncias em cosméticos, perfumes, refrigerantes e indústrias de alimentos. Além disso, como o aroma é uma das características mais apreciadas da fruta, os compostos voláteis desempenham um papel fundamental na determinação da percepção e aceitabilidade dos produtos cítricos pelos consumidores (LV et al., 2015; MEHL et al., 2014; RODRÍGUEZ et al., 2017; WANG et al., 2017; ZOU et al., 2016).

A fragrância cítrica difere de espécie para espécie, ou seja, mostra uma variação fenotípica, variando de um leve aroma de limão ao doce aroma de laranja e ao pungente aroma de cidra (AZAM et al., 2013a; ROUSEFF; PEREZ-CACHO; JABALPURWALA, 2009). As diferentes variedades como também os diferentes órgãos das plantas, também apresentam perfis de aromas distintos (AZAM et al., 2013a; CHEONG et al., 2012; REN et al.,

2015; RODRÍGUEZ; ALQUÉZAR; PEÑA, 2013; ZHONG et al., 2014), que são influenciados por fatores de desenvolvimento (AZAM et al., 2013b; RODRÍGUEZ; ALQUÉZAR; PEÑA, 2013). Mais de 100 compostos orgânicos voláteis já foram identificados em *Citrus*, sendo os terpenos e seus derivados oxigenados, álcoois, aldeídos, ésteres, éteres e óxidos, a principal estrutura de todo o aroma (AZAM et al., 2013b; GONZÁLEZ-MAS et al., 2011; RODRÍGUEZ; ALQUÉZAR; PEÑA, 2013; ZHONG et al., 2014). Eles se acumulam em células especializadas na folha e flavedo (epicarpo, parte externa da casca) em corpos oleosos e nas vesículas de suco das frutas (HOLOPAINEN, 2004).

Terpenos não são apenas o maior grupo de compostos naturais derivados de plantas, onde já foram descritos pelos menos 30.000 compostos, mas também possuem a maior variedade de tipos estruturais. Cerca de centenas de diferentes esqueletos de carbono de terpenos são conhecidos. Os terpenos são formados pela combinação de várias unidades de cinco carbonos (C₅) conhecidas como isoprenos além de isopentenil pirofosfato (IPP) e dimetilalil pirofosfato (DMAPP) (BAKKALI et al., 2008; CHEN et al., 2011). Os terpenos são biossintetizados através de duas vias independentes nas plantas, a via MEP (fosfato de metileritritol) operando em plastídios e a via do ácido mevalônico (MEV) operando no citoplasma, que levam à síntese de IPP e DMAPP (LICHTENTHALER, 1999; SAPIR-MIR et al., 2008). A combinação das unidades de isoprenos é realizada pela atividade de prenil transferases, também conhecidas como difosfato de isoprenil sintases (WANG; OHNUMA, 2000). A condensação de uma molécula de DMAPP com uma de IPP gera difosfato de geranyl (GPP), se estiver na configuração trans, ou difosfato de neril (NPP), se estiver na configuração cis. A adição de outra unidade IPP ao GPP fornecerá difosfato de farnesil (FPP) na configuração trans ou na configuração cis, e outra unidade IPP fornecerá difosfato de geranylgeranyl (GGPP) (TAKAHASHI; KOYAMA, 2006). Prenil difosfatos mais longos também são sintetizados e alguns são adicionados (com a perda da porção difosfato) como componentes para formar compostos como clorofilas, filoquinonas e ubiquinonas (MCGARVEY; CROTEAU, 1995). As centenas de esqueletos básicos de carbono de terpenos são formados a partir de DMAPP, GPP, FPP ou GGPP pelas terpeno sintases (TPS), as terpeno sintases formam os hemiterpenos (5 átomos de carbono) a partir de DMAPP (MILLER; OSCHINSKI; ZIMMER, 2001); monoterpenos (10 átomos de carbono) a partir de GPP (WISE; CROTEAU, 1999), sesquiterpenos (15 átomos de carbono) a partir de FPP (CANE, 1999); e diterpenos (20 átomos de carbono) a partir de GGPP (BEALE; MACMILLAN, 1988) (Figura 1).

Como é possível observar as terpeno sintases são responsáveis pela sínteses de diversos compostos relacionados com terpenos (CHEN et al., 2011). Geralmente, os genomas vegetais contêm conjuntos de genes relacionados (ou seja, 'Famílias de genes') que

codificam enzimas que usam substratos semelhantes e fornecem produtos semelhantes, mas divergiram claramente em diferentes linhagens. A família terpeno sintase (TPS) nas plantas é um exemplo disso, a família de genes TPS é uma família de tamanho médio, com números variando de aproximadamente 20 a 150 genes em alguns genomas de plantas sequenciados (BOHLMANN; MEYER-GAUEN; CROTEAU, 1998; CHEN et al., 2011). Em *Citrus*, podemos citar um estudo com a laranja doce “Pineapple” (*Citrus sinensis* L. Osb.) envolvendo a busca pela família de genes de terpeno sintases, Alquézar et al., (2017) identificou um total de 95 loci e 111 transcritos previstos, 96 deles exibindo similaridades significativas com TPSs conhecidas.

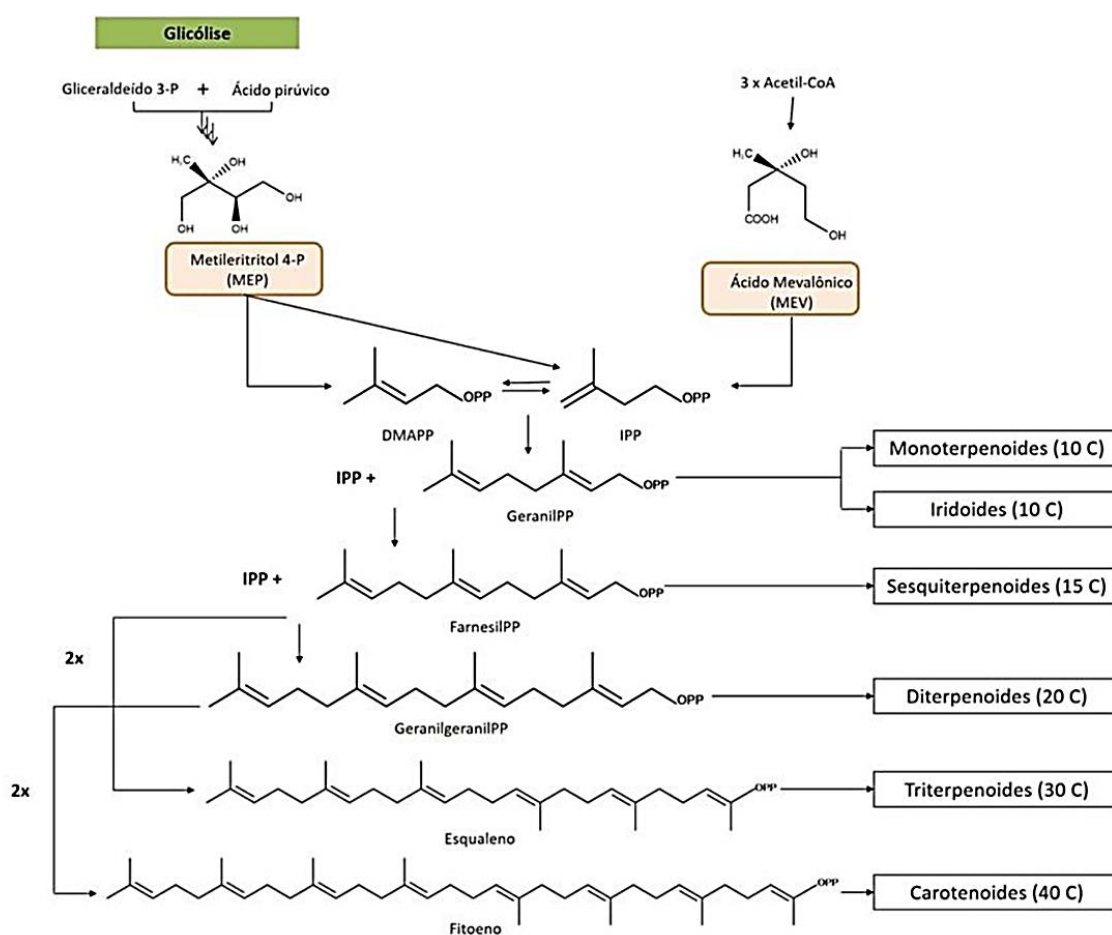


Figura 1 – Biossíntese de terpenos (Fonte: FELIPE; BICAS, 2017).

Baseado na filogenia e funções conhecidas das terpenos sintases (TPSs), sete subfamílias de TPSs são reconhecidas. Estas incluem, subfamília TPS – c, que representa o mais conservado clado entre as plantas terrestres, contendo principalmente diterpeno

sintases; subfamília TPS – e/f representando as TPS conservadas entre as plantas vasculares; subfamília TPS-h, específica para *Selaginella moellendorffii*; subfamília TPS-d, específica para gimnospermas; e três subfamílias específicas para angiospermas TPS-b, TPS-g e TPS-a (CHEN et al., 2011).

As funções biológicas das várias moléculas sintetizadas por terpenos sintases nas plantas estão ligadas não apenas à biossíntese de hormônios, mas também à proteção contra a radiação UV e o estresse foto-oxidativo. Além disso, os terpenos também estão relacionados à proteção térmica, atração de polinizadores, resistência insetos e a microrganismos, entre outros fatores (KEELING; BOHLMANN, 2006; LUDWICZUK; SKALICKA-WOŹNIAK; GEORGIEV, 2017; PENUELAS et al., 2005; STEELE et al., 1998). Podemos citar os hormônios giberelinas e brassinoesteróides, os pigmentos carotenoides na fotossíntese, e a cadeia lateral do fitol, como alguns exemplos de terpenos com funções indispensáveis para o metabolismo, o crescimento e o desenvolvimento vegetal (AUBOURG; LECHARNY; BOHLMANN, 2002).

A regulação da biossíntese de terpenóides é complexa, em grande parte por causa das múltiplas funções desta família de metabólitos (MCGARVEY; CROTEAU, 1995), e dos perfis de expressão diferencial dos genes de terpeno sintases observados ao longo do desenvolvimento da planta em resposta a fatores ambientais bióticos e abióticos (THOLL, 2006).

Os terpenos são bastante conhecidos também por serem os componentes principais dos óleos essenciais. Em citros, os óleos essenciais possuem grande importância econômica, afinal são explorados em diversos setores da indústria. Os monoterpenos são os que estão em maior quantidade nos óleos essenciais, representando 90% dos compostos, e dentre eles, o composto principal é limoneno. As propriedades químicas, físicas e biológicas do limoneno interferem diretamente nas propriedades dos óleos essenciais dos citros. Fatores como genética e ambiente também interferem na composição dos óleos essenciais, diferentes espécies, e mesmo variedades de citros, possuem composições diferentes, assim como concentrações diferentes de limoneno (GONZÁLEZ-MAS et al., 2019; RUIZ; FLOTATS, 2014; SHIMADA et al., 2005).

O sequenciamento de nova geração permitiu uma explosão de novos genomas, dentre os quais os do gênero *Citrus* e, com isso, análises de genômica comparativa foram facilitadas. Este estudo buscou avaliar comparativamente os genomas de laranja doce e outros citros, disponíveis em bancos de dados públicos, focando nos genes que codificam limoneno sintase.

2. OBJETIVOS

2.1 Objetivo geral

- Avaliar diferenças nas sequências de genes de limoneno sintases nos diferentes genomas de citros.

2.2 Objetivos específicos

- Comparar a estrutura genômica nas regiões onde se localizam os genes de limoneno sintase;
- Comparar estruturas gênicas focando as possíveis regiões promotoras dos genes de limoneno sintase.

3. REVISÃO DA LITERATURA

3.1 Importância econômica da citricultura

Uma das principais culturas no comércio mundial atualmente, é a citricultura, com uma produção de cerca de 100 milhões de toneladas por ano, englobando todos os cultivares do gênero. Dentre esses cultivares industriais pode-se dizer que 98 % deles são compostos por laranjas, limões, toranjas e tangerinas (LAGHA-BENAMROUCHE; MADANI, 2013). Os citros são utilizados comercialmente como frutas frescas, ou na forma de sucos. As laranjas predominam no mercado, na safra 2018/2019, 54.3 milhões de toneladas de laranjas foram produzidas globalmente, a maior produção em oito anos, já a produção de suco de laranja atingiu 2.2 milhões de toneladas nesta mesma safra. Enquanto a produção, para este mesmo período, de tangerinas foi de 32 milhões, e a produção de toranjas e limões estima-se chegar a 6.9 e 8.4 milhões respectivamente (USDA/FAS, 2019).

Os citros compreendem um grande número de plantas, o grupo é composto por 13 gêneros que pertencem a subtribo Citrinae, tribo Citrae, subfamília Aurantioideae, da família Rutaceae, sendo que desses gêneros, *Citrus*, *Fortunella* e *Poncirus* são os mais cultivados para uso comercial. Foi possivelmente na China por volta de 1000 a.C. que se iniciou a utilização do gênero *Citrus* para fins ornamentais e alimentícios. Na Europa, a introdução dos citros começou na Grécia por Alexandre (o Grande), cerca de 100 a. C., sendo que, durante a ocupação árabe que ocorreu entre os séculos XI e XII, os citros começaram a ser cultivados na Itália e Espanha, passando a ser introduzido para o restante da Europa durante o período das cruzadas. Já nas Américas os citros foram introduzidos pelos

portugueses e espanhóis durante a colonização do continente (DONADIO; MOURÃO FILHO; MOREIRA, 2005).

Para o Brasil, a citricultura tem uma enorme importância. O Brasil é o maior produtor de laranjas do mundo, na safra 2018/2019 o Brasil teve um aumento de 13% na produção totalizando 17,8 milhões de toneladas. O país ainda domina três quartos das exportações de suco de laranja, produzindo cerca de 1,2 milhões de toneladas nesta mesma safra (USDA/FAS, 2019). A citricultura no Brasil é responsável por promover um crescimento sócio econômico, contribuindo com a balança comercial e a geração de empregos direta e indiretamente (LOPES et al., 2011).

No Brasil as laranjas são os principais citros cultivados, mas também se cultivam tangerinas, limões e limas. No país a produção de citros ocorre principalmente no estado de São Paulo, que possui 85% da produção nacional de laranjas, sendo seguido por estados como Bahia, Minas Gerais, Pará, Paraná e Rio Grande do Sul, que também contribuem para o agronegócio dos citros (LOPES et al., 2011).

3.2 O sequenciamento do genoma dos citros e as descobertas sobre a diversidade e a ancestralidade do gênero

Devido à importância econômica, diversas pesquisas envolvendo diferentes espécies de *Citrus* são realizadas nos mais variados centros de pesquisa. Nos últimos anos, vemos um grande foco no sequenciamento genético de diversas espécies e variedades, principalmente pelo fato de poder fornecer diversas informações, sendo que algumas dessas possivelmente possam auxiliar no melhoramento genético dessas espécies e variedades (WANG et al., 2018; WU et al., 2014; XU et al., 2013).

Um dos fatores que impulsionaram a busca pelo sequenciamento das espécies de citros foi o entendimento da origem genética do gênero. Acredita-se que este é nativo do sudeste asiático, já que a família Rutaceae é amplamente distribuída nas regiões do oeste do Paquistão, região central e norte da China, no oeste da Índia, na região da Nova Guiné e do Arquipélago Bismarck, além do nordeste da Austrália, da Nova Caledônia, Melanésia e das ilhas da Polinésia Ocidental (GMITTER; HU, 1990; REUTHER; BATCHELOR; WEBBER, 1967). A dificuldade de se encontrar a origem genética dos citros ocorre devido a algumas características da biologia e do cultivo dessas variedades. As espécies de citros são alógamas, ou seja, que realizam preferencialmente fecundação cruzada, e são altamente heterozigotas, porém um dos fatores biológicos que dificulta a busca da origem genética nos citros é o fato de poder haver cruzamentos entre as variedades, com produção de híbridos

férteis, resultando em uma alta variabilidade genética no gênero. (REUTHER; BATCHELOR; WEBBER, 1967; VELASCO; LICCIARDELLO, 2014; WANG et al., 2017; WU et al., 2018; XU et al., 2013).

Nessa busca de espécies ancestrais e selvagens que deram origem aos cultivares atuais de citros, Xu et al. (2013) realizaram o sequenciamento do genoma da laranja doce (*C. sinensis* L. Osbeck) da variedade “Valência”, uma das mais importantes variedades cultivadas no mundo e a primeira utilizada para a produção de suco. Havia um senso comum de que a laranja doce não seria uma espécie pura, mas na verdade um híbrido, o que foi confirmado por este estudo. Conforme os autores concluíram, a laranja doce é um híbrido entre toranja (*C. grandis*) e tangerina (*C. reticulata*). Mais especificamente, houve um cruzamento entre toranja e tangerina, gerando um híbrido inicial não identificado, que ao cruzar novamente com tangerina produziu a laranja doce. Esse estudo do genoma da laranja doce também resultou em uma análise que trouxe novas informações sobre a filogenia do gênero, descobrindo-se que o gênero *Citrus* é próximo do cacau, da *Arabidopsis* e do mamão, porém sendo mais antigo que os mesmos, divergindo da ordem Malvales há pelo menos 85 milhões de anos.

Já Wu et al. (2014) sequenciaram os genomas das tangerinas *C. clementina* (“Clementina”), *C. reticulata* (“Ponkan”), *C. deliciosa* (“Willowleaf”), *C. reticulata* x *C. sinensis* (“Murcott”); toranja, *C. maxima* (“Chandler” e Low-acid); *C. sinensis* (“Ridge Pineapple”); e laranja azeda *C. aurantium* (“Seville”). Na análise dos genomas obtidos, os autores evidenciaram que, enquanto as toranjas sequenciadas possuem pouca introgressão de outras espécies, todas as tangerinas mostram uma mistura substancial com toranja, não podendo ser relacionadas como variedades derivadas apenas de uma população ancestral de *C. reticulata*, como era a hipótese inicial dos autores. A laranja doce sequenciada neste estudo também se mostrou como sendo um híbrido, apresentando uma mistura com toranja em ambos os casos. Sendo assim, os autores concluíram que, no caso da ancestralidade das toranjas, esses foram domesticados a partir de uma espécie selvagem de *C. maxima*. Já com a tangerinas a história é um pouco mais complexa, pois não havia suspeita de que as tangerinas “Ponkan” e a “Willowleaf”, poderiam ser híbridos, o que acabou por ser uma surpresa, o resultado de que ambas são na realidade introgressões interespecíficas de *C. maxima* em *C. reticulata* (selvagem). Enquanto para as tangerinas “Clementina” e “Murcott”, já se esperava tratarem-se de híbridos, no caso da “Clementina” esta é um híbrido entre a tangerina “Willowleaf” e a laranja doce, já a “Murcott” é um híbrido do cruzamento entre laranja doce e uma tangerina desconhecida. Além da confirmação da laranja doce (*C. sinensis* cv. “Ridge Pineapple”) ser um híbrido de toranja com tangerina (selvagem), foi encontrado também que esta compartilha alelos com a tangerina “Ponkan” e seguimentos de DNA com as tangerinas “Willowleaf” e “Huanglingmiao”. Já a laranja azeda também trata-se de um

híbrido entre toranja e uma tangerina selvagem, porém não há relação desta com laranja doce (WU et al., 2014).

Ainda na questão da diversidade e ancestralidade, WU et al. (2018), analisaram genomas de 58 acessos do gênero *Citrus* e dois acessos de outros gêneros (*Poncirus* e *Severinia*). Sendo que neste trabalho também foi realizado o sequenciamento das seguintes espécies de *Citrus*; *C. medica* (cidra), *C. micranta* (uma espécie selvagem do subgênero *Papeda*), *C. japonica* (também conhecida como *Fortunella margarita*, kinkan), *C. ichangensis* (ou *C. cavaleriei*, também considerado do subgênero *Papeda*); e três espécies de citros australianas, *Eremocitrus glauca*, *Microcitrus australis* e *Microcitrus australasica*. Através das análises desses vários genomas, os autores observaram que limões, limas, laranjas e toranjas são híbridos, e que as espécies *C. medica*, *C. reticulata* e *C. maxima*, podem ser destacadas como os três principais ancestrais desses citros, apesar de que os autores identificaram cerca de 10 progenitores do gênero. Além disso, propuseram que os citros tiveram sua origem no sudeste do Himalaia, na região que inclui a área oriental de Assam, o norte de Mianmar e o oeste de Yunnan; e que as espécies cítricas ancestrais sofreram um evento de especiação durante o final do período do Mioceno.

3.3 Óleos essenciais de citros

Os óleos essenciais de citros são explorados em diversos setores industriais como na produção de perfumes, fragrâncias a base de óleos cítricos, e como ingredientes aromatizantes na indústria alimentícia, farmacêutica e cosmética, são obtidos principalmente da casca dos frutos, mas folhas e flores também podem ser utilizadas na obtenção. Além da utilização no setor industrial, os óleos essenciais também são utilizados na agricultura, no controle de pragas. Tudo isso devido ao fato dos óleos essenciais e suas composições químicas possuírem uma gama de atividades biológicas, que incluem, atividade antimicrobiana, antioxidante, anticancerígena, anti-inflamatória, inseticida, dentre outras (CHAVAN; WAKTE; SHINDE, 2010; EL SAWI et al., 2019; GONZÁLEZ-MAS et al., 2019; JING et al., 2014; RASPO et al., 2020; RUIZ-PÉREZ et al., 2016; TOSCANO-GARIBAY et al., 2017; TRANCHIDA et al., 2012; VEKIARI et al., 2002).

A extração de óleos essenciais de citros se iniciou no século XVI, com a extração sendo realizada por destilação, C. Gesner extraiu óleos de laranjas e limões. Apenas no século XVIII, que o processo de extração mecânica das cascas se iniciou. Atualmente os óleos essenciais são extraídos a partir de técnicas industriais de extração a frio, a partir das cascas de frutas cítricas como a laranja doce (*C. sinensis*), laranja azeda (*C. aurantium*), limões (*C.*

limon), bergamotas (*C. bergamia*), mexericas (*C. deliciosa*), pomelos (*C. paradise*), dentre outras. O processo de extração a frio ocorre basicamente em três etapas: uma ação mecânica que permite a ruptura dos utrículos da casca e liberação de óleo; a liberação de um fluxo de água utilizado para transportar óleo essencial; e a separação do óleo e da água por centrifugação. Dos resíduos desse processo também é possível recuperar óleo de menor qualidade por destilação (TRANCHIDA et al., 2012).

Compostos voláteis e semi-voláteis, compõem 85 a 99% de toda a fração dos óleos essenciais de citros, que é representada por um pouco mais de 200 compostos. Essa fração volátil é composta por hidrocarbonetos de monoterpenos e sesquiterpenos, e seus derivados oxigenados, como aldeídos, álcoois e ésteres. A fração não volátil, que corresponde de 1 a 15% do óleo, é composta por hidrocarbonetos, esteróis, ácidos graxos, ceras, carotenoides, cumarinas, psoralenos e flavonóides (FISHER; PHILLIPS, 2008; MOUFIDA; MARZOUK, 2003).

Dentre todos os compostos presente nos óleos essenciais de citros podemos destacar o limoneno, afinal sua concentração no óleo essencial varia de 32 a 98% dependendo da espécie e variedade cítrica; como por exemplo, na bergamota, varia de 32 a 45%, limão de 45 a 76%, e na laranja doce de 68 a 98%. Mas este fator se refere ao óleo essencial obtido de cascas, nos óleos obtidos de flores e folhas a concentração de limoneno é menor e outros compostos predominam (GONZÁLEZ-MAS et al., 2019; JING et al., 2014; LOTA et al., 2000; MOUFIDA; MARZOUK, 2003).

É importante ressaltar que a composição química dos óleos essenciais é influenciada por fatores internos (genética) e externos (ambientais). Os fatores genéticos, incluindo, espécies, variedades, e diferentes partes da planta, são os maiores determinantes da composição química dos óleos essenciais (BAKKALI et al., 2008; TU et al., 2002). Um estudo comparativo de óleos essenciais extraídos de cascas de 4 espécies cítricas da Tunísia, realizado por Hosni et al., (2010), mostrou que o δ -cadineno, um sesquiterpeno presente em óleos essenciais, foi encontrado apenas na espécie de pomelo e o α -calacoreno, outro sesquiterpeno, foi observado apenas na espécie de tangerina utilizada. Já Lota *et al.*, (2000) estudou a composição do óleo essencial de 58 variedades de tangerinas pertencentes a 15 espécies diferentes, e em seus resultados observou que a composição desses óleos variaram consideravelmente de amostra para amostra. Óleos extraídos de diferentes órgãos da planta também apresenta diferenças em sua composição química, como por exemplo o estudo realizado por Lota et al., (2002) que mostra que o terpineol-4 foi um dos principais compostos nos óleos de folhas de limão, enquanto não foi detectado nos óleos de casca.

Fatores ambientais como solo, clima, praticas culturais, ataque de insetos, estágio de maturação, entre outros, podem contribuir para a variação quantitativas dos óleos

essenciais. Um exemplo é o estudo realizado por Vekiari et al., (2002), no qual avaliou-se a composição do óleo essencial de limões da variedade Zambetaki (*C. limon*), colhidos em seis diferentes intervalos de tempo, durante um período superior a um ano. Foram encontradas diferenças significativas entre os perfis de aroma e variações quantitativas nos óleos essenciais de acordo com o período em que foram colhidos, além de diferenças nos componentes de óleos extraídos de folhas com os extraídos de casca.

3.4 Limoneno

Limoneno é conhecido como um monoterpene cíclico, cuja a fórmula empírica é $C_{10}H_{16}$. É um líquido incolor em temperatura ambiente, ocorre em duas formas ópticas D- e L-limoneno (Fig. 1), e em uma mistura racêmica conhecida vulgarmente por dipenteno (HAHN et al., 2006).

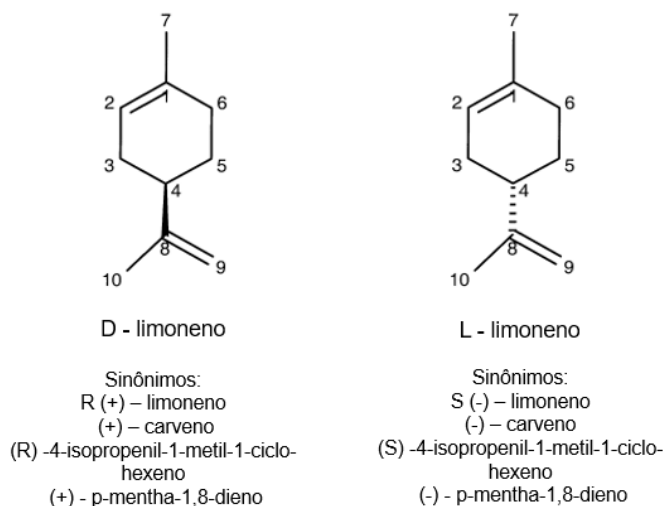


Figura 2: Estruturas químicas das duas formas ópticas de limoneno, com numeração dos átomos de carbono e nomenclaturas que podem ser encontradas na literatura (Fonte: DUETZ et al., 2003).

Os isômeros de limoneno, ou seja, as suas duas formas ópticas, são os monoterpenos cíclicos, mais abundantes na natureza; L-limoneno é principalmente encontrado em uma variedade de árvores e ervas, como por exemplo na espécie *Mentha* spp.; enquanto D-limoneno é o componente principal do óleo derivado das cascas de frutas cítricas como laranjas e limões (DUETZ et al., 2003; RUIZ; FLOTATS, 2014).

O limoneno também possui diversas aplicações industriais, é amplamente utilizado como aditivo de sabor e fragrância em itens alimentares, como sucos de frutas, doces, gomas de mascar, refrigerantes e sorvetes. O limoneno é também uma das fragrâncias mais utilizadas na formulação de cosméticos e pode ser encontrada em diversos produtos de beleza, como sabonetes, xampus, condicionadores, entre outros, além de estar presente também em produtos de limpeza e pesticidas ecologicamente corretos. É também considerado um composto seguro para a preservação de alimentos e pode ser usado como solvente para extração de produtos naturais (EL SAWI et al., 2019; HIROTA et al., 2010; NAZAROFF; WESCHLER, 2004; ROBERTO et al., 2010; SUN, 2007).

O D-limoneno é considerado um produto químico com baixa toxicidade, não representando riscos para os seres humanos, pelo contrário, tem sido utilizado clinicamente para dissolver cálculos biliares contendo colesterol e para alívio da azia e da doença do refluxo gastroesofágico, por causa de seu efeito neutralizante ácido. Além disso, os estudos mostram a capacidade quimiopreventiva contra diversos tipos de câncer, do D-limoneno, evidências de um ensaio clínico mostram uma resposta parcial em um paciente com câncer de mama e doença estável por mais de seis meses em três pacientes com câncer colorretal (SUN, 2007).

Aproximadamente 50 mil toneladas D-limoneno são recuperadas ao ano como subproduto da indústria cítrica mundial, sendo geralmente separado do óleo essencial obtido no suco de laranja pela sua baixa solubilidade em água, alta tendência à autoxidação e polimerização, e formação de “off-flavors”, tornando-se um subproduto industrial adequado para bioconversões a compostos de alto valor comercial (MARÓSTICA; PASTORE, 2007).

O limoneno também serve como precursor de muitos derivados oxigenados encontrados nos óleos essenciais de várias espécies agrônômicas, incluindo mentol em hortelã-pimenta, carvona em hortelã, carvona em cominho e endro, e perillaldeído em perilla (HYATT et al., 2007).

4. MATERIAIS E MÉTODOS

4.1 Identificação de sequências codificando limoneno sintase em *Citrus sinensis* variedade “Valencia”

Inicialmente foi realizada uma busca no banco de dados da variedade de laranja doce “Valência”, com a utilização de palavras chaves, por sequências de genes relacionados a limoneno sintases.

4.2 Identificação de sequências codificando limoneno sintase em outros citros

O acesso aos genomas das variedades ocorreu no banco de dados Citrus Genome Database (<https://www.citrusgenomedb.org/>). As variedades utilizadas foram: *C. sinensis* (laranja doce “Valência”), *C. sinensis* (laranja doce “Ridge Pineapple”), *C. reticulata* (tangerina), *C. ichangensis* (papeda), *C. maxima* (toranja), *C. medica* (cidra).

A partir dos genes de “Valência” encontrados, foi realizada uma busca com a utilização da ferramenta BLAST+ (Basic Local Alignment Search Tool) (ALTSCHUL et al., 1990), disponível no próprio banco de dados “Citrus Genome”, pelas sequências dos genes das outras variedades, sendo as sequências com maior similaridade selecionadas para a utilização no estudo.

4.3 Identificação de sequências promotoras de genes codificando limoneno sintase em citros

Sequências das possíveis regiões promotoras dos genes codificando limoneno sintase em citros também foram analisadas. Para tanto, fragmentos com tamanho de 1Kb à montante do início da sequência dos mRNAs foram utilizados para essa análise. Essas regiões foram identificadas utilizando a ferramenta JBrowse (<https://jbrowse.org/>) (BUELS et al., 2016).

4.4 Alinhamento múltiplo de sequências

As sequências das regiões codificadoras dos genes de limoneno sintase foram alinhadas com a utilização da ferramenta Clustal Omega (“Multiple sequence alignments”, alinhamento de sequências múltiplas), disponível em <https://www.ebi.ac.uk/Tools/msa/clustalo/> (SIEVERS et al., 2011), com os parâmetros padrões do programa.

Além das sequências das regiões codificadoras, as sequências das proteínas expressas por esses genes também foram avaliadas através da mesma ferramenta. As sequências das proteínas foram obtidas no próprio banco de dados “Citrus Genome”, ou quando não disponíveis, foram obtidas pela tradução das sequências gênicas com o auxílio da ferramenta “Translate” do “ExPASy” (disponível em: <https://web.expasy.org/translate/>) (GASTEIGER et al., 2005).

Por fim, foram também alinhadas as possíveis regiões promotoras dos genes que codificam limoneno sintase nos diferentes citros avaliados.

4.5 Análise de região genômica

Para essa análise a ferramenta JBrowse (<https://jbrowse.org/>) (BUELS et al., 2016) foi utilizada. Foram comparadas as sequências dos genes próximos ao analisado de “Valência”, geralmente um gene da esquerda e um da direita, com as sequências dos genes próximos aos similares a este nas outras variedades, se as sequências apresentarem similaridade, significa que ambos os genes analisados se encontram em uma mesma região genômica.

5. RESULTADOS E DISCUSSÃO

As buscas por sequências de limoneno sintase no Citrus Genome Database revelou a presença de 13 genes em laranja doce (*C. sinensis*) variedade “Valência” (Tabela 1). Estas sequências foram utilizadas para buscas por homólogos em outras espécies, além de outra variedade de laranja doce (“Pineapple”) na mesma base de dados “Citrus Genome”, mostrando a presença de poucos genes similares em algumas variedades, como por exemplo, *C. ichangensis*. No caso de *C. clementina* existe um único gene que possui similaridade com diversos genes de Valência (Ciclev10017785m). Já nos casos de “Pineapple”, *C. máxima*, *C. medica* e *C. reticulata*, existem genes para essas variedades que apresentam similaridade com mais de um gene de Valência, como por exemplo, o orange1.1g043404m de “Pineapple” que apresentou alta similaridade com 4 genes de “Valencia”, Cs3g04170.1, Cs3g04290.1, Cs3g04360.1, e orange1.1t03904.1.

Através de um alinhamento múltiplo pela ferramenta Clustal Omega (SIEVERS et al., 2011), cada gene de valência foi individualmente comparado com os genes das outras espécies/variedade que apresentaram similaridade, começando com o alinhamento dos genes da primeira linha da Tabela 1, ou seja, o alinhamento entre “Cs2g07230.1” (“Valência”), “orange1.1g045966m” (“Pineapple”), “Cg2g040870.1” (*C. maxima*), “Cm249680.1” (*C. medica*) e “MSYJ183900.1” (*C. reticulata*), vemos que “Valência”, “Pineapple”, *C. máxima* e *C. reticulata*, em uma determinada região do alinhamento, são bastante similares, mostrando a presença de uma região conservada na sequência desses genes (Figura 4 - Apêndice).

Neste alinhamento, o gene de *C. medica* apesar de em determinada região se alinhar com *C. máxima* e “Valência” ele não se alinha com as demais variedades.

Tabela 1: Identificação dos genes de “Valência” (*C. sinensis*) e os genes similares das outras variedades de acordo com os resultados da comparação das sequências dos genes de “Valência” com outras variedades; “x” significa que não foi encontrado gene que apresente similaridade com a respectiva sequência do gene de “Valência”.

“Valência”	<i>C. clementina</i>	“Pineapple”	<i>C. Ichangensis</i>	<i>C. maxima</i>	<i>C. medica</i>	<i>C. reticulata</i>
Cs2g07230.1	x	orange1.1g045966m	x	Cg2g040870.1	Cm249680.1	MSYJ183900.1
Cs3g04170.1	Ciclev10017785m	orange1.1g043404m	x	Cg3g004050	Cm257260.1	MSYJ098750.1
Cs3g04230.1	Ciclev10017785m	orange1.1g021595m	x	Cg3g004080.1	Cm257240.1	MSYJ271170.1
Cs3g04260	x	orange1.1g045966m	Ci098410.1	CgUng021700.1	Cm249680.1	MSYJ216420.1
Cs3g04290.1	x	orange1.1g043404m	x	Cg3g004050.1	Cm205460.1	MSYJ216420.2
Cs3g04340.1	Ciclev10017785m	orange1.1g046807m	x	Cg3g004140.1	Cm257260.1	MSYJ054830.1
Cs3g04360.1	Ciclev10017785m	orange1.1g043404m	x	Cg3g004050.1	Cm257260.1	MSYJ098750.1
Cs3g04390.1	Ciclev10017785m	orange1.1g045966m	x	Cg3g004130.1	Cm249680.1	MSYJ216420.1
orange1.1t03904.1	x	orange1.1g043404m	x	Cg3g004050.1	Cm257260.1	MSYJ216420.1
orange1.1t04362.1	x	orange1.1g045966m	x	Cg3g004130.1	Cm249680.1	MSYJ216420.1
orange1.1t04363.1	Ciclev10017785m	orange1.1g045966m	x	CgUng021700.1	Cm249680.1	MSYJ216420.1
orange1.1t04367.1	Ciclev10017785m	orange1.1g021595m	x	Cg3g004140.1	Cm257260.1	MSYJ054830.1
orange1.1t04775.1	Ciclev10017785m	orange1.1g046807m	x	Cg3g004080.1	Cm257260.1	MSYJ216420.2

As sequências dessas proteínas foram encontradas no próprio banco de dados “Citrus Genome”, ou quando não disponível, utilizou-se a ferramenta ExPASy (disponível em: “<https://web.expasy.org/translate/>”), para traduzir a sequência do gene, obtendo-se a sequência proteica. Para o gene de “Valência”, “Cs2g07230.1”, e os genes das outras espécies/variedades similares a ele (Tabela 1), o alinhamento das proteínas expressas por esses genes, seguiram o padrão do alinhamento dos genes, como é possível observar na Figura 5 (Apêndice), onde apenas uma região se alinhou perfeitamente, porém, assim como no alinhamento dos genes, *C. medica*, não se alinhou nesta determinada região.

O alinhamento dos promotores para os genes citados acima, não se assemelhou ao que ocorreu com os genes e as proteínas, apenas as sequências de “Pineapple” e *C. reticulata* apresentam uma maior similaridade (Figura 6, Apêndice).

Também foi realizada uma análise sobre a localização desses genes nos genomas das variedades, buscando-se saber se os genes se encontram em uma mesma região, para isso foi utilizada a ferramenta “JBrowse”, onde os genes próximos ao analisado de “Valência”, tiveram suas sequências comparadas com os genes próximos aos similares a este nas outras variedades. No caso do alinhamento acima, os genes “orange1.1g045966m” (“Pineapple”), “Cg2g040870.1” (*C. maxima*), e “MSYJ183900.1” (*C. reticulata*), se encontram

em uma mesma região genômica que o gene de “Valência” (“Cs2g07230.1”). É possível observar que o único gene que não se encontra na mesma região é o de *C. medica* (“Cm249680.1”), e este foi o gene que não se alinhou corretamente com os outros.

O alinhamento das sequências dos genes “Cs3g04170.1” (“Valência”), “Ciclev10017785m” (*C. clementina*) “orange1.1g043404m” (“Pineapple”), “Cg3g004050” (*C. maxima*), “Cm257260.1” (*C. medica*) e “MSYJ098750.1” (*C. reticulata*), mostrou que as seis sequências se alinham em determinados pontos, inclusive há regiões conservadas entre as variedades, é possível observar que a sequência de *C. clementina* é a que difere um pouco das demais em determinadas regiões do alinhamento (Figura 7, Apêndice). No alinhamento das proteínas (Figura 8, Apêndice), é possível observar também, que a proteína expressa pelo gene de *C. clementina* também difere em pequenos pontos onde ela apresenta aminoácidos diferentes das demais sequências, sendo que novamente temos regiões conservadas entre as seis sequências, porém ao retiramos *C. clementina*, foi possível observar que a região conservada entre as variedades restantes é bem maior. Na questão do alinhamento da região promotora, apenas em alguns pontos, temos “Valência”, “Pineapple” e *C. maxima* mostrando um pouco de similaridade. (Figura 9, Apêndice). O gene de *C. maxima*, “Cg3g004050”, é o único dessas sequências analisadas que se encontra em uma mesma região genômica que o gene de “Valência” (“Cs3g04170.1”).

O alinhamento entre os genes “Cs3g04230.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g021595m” (“Pineapple”), “Cg3g004080.1” (*C. maxima*), “Cm257240.1” (*C. medica*) e “MSYJ271170.1” (*C. reticulata*), mostra regiões de conservação entre as seis variedades no alinhamento das sequências codificadoras (Figura 10, Apêndice), o mesmo ocorreu para o alinhamento das proteínas (Figura 11, Apêndice), porém, é possível observar que *C. clementina* em ambos os casos, tem a sequência mais distinta entre as variedades. Ao continuar analisando os alinhamentos foi possível observar que com a retirada da sequência de “Pineapple”, *C. medica* e *C. clementina*, as três variedades restantes possuem uma região conservada que se destaca no alinhamento. Pode-se se dizer que as proteínas de “Valência”, *C. máxima* e *C. reticulata* são mais semelhantes entre si, afinal possuem uma região conservada que é maior do que aparece no alinhamento com as outras variedades. Já o alinhamento entre as sequências de possíveis regiões promotoras não apresentou resultados significativos, ou seja, não apresentou similaridade entre as sequências (Figura 12, Apêndice). Nenhum dos genes das variedades estão localizados na mesma região que o gene de “Valência”.

No caso do alinhamento entre os genes “Cs3g04260” (“Valência”), “orange1.1g045966m” (“Pineapple”), “Ci098410.1” (*C. ichangensis*), “CgUng021700.1” (*C. maxima*), “Cm249680.1” (*C. medica*) e MSYJ216420.1 (*C. reticulata*), é possível observar as

variedades “Valência”, “Pineapple”, *C. maxima* e *C. reticulata* apresentando similaridade em determinadas regiões do alinhamento das sequências codificadoras (Figura 13, Apêndice), sendo que o mesmo resultado ocorre para o alinhamento das proteínas expressas por esses genes (Figura 14, Apêndice). Ao alinhar apenas as sequências das proteínas de “Valência”, “Pineapple”, *C. maxima* e *C. reticulata* é possível observar uma região conservada entre essas quatro variedades. O alinhamento dos promotores não destaca similaridade entre as sequências (Figura 15, Apêndice), e nenhum dos genes das variedades acima estão localizados em uma mesma região gênica que o gene de “Valência”.

O alinhamento entre os genes “Cs3g04290.1” (“Valência”), “orange1.1g043404m” (“Pineapple”), “Cg3g004050.1” (*C. maxima*), “Cm205460.1” (*C. medica*) e “MSYJ216420.2” (*C. reticulata*), mostra regiões conservadas entre as sequências das cinco variedades, no caso do alinhamento das sequências codificadoras (Figura 16, Apêndice). No alinhamento das proteínas também temos uma pequena região conservada entre as cinco variedades (Figura 17, Apêndice), porém essa região conservada se torna maior quando retiramos *C. medica* do alinhamento, ou seja, as outras quatro variedades são mais similares entre si. No caso da sequência promotora (Figura 18, Apêndice), temos aqui uma pequena região em que “Pineapple”, *C. maxima* e *C. reticulata* apresentam similaridade, no restante do alinhamento, vemos que as variedades não se alinham corretamente. Sobre a questão de localidade nos genomas, nenhum dos genes das outras variedades estão localizados em uma mesma região que o gene de “Valência”.

O alinhamento entre as sequências codificadoras dos genes “Cs3g04340.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g046807m” (“Pineapple”), “Cg3g004140.1” (*C. maxima*), “Cm257260.1” (*C. medica*) e “MSYJ054830.1” (*C. reticulata*) (Figura 19, Apêndice) mostra a presença de regiões conservadas entre as seis sequências. O alinhamento das sequências de proteínas desses genes (Figura 20, Apêndice), também mostra regiões conservadas entre as seis variedades, ao analisar mais profundamente essas sequências, foi possível observar que retirando a sequência, de *C. clementina*, temos uma região conservada maior, e se mantermos somente “Valência” e *C. maxima* no alinhamento, vemos que as sequências de ambos são quase totalmente idênticas, havendo uma região conservada ainda maior abrangendo quase que totalmente as sequências. No alinhamento das possíveis sequências promotoras (Figura 21, Apêndice), temos uma maior relação entre “Valência” e *C. maxima*, que demonstram semelhança em alguns pontos do alinhamento. Os genes das variedades citados acima não se encontram em uma mesma região gênica que o gene da variedade “Valência”.

Na Figura 22 (Apêndice) temos o alinhamento entre as sequências codificadoras dos genes “Cs3g04360.1” (“Valência”), “Ciclev10017785m” (*C. clementina*),

“orange1.1g043404m” (“Pineapple”), “Cg3g004050.1” (“*C. maxima*”), “Cm257260.1”, (*C. medica*) e “MSYJ098750.1” (*C. reticulata*), há alguns pontos em que as seis variedades apresentam similaridade, há a presença de regiões conservadas entre as sequências. No alinhamento das sequências de proteínas desses genes (Figura 23, Apêndice), também temos regiões conservadas para as seis sequências, porém alinhando-se somente “Valência”, “Pineapple”, *C. maxima* e *C. reticulata*, temos como resultado uma região conservada maior, indicando que as proteínas dessas quatro variedades são mais semelhantes entre si do que com as outras duas variedades (*C. clementina* e *C. medica*). No caso das sequências promotoras, temos “Valência”, “Pineapple” e *C. maxima*, apresentando similaridade (Figura 24, Apêndice). Esses genes não se encontram em uma mesma região gênica que o gene de “Valência”, de acordo com a análise realizada.

O alinhamento das sequências codificadoras dos genes “Cs3g04390.1” (“Valencia”), “Ciclev10017785m” (*C. clementina*), “orange1.1g045966m” (“Pineapple”), “Cg3g004130.1” (*C. máxima*), “Cm249680.1” (*C. medica*) e “MSYJ216420.1” (*C. reticulata*) (Figura 25, Apêndice), mostra “Valência”, *C. maxima* e *C. reticulata* e “Pineapple” com regiões similares entre si, enquanto “*C. clementina* e *C. medica*”, são as que mais diferem, não há a presença de regiões conservadas entre as seis variedades. No caso do alinhamento das sequências de proteínas desses genes (Figura 26, Apêndice), temos “Valência”, *C. maxima* e *C. reticulata* apresentando similaridade, um alinhamento realizado apenas com essas três variedades resultou na presença de uma grande região de conservação nas sequências de proteínas. O alinhamento das sequências promotora não apresenta similaridades (Figura 27, Apêndice), e apenas o gene de *C. medica*, “Cm249680.1”, se encontra em uma mesma região do genoma que o gene de “Valência” (“Cs3g04390.1”).

O alinhamento entre os genes “orange1.1t03904.1” (“Valência”), “orange1.1g043404m” (“Pineapple”), “Cg3g004050.1” (*C. maxima*), “Cm257260.1” (*C. medica*), “MSYJ216420.1” (*C. reticulata*) mostra que há similaridade entre as cinco sequências, no caso do alinhamento das sequências codificadoras (Figura 28, Apêndice). Também há similaridade entre as cinco sequências em uma região do alinhamento da sequência de proteínas expressas por esses genes (Figura 29, Apêndice). No alinhamento das sequências promotoras há regiões similares entre “Pineapple” e *C. maxima* (Figura 30, Apêndice), e não temos genes de outras variedades localizados em uma mesma região que o gene de “Valência” utilizado nesta análise.

O alinhamento entre as sequências codificadoras dos genes “orange1.1t04362.1” (“Valência”), “orange1.1g045966m” (“Pineapple”), “Cg3g004130.1” (*C. maxima*), “Cm249680.1” (*C. medica*) “MSYJ216420.1” (*C. reticulata*) (Figura 31, Apêndice) mostra que há similaridade entre *C. medica*, *C. máxima* e *C. reticulata* no início das sequências, já no final

das sequências ocorre similaridade entre todas as variedades exceto *C. medica*. No caso do alinhamento das sequências de proteínas (Figura 32, Apêndice), temos similaridade entre “Valência”, *C. máxima*, *C. reticulata* e “Pineapple”, inclusive há regiões conservadas quando alinhamos essas quatro variedades. O alinhamento dos promotores não apresenta similaridade significativa (Figura 33, Apêndice). E dos genes analisados somente o gene de *C. medica* (“Cm249680.1”) se encontra localizado em uma mesma posição genômica que o gene de “Valência” (“orange1.1t04362.1”).

O alinhamento entre as sequências codificadoras dos genes “orange1.1t04363.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g045966m” (“Pineapple”), “CgUng021700.1” (*C. maxima*), “Cm249680.1” (*C. medica*), “MSYJ216420.1” (*C. reticulata*) (Figura 34, Apêndice), mostra similaridade entre “Valência”, “Pineapple”, *C. maxima* e *C. reticulata* não havendo regiões conservadas no alinhamento. Quanto às sequências de proteínas desses genes, inicialmente o alinhamento não apresentou regiões conservadas (Figura 35, Apêndice), foi possível observar que retirando a sequência de *C. clementina* e *C. medica* as outras quatro sequências se alinham mostrando regiões conservadas. No alinhamento das sequências dos promotores não há regiões conservadas (Figura 36, Apêndice). Os genes “CgUng021700.1” (*C. maxima*) e “Cm249680.1” (*C. medica*), se encontram em uma mesma região que o gene de “Valência”, “orange1.1t04363.1”.

Na figura 37 (Apêndice), temos o alinhamento das sequências codificadoras dos genes “orange1.1t04367.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g021595m” (“Pineapple”), “Cg3g004140.1” (*C. maxima*), “Cm257260.1” (*C. medica*), “MSYJ054830.1” (*C. reticulata*) mostrando regiões conservadas. No caso do alinhamento das proteínas desses genes também há pontos conservados entre as seis sequências (Figura 38, Apêndice), porém, se alinharmos somente “Valência” e *C. maxima*, vemos que ambas as sequências são bastantes parecidas, com uma região conservada entre si maior que a vista no alinhamento com as seis sequências. Novamente as sequências promotores dos genes citados não apresentou regiões conservadas nem mesmo indicativos de similaridade (Figura 39, Apêndice). O gene “Cm257260.1” (*C. medica*), se encontra em uma mesma região gênica que o gene “orange1.1t04367.1” de “Valência”.

O alinhamento entre as sequências codificadoras dos genes “orange1.1t04775.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g046807m” (“Pineapple”), “Cg3g004080.1” (*C. maxima*), “Cm257260.1” (*C. medica*) e “MSYJ216420.2” (*C. reticulata*) (Figura 40, Apêndice), mostra regiões conservadas entre as seis sequências. O mesmo resultado foi mostrado com o alinhamento das proteínas desses genes (Figura 41, Apêndice). Enquanto no alinhamento das sequências promotoras é possível visualizar alguma

similaridade entre *C. maxima* e *C. reticulata*, mas não há regiões conservadas entre as seis variedades (Figura 42, Apêndice). Os genes não se encontram em uma mesma região gênica.

Todos esses resultados de alinhamentos serviram para se ter uma ideia inicial da semelhança real entre as sequências, vemos que há regiões conservadas em diversos dos alinhamentos acima, que implica que as variedades possuem relações filogenéticas, o que é esperado já que todas pertencem ao mesmo gênero. Em nenhum momento, as sequências foram 100% idênticas, o que se mostra um resultado interessante, afinal estudos já comprovaram que variedades/espécies diferentes possuem quantidades diferentes de limoneno em seus óleos essenciais (DOSOKY; SETZER, 2018), e aqui estamos analisando que tal fato pode estar relacionado com a sequências dos genes responsáveis pela produção de limoneno. Não somente pelos genes, mas também pela expressão deles talvez, por isso o interesse em alinhar também as regiões promotoras, observar se as sequências são similares ou não nessas regiões.

É possível observar nos alinhamentos citados acima que temos uma relação de similaridade entre “Valência”, *C. maxima* e *C. reticulata* na maioria dos alinhamentos, um resultado interessante já que a “Valência” (*C. sinensis*) é um híbrido entre *C. maxima*, *C. reticulata* e uma espécie desconhecida de citros (XU et al., 2013), então, na verdade, o resultado confirma esse fato.

Outra relação que temos é entre “Valência” e “Pineapple” ambas são laranjas doces, ou seja, são da mesma espécie, mas de variedades diferentes, então é esperado uma semelhança genética entre as duas, o que realmente ocorre. Há similaridade entre ambas em quase todos os alinhamentos, mas sempre elas possuem pequenas diferenças nas sequências, ou seja, para as sequências analisadas é possível observar as pequenas diferenças que ocorrem entre essas variedades. Vale lembrar que as regiões conservadas geralmente destacam regiões de sequências de DNA que codificam éxons funcionalmente, e no caso das sequências de proteínas resíduos críticos para que a proteína exerça sua função.

Como inicialmente foi realizada uma busca das sequências de genes relacionados com limoneno sintases de variedades de citros através das sequências dos genes de “Valência”, resolvemos realizar o mesmo procedimento com as sequências das proteínas expressas por esses genes de “Valência”.

É possível observar na tabela 2, que o resultado da busca de sequências de proteínas similares as encontradas em “Valência” relacionadas com os genes de limoneno sintases, apresentou alguns resultados diferentes de quando a busca foi realizada utilizando as sequências dos genes (Tabela 1). Podemos destacar os genes de *C. ichangensis*, que na primeira busca foi encontrado apenas um gene “Ci098410.1”, que apresentou similaridade ao gene “Cs3g04260” de Valência, enquanto na busca com a sequências de proteínas temos

diversos resultados para *C. ichangensis*. Analisando os resultados da busca de sequências, é possível observar que nenhuma das proteínas desses genes de *C. ichangensis*, apresentou mais identidade com as respectivas proteínas de “Valência”. As proteínas mais similares entre essas duas variedades “Cs2g07230.1” (“Valência”) e “Ci129610.1” (*C. ichangensis*) apresentaram apenas 48,74% de similaridade (Tabela 3).

Tabela 2: Identificação dos genes de “Valência” (*C. sinensis*) e os genes similares das outras variedades de acordo com os resultados do BLASTp das sequências das proteínas expressas pelos genes de “Valência”; “x” significa que não foi encontrada sequência que apresente similaridade com a respectiva sequência de “Valência”.

“Valência”	<i>C. clementina</i>	“Pineapple”	<i>C. ichangensis</i>	<i>C. maxima</i>	<i>C. medica</i>	<i>C. reticulata</i>
Cs2g07230.1	Ciclev10017785m	orange1.1g045966m	Ci129610.1	Cg3g004090.1	Cm107390.1	MSYJ271140.1
Cs3g04170.1	Ciclev10014790m	orange1.1g043404m	Ci165940.1	Cg3g004050.1	Cm126620.1	MSYJ271160.1
Cs3g04230.1	Ciclev10014790m	orange1.1g038218m	Ci288630	CgUng021700.1	Cm205460.1	MSYJ098750.1
Cs3g04260	Ciclev10014790m	orange1.1g045966m	Ci129610.1	CgUng021700.1	Cm028750.1	MSYJ216420.1
Cs3g04290.1	Ciclev10014633m	orange1.1g043404m	Ci165940.1	Cg5g027780.1	Cm285480.1	MSYJ172960.1
Cs3g04340.1	Ciclev10014790m	orange1.1g043404m	Ci165940.1	Cg3g004140.1	Cm249680.1	MSYJ271170.1
Cs3g04360.1	Ciclev10014790m	orange1.1g043404m	Ci165940.1	Cg3g004050.1	Cm257260.1	MSYJ271140.1
Cs3g04390.1	Ciclev10014790m	orange1.1g040856m	Ci165940.1	Cg3g004130.1	Cm178790.1	MSYJ216420.1
orange1.1t03904.1	Ciclev10014790m	orange1.1g021595m	Ci165890.1	Cg3g004050.1	Cm257260.1	MSYJ271140.1
orange1.1t04362.1	x	orange1.1g045966m	x	Cg3g004090.1	Cm249680.1	MSYJ014280.1
orange1.1t04363.1	Ciclev10014790m	orange1.1g040856m	Ci176760.1	Cg3g004130.1	Cm178790.1	MSYJ216420.1
orange1.1t04367.1	Ciclev10017785m	orange1.1g043404m	Ci288630.1	CgUng019540.1	Cm257260.1	MSYJ172940.1
orange1.1t04775.1	Ciclev10014790m	orange1.1g043404m	Ci288600.1	Cg3g004050.1	Cm257260.1	MSYJ216420.1

Analisando as sequências encontradas para *C. clementina* nessa segunda busca, vemos que a sequência de proteína de *C. clementina* mais similar com a de “Valência”, apresentou apenas 63,16% de identidade. Já para as espécies/variedade restantes, temos similaridade mais alta. Para “Pineapple” as sequências de proteínas tiveram identidade com as de “Valência” variando de 66,32% a 99,31%; *C. maxima* de 39,8% a 99,38%; *C. medica* de 34,55% a 97,67% e por fim, *C. reticulata* 63,57% a 96,38% (Tabela 3).

Observando esses resultados vemos novamente que “Valência” apresenta maior similaridade com a variedade “Pineapple”, e as espécies *C. maxima* e *C. reticulata*, na maioria dos casos, exatamente como aconteceu nos resultados anteriores.

Em virtude dessa divergência entre a busca com sequências de gene e a busca com sequências de proteínas, tendo em vista que as sequências de proteínas são mais conservadas que as sequências de genes, foi realizado um alinhamento múltiplo entre todas as sequências de proteínas obtidas durante esse estudo, a Figura 15 mostra a árvore filogenética resultante desse alinhamento. O intuito desse alinhamento foi analisar quais genes de quais variedades realmente são mais semelhantes entre si.

Tabela 3: Porcentagem de identidade das sequências de proteínas das variedades de citros analisadas, com as sequências de “Valência”; “x” significa que não foi encontrada sequência que apresente similaridade com a respectiva sequência de “Valência”.

“Valência”	<i>C. clementina</i>	“Pineapple”	<i>C. ichangensis</i>	<i>C. maxima</i>	<i>C. medica</i>	<i>C. reticulata</i>
Cs2g07230.1	47,06 %	99,31%	48,74%	81,38%	42,4%	81,51%
Cs3g04170.1	43,55%	87,32%	37,77%	89,18%	70,94%	96,38%
Cs3g04230.1	52,59%	71,94%	42,72%	83,6%	37,12%	70,42%
Cs3g04260	39,58%	79,63%	39,8%	39,8%	94,95%	95,8%
Cs3g04290.1	63,16%	83,33%	47,06%	77,36%	63,16%	77,36%
Cs3g04340.1	39,63%	73,74%	34,82%	88,29%	80,25%	87,42%
Cs3g04360.1	43,95%	89,23%	37,12%	88,2%	88,79%	95,07%
Cs3g04390.1	41,06%	68,67%	34,32%	99,38%	34,55%	94,74%
orange1.1t03904.1	38,67%	76,16%	37,7%	77,52%	79,08%	78,38%
orange1.1t04362.1	x	76,92%	x	80,77%	61,76%	82,05%
orange1.1t04363.1	39,49%	66,32%	35,5%	86,46%	35,11%	86,46%
orange1.1t04367.1	44,10%	63,16%	43,01%	69,82%	92,54%	63,57%
orange1.1t04775.1	41,74%	78,69%	44,14%	86,26%	97,67%	92,2%

Com a análise da árvore filogenética (Figura 15), foi possível observar que em alguns casos temos a confirmação da similaridade que ocorreu nos alinhamentos citados acima. Temos genes de “Valência” e *C. maxima* “Cs3g04340.1” e “Cg3g004140.1”; “Cs3g04390.1” e “Cg3g004130.1”; “orange1.1t03904.1” e “Cg3g004050.1”. Temos também “orange1.1t04362.1” (“Valência”) e “Cm249680.1” (*C. medica*); “Cs3g04230.1” (“Valência”) e “MSYJ271170.1” (*C. reticulata*); “Cm178790.1” (*C. medica*) e “Ci176760.1” (*C. ichangensis*); “Ci165940.1” (*C. ichangensis*) e “Ciclev10014633m” (*C. clementina*); “Ci129610.1” (*C. ichangensis*) e “Ciclev10017785m” (*C. clementina*); “MSYJ183900.1” (*C. reticulata*) e “Cg2g040870.1” (*C. maxima*). Pode-se dizer que esses pares de gene citados por estarem próximos dentro de um mesmo clado, apresentam uma similaridade alta, com destaques para os genes de “Valência” e *C. maxima* que já foram citados nos alinhamentos por sua similaridade.

Alquézar et al., (2017) fizeram um amplo estudo sobre a família terpeno sintase (TPS) em uma variedade cítrica, e em seus resultados observou que se tratava de uma das maiores famílias de TPS de angiospermas caracterizadas até o momento, formada por 95 *loci* a partir dos quais apenas 55 codificam para TPSs funcionais. Todas as famílias de TPS das angiospermas, TPS-a, TPS-b, TPS-c, TPS-e / f e TPS-g foram representadas no genoma da laranja doce, no caso desse estudo a variedade “Pineapple” foi utilizada, com 28, 18, 2, 2 e 5 genes putativos de cada família citada respectivamente. Além disso, a β -farneseno sintase de laranja doce, (Z) - β -cubebeno / α -copaeno sintase, duas β -cariofileno sintase e três enzimas

multiprodutos que produzem β -cadineno / α -copaeno, β -elemeno e β -cadineno / o ledeno / alo-aromandendreno como principais produtos foram identificados e caracterizados funcionalmente por ensaios in vivo de *Escherichia coli* recombinante. O autor também buscou genes relacionados com TPS nos bancos de dados de outras variedades, para estudar a filogenia e os motivos conservados das proteínas relacionadas, e falou a respeito da similaridade que há entre esses genes dentro das variedades, um exemplo, foi ao analisar a atividade de D – limoneno sintase presentes nos genes Cs3g04170 e Cs3g04360 (“Valência”), que foi semelhante as atividades de enzimas encontradas em *C. sinensis* (“Pineapple”), *C. limon* e *C. unshiu* e altamente idênticas a elas (> 94% de RRX8W (região conservada conhecida em TPS) e > 99% entre motivos conservados). Também foi encontrado um segundo cluster de D-limoneno sintase, incluindo uma proteína de *C. unshiu* e outra putativa D-limoneno sintase da laranja doce “Valência” (Cs3g04340).

É possível observar que a similaridade entre sequências de TPS é algo comum, porém, mesmo com uma alta similaridade de sequência encontrada entre muitas TPSs, a mutação sustentada ao longo do tempo e a natureza promíscua das TPSs (ou seja, muitos produtos produzidos a partir de um mesmo substrato) podem ser suficiente para gerar a alta diversidade química dos produtos de terpenóides (PICHERSKY; GANG, 2000).

Quando levamos em conta as comparações presentes neste trabalho, vemos que há diferenças entre as espécies/variedades, porém com alta similaridade entre algumas delas. O objetivo principal do trabalho que era o de avaliar diferenças entre as variedades, foi concluído, através da comparação das estruturas genômicas entre as variedades foi possível encontrar diferenças e semelhanças entre elas. Porém com a comparação dos promotores não foi possível avaliar realmente o que acontece, a análise da região promotora não mostrou as semelhanças encontradas na análise de sequências gênicas e protéicas. Tal falta de similaridade entre essas regiões promotoras pode estar relacionada com a questão da regulação desses genes, temos casos de genes que apresentam grande similaridade nos alinhamentos citados nesse trabalho, porém mesmo com essa grande semelhança entre as sequências gênicas, as sequências promotoras diferem entre eles, o que pode ser o resultado que esperava-se, essas diferenças entre os promotores pode explicar a diferença de limoneno sintases entre espécies e variedade de citros. Porém, há a necessidade de um estudo mais aprofundado com tais regiões promotoras, para resultados com melhor clareza, afinal a análise computacional de promotores eucarióticos é um dos problemas mais difíceis na genômica computacional (ZHANG, 2007).

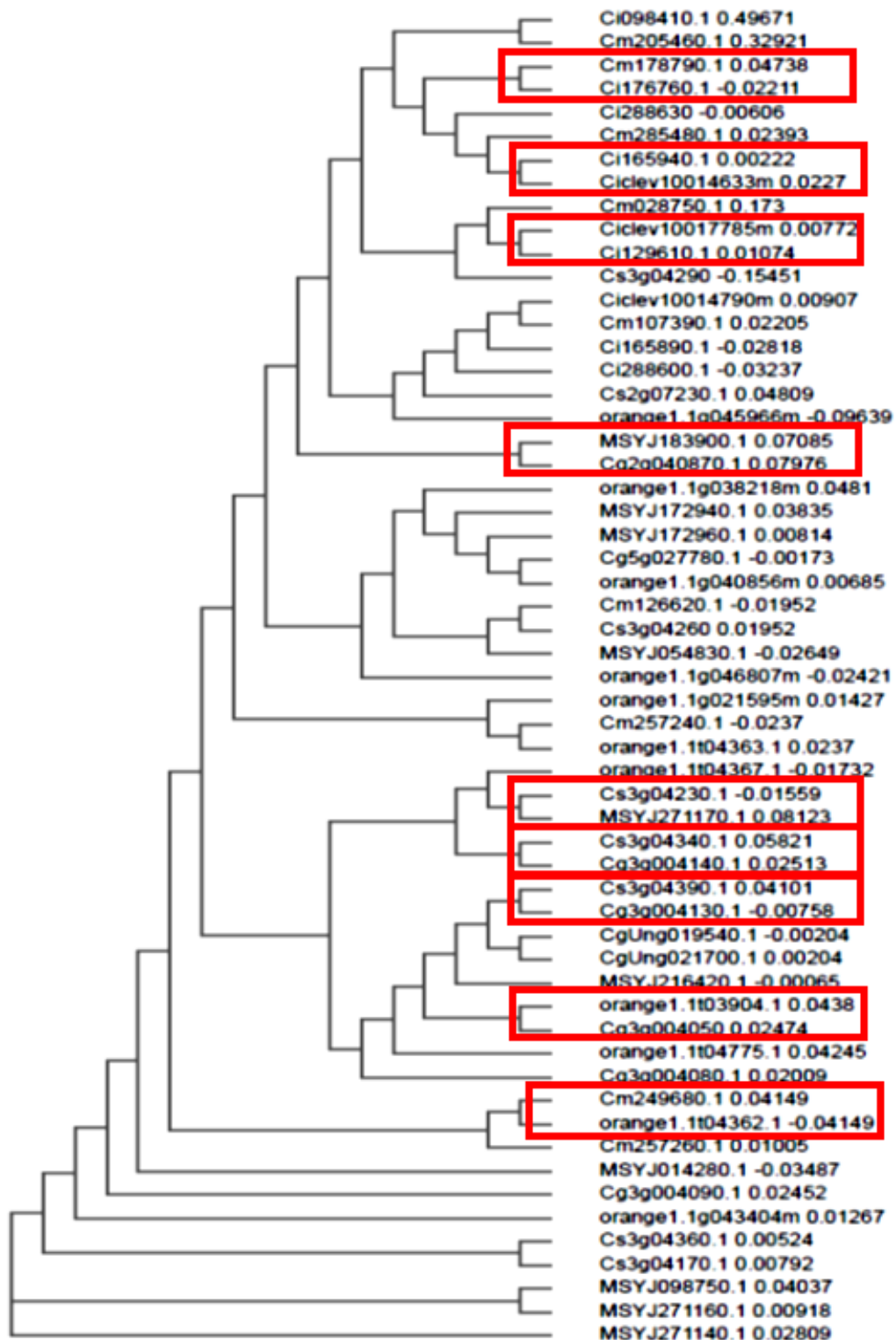


Figura 41: Árvore filogenética resultante de um alinhamento múltiplo entre todas as seqüências de proteínas obtidas durante a pesquisa.

6. CONCLUSÕES

Há diferenças na constituição genética e proteica das sequências de limoneno sintases das variedades de citros analisadas, o alinhamento das sequências mostrou-se uma ferramenta poderosa para observarmos tal aspecto entre as variedades.

Existem grandes semelhanças entre determinadas sequências de proteínas e genes em variedades específicas, mas não são exatamente todos os genes destas espécies/variedades que se assemelham, portanto, a diferença de concentrações de limoneno nos óleos essenciais de diferentes variedades de citros que os estudos apontam, pode estar relacionada às questões genéticas, mais especificamente às diferenças que vimos entre as sequências de gene e proteínas.

A análise da região de 1 kb próxima ao início dos genes de limoneno sintase não resultou nos mesmos padrões de similaridade encontrado nas análises de genes e proteínas, sugerindo que uma análise mais profunda de sequência para resolver essa hipótese. Entretanto, análises de regiões promotoras não são triviais.

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APÊNDICE

Medica	ATGCTCTCTTGCAATTAATCCCTCAACCTTGGTTACCTCTGATGAAGCATACAAAAGACGA	60
Maxima	-----	0
Reticulata	ATGCTCTCTTGCAACCATCCCATCAGTCTTCACTACTTGTTTAAATGGTTTCAAGTGCCT	60
Valencia	-----	0
Pineapple	-----	0
Medica	GCA-----GAAGAGCTGAGGGGAAAAGTGAAGATAGCGAT	95
Maxima	-----	0
Reticulata	CCACTACTTCCCACAAATAGAGCAACCATCAGAGTGAATGAATACAGGCCAGTCTGCGCC	120
Valencia	-----	0
Pineapple	-----	0
Medica	TAAGGATGTAATCGAGCCTCTGGATCAGTTGGAGCTGATTGATAACTGCAAAGACTTGG	155
Maxima	-----	0
Reticulata	CAGCTTGGTAATCCAACAATTGCTAGAAGATCAGCA---AGCTACCCATCTTCAATTTGG	177
Valencia	-----	0
Pineapple	-----	0
Medica	AT--TGGCTCATCGTTTTGAGACTGAGATTAGGAACATATTGAATAATATCTACAACAAT	213
Maxima	-----	0
Reticulata	GATCATGACTTTCTGCACTCGTTGGAGATAAGGAACATATTGCACAATAT---CTACAAT	234
Valencia	-----	0
Pineapple	-----	0
Medica	AATAAAGATTATAAATTGGAGAAAAGAAAATCTGTATGCAACCTCCCTTGAGTTCAGACTA	273
Maxima	-----	0
Reticulata	AATGAAGATGACAAATGGAAAGAAAAGAAAATCTATATGCAACCTCTCTGGAATTTAGACTC	294
Valencia	-----	0
Pineapple	-----	0
Medica	CTTAGACAACATGGCTATCCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGACCAG	333
Maxima	-----ATG	3
Reticulata	CTCAGGCAACATGGTTATCATGTTTCCCAAGAGGTCTTAATAGTATTAAGACAAGATG	354
Valencia	-----	0
Pineapple	-----	0

Figura 4 – Alinhamento das sequencias codificadoras dos genes “Cs2g07230.1” (“Valência”), “orange1.1g045966m” (“Pineapple”), “Cg2g040870.1” (*C. maxima*), “Cm249680.1” (*C. medica*) e “MSYJ183900.1” (*C. reticulata*).

Medica	GGAGGCTTCATTTGTGATGATTTCAAGGGAATACTGAGCTTGCATGAAGCTTCGTATTAC	393
Maxima	GGTGGTTGGATTGGTGACGAATTCAAGGGAATGCTGAGCTTGACGAAGCCTCATATTAC	63
Reticulata	GGTGGTTGGATTGGTGACGATTTCAAGGGAATGCTGAGCTTGACGAAGCCTCATATTAC	414
Valencia	-----	0
Pineapple	-----	0
Medica	AGCTTAGAAGGAGAAAGCATCATGGAGGAGGCCTGGCAATTTACTAGTAAACATCTTAAA	453
Maxima	AGCCTAGAAGGAGAAAGCATCATGGAGGAGGCCTGGCAATTCACCAGTAAACATCTTAAA	123
Reticulata	AGCCTAGAAGGAGAAAGCATCATGGAGGAGGCCTGGCAATTCACCAGTAAACATCTTAAA	474
Valencia	-----	0
Pineapple	-----	0
Medica	GAAGTGATGATCAGCAAGAACATGGAAGAGGATGTATTTGTAGCAGAACAAGCGAAGCGT	513
Maxima	GAAGTGACGATGGGCAA-----GGATGTATTCGTAGCAGAGCAAGCGAGGCGT	171
Reticulata	GAAGTGACGATGAGCAA-----GGATGTATTCGTAGCAGAGCAAGCGAAGGCGT	522
Valencia	-----	0
Pineapple	-----	0
Medica	GCACTGGAGCTCCCTCTGCATTGGAAAAGTGCCAAATGTTAGAGGCAAGGTGGTTCATACAC	573
Maxima	GCCTTGGAGCTCCGTTTGCATTGGAGAGTGGCAAGGCTAGAGGCAAGGTGGTTCGTAGAT	231
Reticulata	GCCTTGGTGCCTCCCTTGCATTGGAGAGTGGCAAGGCTAGAGGCAAGGTGGTGGAAAGGAC	582
Valencia	-----	0
Pineapple	-----	0
Medica	ATTTATGAGAGAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGAT-----	626
Maxima	GCATATGAGGAAAAGAAAGGACAAGAACCCTTACT-----	269
Reticulata	AAAGGTCTTGGGGAGAAATTGAGCTTTGCCAGGAGCAGGTTGGTAGCATCCTTCTTATGG	642
Valencia	-----ATGTCCTTCTGCACCATCCCATCAGCCTTCACTACTTGT	39
Pineapple	-----	0
Medica	-----GGAGTTTAACTTTGC--AGGCAATTTACCAG----GAAGAAC	664
Maxima	-GGACCTAGCTAAGTTGGACTTCAACATTTCTGC--AGGCAATATACCAG---GAAGAAC	322
Reticulata	GGCATGGGGATAGCGTTTGGCCCTCAATTCGCCTACTGCAGGAGAGTACTACAATCAGC	702
Valencia	TAAATGGTTTCAAGTGTCTCCACTACTTTCC--ACAAATAGAGCAA--CCATCAGA	93
Pineapple	-----	0
Medica	TAAAGAA-ATTC-----	677
Maxima	TTAAGGATATTTCA-----TGGTGGTGGATGTGGCTGGGCAT	359
Reticulata	GTAGCACTAATTACTGTAATTGATGACATTTATGATGCTTTGGAACATTTGGATGAACCT	762
Valencia	GT--GAATGAATACAGGCCAGTCTGCGCCAGCTTGGTAATCCAACAATTTGTAGAAAAAT	151
Pineapple	-----	0
Medica	-----AGGGTGGGACATCAATTATGCTTTGAAGCACCTT	711
Maxima	AATACGAGCCTACTTGGTGGAGGC--CAAATGGTACAACA-----GTAAGTA	404
Reticulata	GAGCAATTCATTGATGATGCCGTCGAGAGGTGGGACATCAATTATGCTATGGACCAGCTT	822
Valencia	CAGCAAGCTACCCATCTTCAATTTGGGATC-----ATGA-CTTCTGCAGTCGTTGGGT	204
Pineapple	-----	0
Medica	CCGGCTATATGAAAATGTGTTTTCTTGCCTTTACAACCTTTGTTAATGAATTTGCTTAT	771
Maxima	CACGCCAACACTGGAAGA-----GTACTTAAACAATGGGGTGGT-----	443
Reticulata	CCGGACTATATGAAAATATGTTTTTTTGTGCTTTACAATTTGTTAATGAATTTCTTAT	882
Valencia	AGCGGCTACACGGAGCTGGAATTTCTAGAAAAGTAACAATATCCAGATATAATTTCA----	260
Pineapple	-----AAGGAGCTGGAATTTCTAGAAAAGTAACAATATCCAGATATAATTTCA----	47
	* * * * *	
Medica	TACGTTCTCAAACAACAGGATTTTGTATTTGCTTCTGAGCATAAAAAATGCACCCATTCCC	831
Maxima	ATCAATAGCAGGCCCTAT-----AATGACAATT-A-----	472
Reticulata	CACATTTTCAAACAACAGGATTC-ATATAAGCTTC-CGAGTATTAATAATGCAGATGAG-	939
Valencia	---ATGGTCATCCAAGATTTTCCGCTTCAAGATG-ATTTGGGAACCTCAACGGATGAA-	315
Pineapple	---ATGGTCATCCAAGATTTTCCGCTTCAAGATG-ATTTGGGAACCTCAAC-GATGAA-	101
	** * *	
Medica	TTGGAGGACAACACATGGCTTTACAGCATCTCCTGGCACCAAAGGCTGA-----	882
Maxima	----GTGC---ATACCTTGTGCTA-CAAATCCAATCATAGAGAAGGAGCTGGAAATTTCT	524
Reticulata	TTAAAGAG---AGGGGATGCTTCGA-AATCAATCCAGTGTATATGCATGAAACTGGTGT	995
Valencia	TTAAAGAG---AGGGGATGTTTGA-AATCAATCCAGTGTATATGCATGAAACTGGTGT	371
Pineapple	TTAAAGAG---AGGGGATGTTTGA-AATCAATCCAGTGTATATGCATGAAACTGGTGT	157
	* * * * *	
Medica	-----	882
Maxima	AGAAAAGGAACCTGCTCGTGAACACATAAAGGATTTGATGAGACAGATGTGGAAGAAGGT	584
Reticulata	CTCAGAGGAACCTGCTCGTGAACACATAAAGGATTTGATGAGACAGATGTGGAAGAAGGT	1055
Valencia	CTCAGAGGAACCTGCTCGTGAACACATAAAGGATTTGATGAGACAGATGTGGAAGAAGGT	431
Pineapple	CTCAGAGGAACCTGCTCGTGAACACATAAAGGATTTGATGAGACAGATGTGGAAGAAGGT	217

Figura 4 – Continuação.

Medica	-----	882
Maxima	GAATGCATACAGAGCTAATAAAGATTCTCCTTTATCTCAAACACAGCTGACTTCATGTT	644
Reticulata	GAATGCATACAGAGCTAATAAAGATTCTCCTTTATCTCAAACACAGCTGACTTCATGTT	1115
Valencia	GAATGCATACAGAGCTAATAAAGATTCTCCTTTATCTCAAACACAGCTGACTTCATGTT	491
Pineapple	GAATGCATACAGAGCTAATAAAGATTCTCCTTTATCTCAAACACAGCTGACTTCATGTT	277
Medica	-----	882
Maxima	GAATCTGGTGAGAGCGTCCCATTTTATGTATCTACATGGAGATGGGCATGGTGTTCAAAA	704
Reticulata	GAATCTGGTGAGAGCGTCCCATTTTATGTATCTACATGGAGATGGGCATGGTGTTCAAAA	1175
Valencia	GAATCTGGTGAGAGCGTCCCATTTTATGTATCTACATGGAGATGGGCATGGTGTTCAAAA	551
Pineapple	GAATCTGGTGAGAGCGTCCCATTTTATGTATCTACATGGAGATGGGCATGGTGTTCAAAA	337
Medica	-----	882
Maxima	CCAGGAGACTATGGACGTAGCGTTTCTGCGTTTACATTGCTTTTTCGGCCCATTCCTTG	764
Reticulata	CCAGGAGACTATGGACGTAGCG-----TTTACATTGCTTTTTCGGCCCATTCCTTG	1227
Valencia	CCAGGAGACTATGGACGTAGCG-----TTTACATTGCTTTTTCGGCCCATTCCTTG	603
Pineapple	CCAGGAGACTATGGACGTAGCG-----TTTACATTGCTTTTTCGGCCCATTCCTTG	389
Medica	-----	882
Maxima	GAGGACGAAGACATGGTTTTACACCATCTCTCGGCACCAAGGCTGATGATGCTTAA	822
Reticulata	GAGGACGAAGACATGGTTTTACACCATCTCTCGGTACCAAGGCTGA-----	1275
Valencia	GAGGACGAAGACATGGTTTTACACCATCTCTCGGTACCAAGGCTGA-----	651
Pineapple	GAGGACGAAGACATGGTTTTACACCATCTCTCGGTACCAAGGCTG-----	436

Figura 4 – Fim.

Medica	MSSCINPSTLVTSDEAYKRAAEELRGKVKIAIKDVIPLDQLE---LIDN---LQR--LG	52
Maxima	-----	0
Reticulata	MSSCTIPSVFTTCLNGFKCPPLLPTNRATIRVNEYRPVCAQLGNPTIARRSASYSSSIWD	60
Valencia	MSSCTIPSAFTTCLNGFKCPPLLSTNRATIRVNEYRPVCAQLGNPTIVRKSASYSSSIWD	60
Pineapple	-----	0
Medica	LAHRFETEIRNINLNNIYNNKDYNRKENLYATSLEFRLLRQHGYPVSQEVFNGFKDDQG	112
Maxima	-----MG	2
Reticulata	HDFLHSLERINLHNIYNN-EDDKWKKENLYATSLEFRLLRQHGYHVSQEVFNSIKDKMG	119
Valencia	HDFLQSLGSGYTELE-----F--L-----	77
Pineapple	-----KELE-----F--L-----	6
Medica	GFICDDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEVMISKMEEDVFVAEQAKRA	172
Maxima	GWIGDEFKGMLSLYEASYSLLEGESIMEEAWQFTSKHLKEVTM----GKDVFAEQARRA	58
Reticulata	GWIGDDFKGMLSLYEASYSLLEGESIMEEAWQFTSKHLKEVTM----SKDVFAEQARRA	175
Valencia	-----ESNN-----I-----	82
Pineapple	-----ESNN-----I-----	11
	*.:. :	
Medica	LELPLHWKVPMLERWFIHIYERREDKNHLLLELAKMEF-----	211
Maxima	LELRLHWRVARLEARWFDAYEERKDKNPLLLDLAK-----LDF-----	97
Reticulata	LVLPLHWRVARLEARWVKDKGLGEKLSFARSRLVASFLWGMGIAFEPQFAYCRRVLTITV	235
Valencia	-PDIIQW-----S-----	89
Pineapple	-PDIIQW-----S-----	18
	..*	
Medica	---NTLQAIYQE-----ELKEISGWDINYALKHLPGYMKMCFALYNFVNEFAYY	258
Maxima	---NILQAIYQE-----E----L-KDISWMMWLG--IIRAYLVE-----AKWYN---SK	134
Reticulata	ALITVIDDIYDVFGLDELEQFIDDAVERWDINYAMDQLPDYMKICFFVLYNFVNEFPYH	295
Valencia	-----SK	91
Pineapple	-----SK	20
Medica	VLKQQDFDLLLSIKNAPIP-LEDKHAFTASPGT-----KG-----	293
Maxima	YTPTLEEYLT----NGVVSIAGPIMTISAYLAATNPIIEKELEFLEKELAREHIKDLMR	189
Reticulata	IFKQQDSYKLPISIKNADELKRGDASKSIQCYMH-----ETGVSEELAREHIKDLMR	346
Valencia	IFRLQDD----LGTSTDELKRGDVWKSIIQCYMH-----ETGVSEELAREHIKDLMR	138
Pineapple	IFRLQDD----LGTSTDELKRGDVWKSIIQCYMH-----ETGVSEELAREHIKDLMR	67
	: . : :	
Medica	-----	293
Maxima	QMwKKVNAYRANKDSPLSQTTADFMLNLVRASHFMYLHGDGHGVQNETMDVAFRLRHCF	249
Reticulata	QMwKKVNAYRANKDSPLSQTTADFMLNLVRASHFMYLHGDGHGVQNETMDVAFTLL---	403
Valencia	QMwKKVNAYRANKDSPLSQTTADFMLNLVRASHFMYLHGDGHGVQNETMDVAFTLL---	195
Pineapple	QMwKKVNAYRANKDSPLSQTTADFMLNLVRASHFMYLHGDGHGVQNETMDVAFTLL---	124
Medica	-----	293
Maxima	FGPFWRKTWFSHLSAPKADDA	273
Reticulata	FRPILEDEDMVFTPSLGTGK---	424
Valencia	FRPILEDEDMVFTPSLGTGK*--	216
Pineapple	FRPILEDEDMVFTPSLGTGK*--	145

Figura 5 – Alinhamento das sequencias de proteínas dos genes “Cs2g07230.1” (“Valência”), “orange1.1g045966m” (“Pineapple”), “Cg2g040870.1” (*C. maxima*), “Cm249680.1” (*C. medica*) e “MSYJ183900.1” (*C. reticulata*).

Valencia	GTATCCATAATAATAAATATGATTATTTTCCATATTTATATACCTAAATCTTTTTTTT	60
Pineapple	TT---CTCTATGATTGGATATTGTTATTAATCATT-----CTCTTTACT--TTCCCTT	49
Reticulata	-----	0
Maxima	-----	0
Medica	-----	0
Valencia	CCCCATCTTTCACACTAATTGTT--CAATCACCATCTTACGGTAATTTTTTTT---TTA	114
Pineapple	CAGCTTTTCTGCTTGCTTTGATATGTTTCACCCTGCGGCGTTTAATTTTTGATATGTTT	109
Reticulata	-----	0
Maxima	-----	0
Medica	-----	0
Valencia	-ACATA--TTCTCTACAACCTTACTTCTATTATTTTTATTCTGCGTCATCCCTT--TTAT	169
Pineapple	CAAATTTCCAATGTAAAAACTGAACAAATTAATTAGGATAACAAAAATGAAAAAAAAT	169
Reticulata	-----	0
Maxima	-----	0
Medica	-----	0
Valencia	AATC-----TATTTTTTATTTAATTATAAAACATAAAACAACAGAGGATAT-	221
Pineapple	AATCATTGTAATAAGTCAATACCGTGTAGCCGCTACCAACGACTGCAGAAAGTCATG	229
Reticulata	-----	0
Maxima	-----	0
Medica	-----	0
Valencia	ATTCCATTTTGTTTT-GATTATAGATTGTTATTATTACAATGATCTATTTGGTAATAAT	280
Pineapple	ATCCCAAATGAAGATGGGTAGCTTGTCTGATTTTCAACAATTGTTGGA-----TTAC	282
Reticulata	-----	0
Maxima	-----ATCTTG--TCTGTAATACTA-----TTAA	22
Medica	-----TTG--GATATACAGATG-----TAG-	18
Valencia	ATTTTTTGGGGTACTTAGTACTTAATCCTTTCTGACAATCTTGATCTTACTGGTGC	340
Pineapple	CAAGCTGGGCGCAGACTGGCTGTATTCAAT--CACTCTGATGGTGTCTAT-TTGTG	338
Reticulata	-----	0
Maxima	AGACCTCTGCAAAATGTATATGTATACATA---TACATTTATGCTATGTTACTTTTTG	79
Medica	----TGTAAGCTAGCTTACAGTTATACTT---GGCAAAGATTCTCAAATTATCTATG	69
Valencia	TTGCCAAGGAGAAATCCCGGAAATCGTATAAAAATAAATAACAAGTAT-----	388
Pineapple	GAAAGTAGTGGAGGACACTTGAACCATTTAAACAAGTAGTGAAGGCTGATGGGATGGTG	398
Reticulata	-----	0
Maxima	GATTGGAGTGGGAATCCTGAGGAGTGGGAATCCTGGATTAGGAGTGGAGTGGGAGTG	139
Medica	GTTTGTGGTGATGC--ACGAGGTTTTATATATAA--ATATACATAT-----	113
Valencia	-----ATATAATTTTACAGTGGCAAAATGAAAATTA	421
Pineapple	CAAGAAGACATTGGATGGATGTAAGCTCACGTTTTCTAATGCGCTTCAAATAACCTTT	458
Reticulata	-----TTGGATGGATGTAAGCTCACGTTTTCTAATGCGCTTCAAATAACCTTC	50
Maxima	AGAGTAGGGTGT---TACTTAGACTAAATGAAAGTAGGATTGTCAATCAGAA---TC	192
Medica	-----ATA---TAGGCAGAGGAGAAGTTCATGTGATTATTTTTCTT-----A	153
	*	
Valencia	TTAAGGTTTTAGATGTTTTTCATCCAGAAAAATAAACGACTTTACCCCAAAATATATA	481
Pineapple	TTGATAAGCTGCTAAATTAATCTATGGTTTTtCTTTtCTTTCTtCCGTTTTtTTt	518
Reticulata	TTGATAAGCTGCTAAATTAATCTATGGTTTTTCTTTCTTTCTTTCCCTTTTTTTTTT	110
Maxima	CTAATTATTTGTTTACTTTGCTTGGATTGG-----AGTAAATTGTTTT	237
Medica	CTCATTTTTTCTGAGTTTTGAAAGCGTTAATT-----TTAAGTCTTAATAGTA	204
	* * * ** *	
Valencia	TATATATACTGCTGTAC-----GGCCAAGGCGNNNNNNNNNNNNNNNNNNNNNN	535
Pineapple	AAGGTGCAAGCTTGTATATATAGAGAAAGGAGATTGTGTATCCACGCTTT-----	571
Reticulata	AAGGTGCAAGCTTGTATATATAGAGAAAGGAGATTGTGTATCCACGCTTT-----	163
Maxima	AAATTATAATTTTATCCTTAT-GTACAGA---ATTATAATTGTA--ATTA-----	282
Medica	CAAAGATATTTTATTCATAT--GGGGGGGGGGTGGAAAGGAGTA--CATC-----	253

Figura 6 – Alinhamento das sequências promotoras dos genes “Cs2g07230.1” (“Valência”), “orange1.1g045966m” (“Pineapple”), “Cg2g040870.1” (*C. maxima*), “Cm249680.1” (*C. medica*) e “MSYJ183900.1” (*C. reticulata*).

Valencia	NNNNNNNNNNNNNNNTTAATTAAGTCGATGCTGCTGTACCGTACATCCGCCTTGCC	595
Pineapple	-----tATTTTCTTATTGATCATATCATATATCATCTAGAGCAGAGTTTATTGTG-	623
Reticulata	-----TATTTTCTTATTGATCATATCATATTTCCCTAGAGCAGAGTTTATTGTG-	215
Maxima	-----AAAAATTAATA---AAA-AATATAT-TTGAAAAATAAATAAATATTTTATT-	329
Medica	-----ATACTGTGCGA---ACGAGGTCAATATTGTCCACAGACACATACATCATCC	303
	* * * * *	
Valencia	--GTACAGCAGATATATA--TATATATATATATCAATT-----ATGCA-----	636
Pineapple	--TGTTAAAAGTTATTAATGTCTAATTAATTTTTtCTTTTCAGACGTTGGAGTATTTT	681
Reticulata	--TGTTAAAAGTTATTAATGTCTAATCAATTTTTCTTTCTCGGACGTTGGAGTATTTT	273
Maxima	---ATATTTATAAATTAATAAATAATTACTAATATTCTTAATTATGTAATCATAATTTT	385
Medica	ACACATTCGGATGTTTATTTCTTTTCTTTTCTTTTCTTTTCTG-CATACAAATTTT	362
	* * * * *	
Valencia	--TATGAATTCAGATTTGAATAATTTTTAAATCCATTCAAACAAAACAAAACAAATG	694
Pineapple	tCTTTtCTTTTAAATTTA-----AATGCGCTTG-----	710
Reticulata	TCCTTTCTTTTAAATTTA-----AATGCGCTTG-----	302
Maxima	T-TATTAATTTTAAATTTAAATTTATGTGAATAAAAAAT-TATTAATAATAGCAACACAAATG	443
Medica	T-AAAGAATCT-----TTCCATAAACTA-CACAATAAATGCACGCAGAAATG	407
	* **	
Valencia	ATACTTTCCCAAGCGCATTT-----AAAATTAAGAAAGAAAGAAAT	737
Pineapple	GGAAAGTATCATTGTGT-TtGTGT-----TAGTTGAATGGATTTAAAAAT	758
Reticulata	GGAAAGTATCATTGTGTGTGT-----TAGTTGAATGGATTTAAAAAT	351
Maxima	AAATATTATTA-TTGATAATATAGTACAAAATTA--TATTTTTTTAGAATAAAATATT	500
Medica	ACAAGAAATTCATAAATCAATTCTACTAACAAGTTTATTATTATTAATTAATCTT	467
	* ** * ** *	
Valencia	ACTCCAACGTCGAAAAAGAAAAAATTAAT-----TAGACATTAATAACT-----	783
Pineapple	ATTCAAA-TCTGAATTC-----AT---ATGCATAATTGATATATATATATATT	802
Reticulata	ATTGAAA-TCTGAATTC-----AC---ATGCATAATTGATATTTTT-----	388
Maxima	TATTATT-ATTA-ATTA---AATAATTAATATTATTAAAAATTAATATTAAATATT	554
Medica	GTTTTAT-GCGGAAATAAGACACAAAGTAAGTTAAGGAAAAA---AAAGGAACACA	523
Valencia	-TTAACACACAATAAAC-----CTCTGCT-	807
Pineapple	TTGGGGGTAA--AGTCGTTtAT----TTTTCTGGATGAAAAACATCTAAACCTTAA	854
Reticulata	-TTTTGGGGTA--AGTCGTTTAT----TTTTCTAGATGAAAAACATCTGAAACCTTAA	439
Maxima	AATTTAAATATAATATTATTATTATTATTATTAAATTTAATAAAATAAATATGATA	614
Medica	AAGTTGCAACAATAT-----CTTAATGTTGAGG-----ACTAACATC	561
	*	
Valencia	-----CTAGATGATATATGATATGATCAA-	831
Pineapple	TAATTTTCA-TTTTGCCACTGTAAAAATTA-TATATACTTGTATTATTATTATACGAT	912
Reticulata	TAATTTGCTTTTTTGCCACTGTAAAAAGTA-TATATACTCGTTATTGTTTTATAAGAT	498
Maxima	TAATTTATTTTTTATTAATATGATATTATTATTATTATTA-AAATGATATTATTAT	673
Medica	GAAATTCATTTGTTACAGTTATAAAGTACT----TTTGCGG-AAAATAAATTAATAAT	616
	* * * * *	
Valencia	-----TAAG-----	835
Pineapple	TTCCCGGATTTCTgcTTGGCAACGACCAGTCAAGATGACAAGATTGTCAGAAAGGATTA	972
Reticulata	TTCCCGGATTTCTCCTTGCAACAACCATGTTGATGCTAAAATCTGCTCGCTTAGAC	558
Maxima	TTATTTATTTTATAAGGATAAAATGGGAAGAGGGGGAGTGGATTCT-----	722
Medica	TTCAAATAATTATCAACAAAAGTAG---ACTGGGCAGGTAGATGTCT-----	662
	*	
Valencia	-----AAAAATAAAGACGTG	851
Pineapple	AGTACTAAGTACCCAAAAAAT----ATTAT-----	1000
Reticulata	CGACCAGATCTTTCAACAACGCTTAAGTTATCGACTGTTACTCGAACCTAAGGCCGG	618
Maxima	ACTCTACTCTCC-----CCGTGGGAGT-----	745
Medica	ACTCAAAAGTATA-----CTGCAAAATGTATGTACCGAAACTATGAACCAAAGCAGGA	715
Valencia	GATACACAATCTCCTTTCTCTATATATA-CACAAGCTTGACCTTAAAAAAGCGGAA	910
Pineapple	-----	1000
Reticulata	GACCAC-----CCTCCTTTCTCT-----CACTAGACCTGCGTTCAACAAAATGGAT	665
Maxima	-----GGGAATCTCACTCCCACTCAAAATTAGGT	776
Medica	GGCAACAATAGTCATACTTTTTCATGAGGGAATCTAACTTGCTAATGCATGTGTTTAT	775

Figura 6 – Continuação.

Valencia	AGAAAGAAA-----	919
Pineapple	-----	1000
Reticulata	CAGAAACGCCAGTGGTTTTGCCGCGTAAACCCCTCCGATGCCTAAGTTAGCACAAAGGTGT	725
Maxima	GGGACCCAT-----GAATCCCACTCCCACTCCCCCTTTTTTAA--GGTAAGTAAAC---	826
Medica	AATAATCAA-----CGATGTCGATATTTCTTTATAATACTCACAGTGAACAGA	823
Valencia	--AAGAAAAACCATAGAT----TA-ATTTAGCAGCTTATCAAAAAGGTTATTTGAAGCG	972
Pineapple	-----	1000
Reticulata	TTACGGGAAAACAATATAATTTGGA-TTCACGAAGTTTGTTCAAAATCTGTAAGGAATTA	784
Maxima	--ATTGGAGTGGG-AGGAATTCACACTTACACTCCCACTCCAAAAA---TAAACATTG	880
Medica	AACGTGTAGAAGCATGTGTTAATAATCAACGAAACTATTTCTATAAGTGCATAGATCA	883
Valencia	CATTAGAAAA-----CAGTGAGCTTA-CATCCATCAA-----	1005
Pineapple	-----	1000
Reticulata	ATCTGGTTGCA-ATTTGGCAGCGTTTTCCCTCCCTCAATTTTTCTGTCCCTTCTTCTTC	843
Maxima	CCTTAATTTAGTGATTAATA-----ATTCCTTCTCTCT-----A	916
Medica	C-CAAAAACAATGTTTAAAAGTTCTTTAATCTCTATATTT-----T	924
Valencia	-----	1005
Pineapple	-----	1000
Reticulata	GATCTCTTCTCTTTTATAGCCGCCCTTTGTCCACGTTTTCCGTTTGCCCTTATCCAT	903
Maxima	GTTATTTTAATTCATTTAATTTAAATATATATAAAATATGTGTAC-----	964
Medica	GAGTTTGTATATTTTTAATTCCTATATTTTAAAAATATCTTAAAG-----	972
Valencia	-----	1005
Pineapple	-----	1000
Reticulata	CCTTTTTCGGGTGGTGGTAGCCCTCATGGAGCTCTAACTATTACATTGTTGGCAACGT	963
Maxima	-----GTCGTCGACGTTTTAGTATTAACATAATTAATCCAGAT	1001
Medica	-----TTCCTTGTGTTAAAATATTGATACTCTACC-----	1003
Valencia	-----	1005
Pineapple	-----	1000
Reticulata	GGATCTCGTGTGCTTCAACCGTTCTGGGAGAAGC	999
Maxima	CGA-----	1004
Medica	-----	1003

Figura 6 – Fim.

Clementina	---ATGGCTTGAGTAACTCAATAGT-----TGCT-----	30
Medica	ATGTCTTCTCCATTAATCCCTCAACCTTGGTTACCTCTGTAATGGTTTCAAATGTCTT	60
Maxima	ATGTCTTCTTGCAATTAATCCCTCAACCTTGGTTACCTCTATAAATGGTTTCAAATGTCTT	60
Reticulata	-----	0
Valencia	ATGTCTTCTTGCAATTAATCCCTCAACCTTGGTTACCTCTATAAATGGTTTCAAATGTCTT	60
Pineapple	-----	0
Clementina	-----TGTAATGGC-----	39
Medica	CCTCTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCACTCCAATGC	120
Maxima	CCTCTTGCAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGC	120
Reticulata	-----	0
Valencia	CCTCTTGCAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGC	120
Pineapple	-----	0
Clementina	-----TCCAATGATCCGTTGCAACGGCGGTGAGCCAATTACCATGCG	81
Medica	-----	120
Maxima	CTTGTCAGCGCCAAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACACCACT	180
Reticulata	-----	0
Valencia	CTTGTCAGCGCCAAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACACCACT	180
Pineapple	-----	0
Clementina	AGTATTTGGAACCTGAACTCATAGAGTCTTTACCACTCCTTATACTACGAGTTGTAT	141
Medica	-----CTTGATGAAGCATAAC	135
Maxima	TCAATTTGGGACCATGATTTTTTGACAGTATTGAATAGCAACTATACGGATCAAACATAC	240
Reticulata	-----	0
Valencia	TCAATTTGGGACCATGATTTTTTGACAGTATTGAATAGCAACTATACGGATCAAACATAC	240
Pineapple	-----ATGAAACATAC	11
Clementina	GCCAACAGATTAGATGAGTTGAAGCAAAAGGCTAAAGATTTGTTTGCATCCGCCAAAGAA	201
Medica	AAAAGACGAGCAGAAGGGCTGAAGGGAAAAGTGAAGATAGCGATTAAGGAT---GTAACC	192
Maxima	AGAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGACAGCGATTAAAGGAT---GTAACC	297
Reticulata	-----	0
Valencia	AGAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGACAGCGATTAAAGGAT---GTAACC	297
Pineapple	AAAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGACAGCGATTAAAGGAT---GTAACC	68
Clementina	AGCACTAGTGAACATTTAAAGCTAACTGACTCGGTGCAGAAGTTGGGAGTGGCATACCAT	261
Medica	GAGCCTCTGGATCAGTTGGAGCTGATTGATAAATTTGCAAGACTTGGATTGGCTCATCGT	252
Maxima	GAGCCTCTGGATCAGTTGGAGCTGATTGACAACCTTGCAAAAGACTTGGATTGGCTTATCAT	357
Reticulata	-----	0
Valencia	GAGCCTCTGGATCAGTTGGAGCTGATTGACAACCTTGCAAAAGACTTGGATTGGCTTATCAT	357
Pineapple	GAGCCTCTGGATCAGTTGGAGCTGATTGATAATTTGCAAAAGACTTGGATTGGCTTATCAT	128
Clementina	TTTGAAGAAGAGATCAAAGAGGCCATGAATATTCTCAAAGGAGATGCTA-----	310
Medica	TTTGAGACTGAGATTAGGAACATATTGAATAATATCTACAACAATAATAAAGATTATAAT	312
Maxima	TTTGAGACTGAGATTGAAACATATTGCATAATATCTACAACAATAATAAAGATTATAAT	417
Reticulata	-----	0
Valencia	TTTGAGACTGAGATTGAAACATATTGCATAATATCTACAACAATAATAAAGATTATAAT	417
Pineapple	TTTGAGCCTGAGATTGAAACATATTGCATAATATCTACAACAATAATAAAGATTATAAT	188
Clementina	---CCATCAAAGATCTTAATGCAACGTCACTGCATTTTCGCCTTCTACGTGAACACGGC	366
Medica	TGGAGAAAAGAAAATCTGTATGCAACCTCCCTTGAGTTTCAGACTACTTAGACAACATGGC	372
Maxima	TGGAGAAAAGCAAATCTGTATGCAACCTCCCTTGAAATTCAGACTACTTAGACAACATGGC	477
Reticulata	-----ATGTGTAAGGTTTT-----GATGAATAAATTTCTTTTT	36
Valencia	TGGAGAAAAGCAAATCTGTATGCAACCTCCCTTGAAATTCAGACTACTTAGACAACATGGC	477
Pineapple	TGGAGAAAAGAAAATCTGTATGCAACCTCCCTTGAAATTCAGACTACTTAGACAACATGGC	248
Clementina	CATCCAGTTAGTACAGGTGTTTGTATAAATTCAGAAAAGGGACGGGAGGTTCCATGAC	426
Medica	TATCCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGG-CCAGGGAGGCTTCAATTTG	431
Maxima	TATCCTGTTTCTCAAGAGGTTTTCAAGTGGTTTTAAAGACGA-CAAGGGAGGCTTCAATTTG	536
Reticulata	CGGTTGAGCACTGCAGAGGTTTTCAAGTGGTTTTAAAGACGA-CAAGGGAGGCTTCAATTTG	95
Valencia	TATCCTGTTTCTCAAGAGGTTTTCAAGTGGTTTTAAAGACGA-CAAGGGAGGCTTCAATTTG	536
Pineapple	TATCCTGTTTCTCAAGGG-TTTTCAAGTGGTTTTAAAGACGA-CAAGGTAGGCTTCAATTTG	306
Clementina	AATTTACGAGAAGACATAGAAGGGCTTTTGAATTTATTTGAAGCTTCATTCTTGAATT	486
Medica	-----TGATGATTTCAAGGGAATACTGAGCTTGCAAGGCTCGTATTACAGCTTA	483
Maxima	-----TGATGATTTCAAGGGAATACTGAGCTTGCAAGGCTCGTATTACAGCTTA	588
Reticulata	-----TGATGATTTCAAGGGAATACTGAGCTTGCAAGGCTCGTATTACAGCTTA	147
Valencia	-----TGATGATTTCAAGGGAATACTGAGCTTGCAAGGCTCGTATTACAGCTTA	588
Pineapple	-----TGATGATTTCAAGGGAATACTGAGCTTGCAAGGCTCGTATTACAGCTTA	358

Figura 7: Alinhamento das seqüências codificadoras dos genes “Cs3g04170.1” (“Valência”), “Ciclev10017785m” (*C. clementina*) “orange1.1g043404m” (“Pineapple”), “Cg3g004050” (*C. maxima*), “Cm257260.1” (*C. medica*) e “MSYJ098750.1” (*C. reticulata*).

Clementina	GAAGGAGAGGATGTTCTAGAAGAAGCCAATATTTTTGTACTGAGCATCTAAAGGAGTCA	546
Medica	GAAGGAGAAAGCATCATGGAGGAGGCTGGCAATTTACCAGTAAACATCTTAAAGAAGTG	543
Maxima	GAAGGAGAAAGCATCATGGAGGAGGCTGGCAATTTACCAGTAAAGCATCTTAAAGAAGTG	648
Reticulata	GAAGGAGAAAGCATCACGGAGGAGGCTGGCAATTTACCAGTAAAGCATCTTAAAGAAGTG	207
Valencia	GAAGGAGAAAGCATCATGGAGGAGGCTGGCAATTTACCAGTAAAGCATCTTAAAGAAGTG	648
Pineapple	GAAGGAGAAAGCATCATGGAGGAGGCTGGCAATTTACCAGTAAAGCATCTTAAAGAAGTG ***** * ** * * * * ** * * * * * * * * *	418
Clementina	TTAGGGAC-----GTTGGGGAGCAAAATCATACTGGCTGAGCAGGTACAACAATCT	597
Medica	ATGATC---AGCAAGAGCAAGGAAGAGCATGTATTTGTAGCAGAACAAGCGAAGCTGCG	600
Maxima	ATGATCATCAGCAACAGCAAGGAAGAGTATGTATTTGTAGCAGAACAAGCGAAGCTGCG	708
Reticulata	ATGATCACCAGCAACAGCAAGGAAGAGGATGTATTTGTAGCAGAACAAGCGAAGCTGCG	267
Valencia	ATGATCATCAGCAACAGCAAGGAAGAGTATGTATTTGTAGCAGAACAAGCGAAGCTGCG	708
Pineapple	ATGATCACCAGCAACAGCAAGGAAGAGGATGTATTTGTAGCAGAACAAGCGAAGCTGCG * ** * * * * * * * * * * * * * * * * * * *	478
Clementina	TTAGACATCCCTTCATATTGGAGGATGCCAAGAATTGAGGCTCAGAACTTCATCAAATTA	657
Medica	CTAGAGCTCCCTCTGCATTGGAAAGTGCCAATGTTAGAGGCAAGGTGGTTCATACACGTT	660
Maxima	CTGGAGCTCCCTCTGCATTGGAAAGTGCCAATGTTAGAGGCAAGGTGGTTCATACACGTT	768
Reticulata	CTGGAGCTCCCTCTGCATTGGAAAGTGCCAATGTTAGAGGCAAGGTGGTTCATACACGTT	327
Valencia	CTGGAGCTCCCTCTGCATTGGAAAGTGCCAATGTTAGAGGCAAGGTGGTTCATACACGTT	768
Pineapple	CTGGAGCTCCCTCTGCATTGGAAAGTGCCAATGTTAGAGGCAAGGTGGTTCATACACGTT *	538
Clementina	TACCCACAGATGATGAAAGCAGTCCAATTTTGCTGACTCTAGCCAAGTTGGATTACAAT	717
Medica	TATGAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTTGGAGTTTAAC	720
Maxima	TATGAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTTGGAGTTTAAC	828
Reticulata	TATGAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTTGGAGTTTAAC	387
Valencia	TATGAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTTGGAGTTTAAC	828
Pineapple	TATGAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTTGGAGTTTAAC *	598
Clementina	TTAGTACAATCCATACACCAACAAGAAGTGAAGGAGTTGGCAAGGTGGTGGAGTAACTG	777
Medica	ACTTTGCAGGCAATTTACCAGGAAGAAGTAAAGACATTTTCAGGGTGGGACATCCATTAT	780
Maxima	ACTTTGCAGGCAATTTACCAGGAAGAAGTAAAGACATTTTCAGGGTGGTGGAGGATAAC	888
Reticulata	ACTTTGCAGGCAATTTACCAGGAAGAAGTAAAGACATTTTCAGGGTGGTGGAGGATAAC	447
Valencia	ACTTTGCAGGCAATTTACCAGGAAGAAGTAAAGACATTTTCAGGGTGGTGGAGGATAAC	888
Pineapple	ACTTTGCAGGCAATTTACCAGGAAGAAGTAAAGACATTTTCAGGA----- -----	643
Clementina	GGTTTTAAAGAGAACTAAGTTTTGCGAGAGACCGGTTGATGGAAAATATTTGTTGGTG	837
Medica	GCTTTGAACACCTTCCGGACTACATGAAATTTGTTTTTTGCGCTTTACAACCTTTGT	839
Maxima	GGTCTGGAGAGAAATGAGCTTTGCGAGGACAGCTTGGTAGCATCCTTCTTATGGAGC	948
Reticulata	GGTCTGGAGAGAAATGAGCTTTGCGAGGACAGCTTGGTAGCGTCTTCTTATGGAGC	507
Valencia	GGTCTGGAGAGAAATGAGCTTTGCGAGGACAGCTTGGTAGCGTCTTCTTATGGAGC	948
Pineapple	----- -----	643
Clementina	ATGGGCCCTTTGTTTCAAAGCACAGTTTTCTAAGTGCAGAATTGGCCTCACAAAATTTGTA	897
Medica	-TAATGAATTTGTTTATTACGTACTTGCATTACAGAAAAG- -CTCTTCAGAATTCAGA-	895
Maxima	ATGGGGATAGGGTCTGAGCCTCAATTTGGCCTATTGCAGGAGAAATGATCACAATTTGCAATA	1008
Reticulata	ATGGGGATCGCGTTGAGCCTCAATTCGCTACTGCAGGAGAGTGTCTACAATCTCGATA	567
Valencia	ATGGGGATCGCGTTGAGCCTCAATTCGCTACTGCAGGAGAGTGTCTACAATCTCGATA	1008
Pineapple	-TGGGGATCGCGTTGAGCCTCAATTCGCTACTGCAGGAGAGTGTCTACAATCTCGATA *	702
Clementina	TGCATATTAAGTGCAGTATGATGATTTATGATGTATATGGATCAATAGATGAGCTTGAA	957
Medica	-----TT---GAAAGCTGA-----	906
Maxima	GCTCTAGTTACAGTGATGATGACATTTATGATGTTTATGGAACCTTGGACGAACCTTGAG	1068
Reticulata	GCCCTAATTACAGTGATGATGACATTTATGATGTCTATGGAACATTTCGATGAACCTTCAG	627
Valencia	GCCCTAATTACAGTGATGATGACATTTATGATGTCTATGGAACATTGGATGAACCTTGAG	1068
Pineapple	GCCCTAATTACAGTGATGATGACATTTATGATGTCTATGGAACATTGGATGAACCTTGAG * * * * *	762
Clementina	CTCTTTACAGAAGCAGTGAAGTTTTCCACCATCTTATATATTATCCTTTTGTTTATG	1017
Medica	-----	906
Maxima	CTATTCACTGCTGCTGTTGAGAGGATTGTTG-----	1099
Reticulata	ATATTCACTGATGCTATTGAGAG-----	650
Valencia	ATATTCACTGATGCTGTTGCGAG-----	1091
Pineapple	cTATTCACTGATGCTGTTGAGAG-----	785
Clementina	GGGATTTCCCTTAAAATCCGGTGGGAAATTGGGGCAGTACTGGAGGAGCTGCCAGAAAT	1077
Medica	-----	906
Maxima	-----GCAAACATAATGTGGGACATCCATTATGCTTTGAACACCTTCCGGACTAC	1149
Reticulata	-----GTGGGACATCAATTATGCTTTGAAGCACCTTCCGGGCTAT	690
Valencia	-----GTGGGACATCAATTATGCTTTGAAGCACCTTCCGGGATAT	1131
Pineapple	-----TGGGACATCAATTATGCTTTGAAGCACCTTCCGGGcTAT	824

Figura 7 – Continuação.

Clementina	ATGCAGATTGCTACTTGGCCATGTTAACTTTGGAAATGAGTTGGCATGTGATGTTATG	1137
Medica	-----	906
Maxima	ATGAAATGTGTTTTTTTTCGCGCTTTACAACCTTTGTTAATGAATTTGCTTATTACGTACTC	1209
Reticulata	ATGAAATGTGTTTTCTTTCGCGCTTTACAACCTTTGTTAATGAATTTGCTTATTAC-----	744
Valencia	ATGAAATGTGTTTTCTTTCGCGCTTTACAACCTTTGTTAATGAATTTGCTTATTACGTTCTC	1191
Pineapple	ATGAAATGTGTTTTCTTTCGCGCTTTACAACCTTTGTTAATGAATTTGCTTATTACGTTCTC	884
Clementina	AAAATTCATGGCCTCAATACTCTATCCTACATTAAGAAAGAGTGGGAAATCTGTGTACA	1197
Medica	-----	906
Maxima	AAACAACAGGATTTTGATATGCTTCGGAGTAATAAAAAATTCATGGCTTGGCTTACTACAA	1269
Reticulata	-----TGGCTTGGCTTAAATACAA	762
Valencia	AAACAACAGGATTTTGATATGCTTCGAGCATAAAAATGCATGGCTTGGCTTAAATACAA	1251
Pineapple	AAACAACAGGATTTTGATATGCTTCGAGCATAAAAATGCATGGCTTGGCTTAAATACAA	943
Clementina	TCATACCTAGTAGAAGCCAGATGGTTTAGCAAGGGTACACGCCAACTGCGAAGGAATAC	1257
Medica	-----	906
Maxima	GCCTGCTTAGTGGAGGCCAAAATGGTACCATAGTAAGTACACGCCAACGCTGGGAGAATTC	1329
Reticulata	GCCTACTTGGTGGAGGCCAAAATGGTACCATAGCAAGTACACGCCAACTGGAAGAATAC	822
Valencia	GCCTACTTGGTGGAGGCCAAAATGGTACCATAGCAAGTACACGCCAACTGGAAGAATAC	1311
Pineapple	GCCTACTTGGTGGAGGCCAAAATGGTACCATAGCAAGTACACGCCAACTGGAAGAATAC	1003
Clementina	ATAGAAAATGCATGGGTTTCAGTGGGAAGCCCTGCTGCCATTGTCCATGCCTATATCTTG	1317
Medica	-----	906
Maxima	TTGGAAAATGGATTGGTATCAATAGGAGGCCCTATGGGTACAATGACTTTCATACCTTTCT	1389
Reticulata	TTGGAAAATGGATTGGTATCAATAACGGGCCCTTAAATTATAACGATTTTCATATCTTTCT	882
Valencia	TTGGAAAATGGATTGGTATCAATAACGGGCCCTTAAATTATAGCGATTTTCATATCTTTCT	1371
Pineapple	TTGGAAAATGGATTGGTATCAATAACGGGCCCTTAAATTATAACGATTTTCATATCTTTCT	1063
Clementina	CTACAACCTCAAAGGAAGCAATGCCTTGACCGAAAATTCACCTAGCTGCCTCAAAGTCGAA	1377
Medica	-----	906
Maxima	GGGAC-----AAATCCAATCATTGAGAAG-----GAACTAGAATTTTTA	1428
Reticulata	GGTAC-----AAATCCAATCATTAAAGAAG-----GAACTGGAATTTCTA	921
Valencia	GGTAC-----AAATCCAATCATTAAAGAAG-----GAACTGGAATTTCTA	1410
Pineapple	GGTAC-----AAATCCAATCATTAAAGAAG-----GAACTGGAATTTCTA	1102
Clementina	CATGGCTATGATGAGATGATATATTGGTCATCTCTCATCAGTCGGCTCAGTAACGATTTG	1437
Medica	-----	906
Maxima	GAAAGTAATCAAGATATAATTCAGTGGCCATCAAGATTTCTCGTCTTCAAGATGATTTG	1488
Reticulata	GAAAGTAATCCAGATATAGTTCACTGGTCATCCAAGATTTTCCGCTTACAAGATGATTTG	981
Valencia	GAAAGTAATCCAGATATAGTTCACTGGTCATCCAAGATTTTCCGCTTCAAGATGATTTG	1470
Pineapple	GAAAGTAATCCAGATATAGTTCACTGGTCATCCAAGATTTTCCGCTTCAAGATGATTTG	1162
Clementina	GGAAATCCCGGTTGAGTTGAAGAGAGGCGACGTGGCGAAATCTATTAGTGCTACATG	1497
Medica	-----	906
Maxima	GGAACCTTATCGGATGAGATACAGAGAGGGGATGTTCCGAAATCAATCCAGTGTACATG	1548
Reticulata	GGAACCTTATCGGACGAGATACAGAGAGGGGATGTTCCGAAATCAATCCAGTGTACATG	1041
Valencia	GGAACCTTATCGGACGAGATACAGAGAGGGGATGTTCCGAAATCAATCCAGTGTACATG	1530
Pineapple	GGAACCTTATCG-----	1174
Clementina	ATTGAAGAAGGCATATCAGAAGAAGAAGCAAGGGACCGTATAAAAAAGTTTGATAATTTAC	1557
Medica	-----	906
Maxima	CATGAAACTGGTGCCCTCGGAGGAAGTTGCTCGTGAACACATCGAGGATATGATGAGACAG	1608
Reticulata	CATGAAACTGGCGCCTCGGAGGAAGTTGCTCGTGAACACATCAAGGATATGATGAGACAG	1101
Valencia	CATGAAACTGGTGCCCTCGGAGGAAGTTGCTCGTGAACACATCAAGGATATGATGAGACAG	1590
Pineapple	-----	1174
Clementina	TCCTGGAAAAGCTGAATGGCAAGAATCTTTATAAAAAGTATTTTC----CAGAAAAGCAT	1613
Medica	-----	906
Maxima	ATGTGGAAGAAGGTGAATGCATACAGAGCTGATAAAGATTTCCCTTATCTCAAAAATACA	1668
Reticulata	ATGTGGAAGAAGGTGAGTGCATACACAGCCGATAAAGACTCTCCCTTGACTCGAACAACT	1161
Valencia	ATGTGGAAGAAGGTGAATGCATACACAGCGGATAAAGACTCTCCCTTGACTCGAACAACT	1650
Pineapple	-----	1174
Clementina	GGCGAAAATGTGTTAGACATGTCTAGAAGTGCACATT--GCATTTTCCATGGAGATGGT	1671
Medica	-----	906
Maxima	GTTGACTTCATGTTGAATCTTGTGAGAATGTCCCATTTTATGTATCTACGTAGAGATGGG	1728
Reticulata	ACTGAGTTCCTCTTGAATCTTGTGAGAATGTCCCATTTTATGTATCTCCATGGAGATGGG	1221
Valencia	ACTGAGTTCCTCTTGAATCTTGTGAGAATGTCCCATTTTATGTATCTACATGGAGATGGG	1710
Pineapple	-----	1174

Figura 7 – Continuação.

Clementina	ATAGGAACATCAACCGGGTTTCTAGAGATCGTTTGGTCTCTTTAATACTTGAGCCTATA	1731
Medica	-----	906
Maxima	CACGGTGCTCAAACAAGAGACTATGGATGTAGCTTCTACATGGCTTTTCAGCCCAT	1788
Reticulata	CATGGTGTTCAAACAAGAGACTATCGATGTCGGCTTTACATTGCTTTTCAGCCCAT	1281
Valencia	CATGGTGTTCAAACAAGAGACTATCGATGTCGGTTTTACATTGCTTTTCAGCCCAT	1770
Pineapple	-----	1174
Clementina	CCAGTTGAATTGTAA-----	1746
Medica	-----	906
Maxima	CCCTGGAGGACAACCACATGGCTTCCACAGCACCAACGGCTGATGAATCCCAGAGTGC	1848
Reticulata	CCCTGGAGGACAAGACATGGCTTTCACAGCATCTCCTGGCACCAAAGACTAA-----	1335
Valencia	CCCTGGAGGACAAGACATGGCTTTCACAGCATCTCCTGGCACCAAAGGCTGA-----	1824
Pineapple	-----	1174
Clementina	-----	1746
Medica	-----	906
Maxima	AGTTTCAGTTGA	1860
Reticulata	-----	1335
Valencia	-----	1824
Pineapple	-----	1174

Figura 7 – Fim.

Clementina	-----MA--CSNNSIVACNGSNDPLQRRSANYHA	27
Medica	MSSSINPSTLVTSVNGFKCLPLTTNKAAIRIMAKNKLQCLD-----	42
Maxima	MSSCINPSTLVTSSINGFKCLPLATNKAAIRIMAKNKPQCLVSAKYDNLTVDRRSANYQP	60
Reticulata	-----	0
Valencia	MSSCINPSTLVTSSINGFKCLPLATNKAAIRIMAKNKPQCLVSAKYDNLTVDRRSANYQP	60
Pineapple	-----	0
Clementina	SIWNPELIESFTTPYTYELYANRLDELKQKAKDLFASAKESTSELLKLTDSVQKLGVAHYH	87
Medica	-----EAYKRRRAEGLKGVKIAIKDVIETP-LDQLELIDNLQRLGLAHR	84
Maxima	SIWDHDFLQSLNSNYTDQTYRRRAEELKGVKTAIKDVTETP-LDQLELIDNLQRLGLAYH	119
Reticulata	-----	0
Valencia	SIWDHDFLQSLNSNYTDQTYRRRAEELKGVKTAIKDVTETP-LDQLELIDNLQRLGLAYH	119
Pineapple	-----DETYKRRRAEELKGVKTAIKDVTETP-LDQLELIDNLQRLGLAYH	43
Clementina	FEETKEAMNILKGD-----TIKDLNATSLHFRLREHGHVPVSTGVDFKFRKRDRGRFHD	142
Medica	FETEIRNIIHNIYNNKDYWRKKNLYATSLEFRLLRQHGYVPVSEVFNGLKDGQGGFI-	143
Maxima	FETEIRNIIHNIYNNKDYWRKKNLYATSLEFRLLRQHGYVPVSEVFNGLKDGQGGFI-	178
Reticulata	-----MCKSFDEYNFFRLSTAIEVFSFGKDDKGGFI-	31
Valencia	FETEIRNIIHNIYNNKDYWRKKNLYATSLEFRLLRQHGYVPVSEVFNGLKDGQGGFI-	178
Pineapple	FEPEIRNIIHNIHNNKDYWRKKNLYATSLEFRLLRQHGYVPVSEVFNGLKDGQGGFI-	102
	. * . . : ** . . . *	
Clementina	NLREDIEGLNLFASFLGIEGEDVLEENIFCTEHLKESLGTG---SKIIILAEQVQQS	199
Medica	--CDDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEVMI-SKSKEEHVFAEQAKRA	200
Maxima	--CDDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEMMIISNSKEEYVFAEQAKRA	236
Reticulata	--CDDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEMMIISNSKEEYVFAEQAKRA	89
Valencia	--CDDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEMMIISNSKEEYVFAEQAKRA	236
Pineapple	--CDDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEMMIISNSKEEYVFAEQAKRA	160
	:*:	
Clementina	LDIPSYWRMPRIEAQNFILYPTDDESSILLTLAKLDYNLVQSIHQQLKELARWWSNL	259
Medica	LLEPLHWKVPMLERWFIHVYKREDKNHLLLELAKLEFNTLQAIYQEEELKDISG----	255
Maxima	LLEPLHWKVPMLERWFIHVYKREDKNHLLLELAKLEFNTLQAIYQEEELKDISGWWKDT	296
Reticulata	LLEPLHWKVPMLERWFIHVYKREDKNHLLLELAKLEFNTLQAIYQEEELKDISGWWKDT	149
Valencia	LLEPLHWKVPMLERWFIHVYKREDKNHLLLELAKLEFNTLQAIYQEEELKDISGWWKDT	296
Pineapple	LLEPLHWKVPMLERWFIHVYKREDKNHLLLELAKLEFNTLQAIYQEEELKDISG----	215
	*:	
Clementina	GFKEKLSFARDRLMENYLLVMGLCFKAQFSKCRIGLTKFVCILTIDDIYDVYGSIDELE	319
Medica	-----	255
Maxima	GLGEKLSFARDRLVASFWSMGIGSEPLAYCRRIVTIAIALVTVIDDIYDVYGTLDLELE	356
Reticulata	GLGEKLSFARNRLVASFWSMGIAFEPQFAYCRRVLTISIALITVIDDIYDVYGTDFDELQ	209
Valencia	GLGEKLSFARNRLVASFWSMGIAFEPQFAYCRRVLTISIALITVIDDIYDVYGTLDLELE	356
Pineapple	-----MGIAFEPQFAYCRRVLTISIALITVIDDIYDVYGTLDLELE	255
Clementina	LFTEAVKSFPPSYILSFCFMGISPKIRWEIGAVLEELPEYMQICYLAMFNGNELACDVM	379
Medica	-----WDIHYALNHLDPYMKLCFFALYNFVNEFVYVYL	288
Maxima	LFTAVER-----IVGKLMWDIHYALNHLDPYMKLCFFALYNFVNEFVYVYL	403
Reticulata	IFTDAIE-----RWDINYALKHLPGYMKMCFALYNFVNEFVYVYL	248
Valencia	IFTDAVA-----RWDINYALKHLPGYMKMCFALYNFVNEFVYVYL	397
Pineapple	LFTDAVE-----RWDINYALKHLPGYMKMCFALYNFVNEFVYVYL	296
	*:	
Clementina	KIHGLNTLSYIKKEWENLCTSYLVEARWFSKGYPTAKEYIENAWVSVGPAIVHAYIL	439
Medica	ALQKDSSEFQIES-----	301
Maxima	KQQDFDMLRSNKNLWGLLQACLVEAKWYHXYPTPLGEFLENGLVSIGGPMGMTSYL-	462
Reticulata	-----WGLIQAYLVEAKWYHXYPTPLKEEYLENGLVSIITGPIITISYL-	293
Valencia	KQQDFDMLLSIKNAWLGLIQAYLVEAKWYHXYPTPLKEEYLENGLVSIITGPIITISYL-	456
Pineapple	KQQDFDMLLSIKNAWLGLIQAYLVEAKWYHXYPTPLKEEYLENGLVSIITGPIITISYL-	355

Figura 8: Alinhamento das sequências de proteínas dos genes “Cs3g04170.1” (“Valência”), “Ciclev10017785m” (*C. clementina*) “orange1.1g043404m” (“Pineapple”), “Cg3g004050” (*C. maxima*), “Cm257260.1” (*C. medica*) e “MSYJ098750.1” (*C. reticulata*).

Clementina	LQLQGSNALTENSLSCLKVEHGYDEMIYWSSLISRLSNDLGNSAVELKRGDVAKSIQCYM	499
Medica	-----	301
Maxima	---SGTNPIIEKELEFL---ESNQDIHWPFKILRLQDDLGTSSDEIQRGDVPKSIQCYM	516
Reticulata	---SGTNPIIKKELEFL---ESNPDIVHWSSKIFRLQDDLGTSSDEIQRGDVPKSIQCYM	347
Valencia	---SGTNPIIKKELEFL---ESNPDIVHWSSKIFRLQDDLGTSSDEIQRGDVPKSIQCYM	510
Pineapple	---SGTNPIIKKELEFL---ESNPDIVHWSSKIFRLQDDLGTSS-----	393
Clementina	IIEGISEEEARDRIKSLIIYSWKKLNGKNLYKS-DFPESMAKMCLDMSRTAHC-IFHGDD	557
Medica	-----	301
Maxima	HETGASEEVAREHIEDMMRQMWKKNVAYRADKDSPLSQNTVDFMLNLVRMSHFMYLRRDG	576
Reticulata	HETGASEEVAREHIKDMRQMWKKNVAYRADKDSPLTRTTTEFLNLVRMSHFMYLHGDG	407
Valencia	HETGASEEVAREHIKDMRQMWKKNVAYRADKDSPLTRTTTEFLNLVRMSHFMYLHGDG	570
Pineapple	-----	393
Clementina	IGTSTGVSRLVSLILEPIVEL-----	581
Medica	-----	301
Maxima	HGAQNQETMDVASTWLFQPIPLEDNHMASTAPTAEFPECSFS	619
Reticulata	HGVQNQETIDVGFLLFQPIPLEDKMAFTASPGTKD-----	444
Valencia	HGVQNQETIDVGFLLFQPIPLEDKMAFTASPGTKG*-----	607
Pineapple	-----	393

Figura 8 - Fim.

Reticulata	-----AACG-----	4
Medica	-----TTGGATATA	9
Clementina	-----	0
Pineapple	-----	0
Valencia	ATAGAGATTAAAGACCTTTTAAAGCATTCTTTTGGTGCTCTATGACTCTTATGGAATA	60
Maxima	-----	0
Reticulata	-----AATATTACGACAC-----	17
Medica	T-----AGATGTAGAGTAAGCTAGCTTACAGTTACTTGGCGAAGATTCT	55
Clementina	-----TGGGAGAAT-----	10
Pineapple	-----	0
Valencia	ATTTGCTTGATTATTAACACATGCTTCTACACGTTTTTGTCTACTGTGACTATTATAAA	120
Maxima	-----	0
Reticulata	-----	17
Medica	CAAAATTA-----ATCTATGGTTTGGT-----GATGTA	84
Clementina	---ATAA-----TTAATATGATTTACAATTTGAGGGGAATGCTTAGAA--	51
Pineapple	-----	0
Valencia	AAAATGAGTAATGATATAGCCACAACTCTGTACAACTGATGTGGCATGATAAGATTG	180
Maxima	-----ACTCTGTACAACTTATTTGTACAACTGATGTGGCATGATAAGATTG	50
Reticulata	-----GTGATTT-----ATATATCTGTATAT---	38
Medica	-----CGAGGTTATATATATATATA	104
Clementina	-----GAAACAGATACAATATAACAATATATACATATACA	88
Pineapple	-----	0
Valencia	GTTGAATTAATATTAATGACACATGATTTGTTTATTTATTTATTTTATTCA	240
Maxima	GTTGAATTAATATTAATGACACATGATTTGTTTATTTATTTTATTTTATTCA	110
Reticulata	-----ATAGAATCAGCTTT-----	52
Medica	GGCAGAG-----	111
Clementina	CACA-----CACACACAGAGTTTCTAAAAATAGAAAGAAAGCATCAAGTTGTTGAGA	142
Pineapple	-----	0
Valencia	GCCAAATGAATTAATGACACATGATTTGTACAAAATAAATTTGTACAAGAGTTGTGGCT	300
Maxima	GCCAAATGAATTAATGACACATGATTTGTACAAAATAAATTTGTACAAGAGTTGTGGCT	170

Figura 9: Alinhamento das sequências promotoras dos genes “Cs3g04170.1” (“Valência”), “Ciclev10017785m” (*C. clementina*) “orange1.1g043404m” (“Pineapple”), “Cg3g004050” (*C. maxima*), “Cm257260.1” (*C. medica*) e “MSYJ098750.1” (*C. reticulata*).

Reticulata	-----CTGTCTGGAATTCTGAAGAA-----	72
Medica	-----	111
Clementina	ATAGTTGCAAGTT-----GTGAG-----AGGGATGCCAAATTCATCAATTAACCT	187
Pineapple	-----	0
Valencia	GTATCATCACTCTAAAAAATATCGACATCGTTGATTATTGTAACACATGCATTAGCAA	360
Maxima	GTATCATCACTCTAAAAAATATCGACATCGTTGATTATTGTAACACATGCATTAGCAA	230
Reticulata	----TATTCTCTGATACAAGCATCTCATTTTATAAAGCACGTGACTTGTGG-----	120
Medica	-----GAGAAAGTTCATGTGATT-----TATTTTTCTGACTACTT	145
Clementina	GATACAATTGCAGAGTCAACGATCATGTTTCACGTG-----AACTTGCCCTTCT---	236
Pineapple	-----	0
Valencia	GTTAGAATTCCCTCATGAAAAAGTATGACTATTTTTTGCCCTCCAGATTTGGGTTTCATAGT	420
Maxima	GTTAGAATTCCTCATGAAAAAGTATGACTATTTTTTGCCCTCCAGATTTGGGTTTCATAGT	290
Reticulata	-----CTTTACAATGCATTTACATATAGAGTTATCTTCTAGTTC-----GAGATTCT	167
Medica	TTTTCTGAGTTTTGAAAGCGTTAA-----TTT	173
Clementina	-TTGACTATT--ATTGGGTGTGTGAGGTTGCATTAATTACCTCTATTCCCTCAAAGATT	293
Pineapple	-----CTGCTCCCACTAACTTTT-GAGTTGACATCTACCTGCCCAaCTACTTT	48
Valencia	TTTGATACATACATTTGCAGTATAATTTT-GAGTAGACATCTACCTGCCAGCTACTTT	479
Maxima	TTTGATACATACATTTGCAGTATAATTTT-GAGTAGACATCTACCTGCCAGCTACTTT	349
	* *	
Reticulata	TTAATGCAAAAGCGTTTGGAAATAATTTAATATACATTTATATAAGTGTAGGCTGGTGCCTT	227
Medica	TTAAGTCTTAATAGTACAAAAGTATTTTATTTCATTTGGGGGAAAAAAA--AGGAGTACA	231
Clementina	T--AGATAACCTTTTTTATATTACATTTGATTTCATCAAAATAA--ATACACAAA	348
Pineapple	TTGTTGATAATCATTGTAAATTTAATTTGT-TTCCGCAAAAGTA--CTTTATAA-	104
Valencia	TTGTTGATAATTTTGAATTTAATTTGT-TATCCGCAAAAGTA--CTTTATAA-	535
Maxima	TTGTTGATAATTTTGAATTTAATTTGT-TATCCGCAAAAGTA--CTTTATAA-	405
	* * * * *	
Reticulata	TATACTGCTGTAAAAGCGGAGTCTGCAC-----T-----	257
Medica	TCATA--CTGTGCGAAC---GAGGTCAATATTGTACCAGAAGACACGTACATCATCCATA	286
Clementina	TACACAGATGCACCATACGTATATTAAAGTATATAGTATAAATAAAATCTCTAAAT	408
Pineapple	-----CTGTAACAAATAGAATTTTCGATGTTAGTCTCAACATTAAGATATTGTTGCA	157
Valencia	-----CTGTAACAAATAGAATTTTCGATGTTAGTCTCAACATTAAGATATTGTTGCA	588
Maxima	-----CTGTAACAAATAGAATTTTCGATGTTAGTCTCAACATTAAGATATTGTTGCA	458
Reticulata	-----TGAGAATAATTTAATAAATATGATTAAATGTACAAGTT	298
Medica	CATTCCGATGAATGTT----GT-----ATA-----ATCTTTATTTTATCTTT	327
Clementina	CACTGTTATTCCTCATACATCTAATAGTATTATAAATATATCATTATCCATTTGATAAT	468
Pineapple	ACTTTGTATGCCTTT-----TT-----TTCCTTAAAC---TTAGTTT	191
Valencia	ACTTTTGTTCCTTTTTT-TTTT-----TTCCTTAAAC---TTACTTT	627
Maxima	ACTTTTGTTCCTTTTTTTTT-----TTCCTTAAAC---TTACTTT	498
	* *** *	
Reticulata	ATCTATTGATAAAATCAAA--TCTTTGCAATATATATGAGTTATGCAATCAAGGCATAG	356
Medica	TTTTTTCCT--GCATACAAA-TTTTTAAAGAGTCTTTCAAT-----	366
Clementina	GACTACGGT--TGTTTCAAAGTATATAAAATATGTTACAAT-----	508
Pineapple	GTATATTCT--TATTCTCC--AcAAAACAAGATTTAATGT-----	229
Valencia	GTGTAATCT--TATTTCCGC--ATAAAACAAGATTTAATGT-----	665
Maxima	GTGTAATCT--TATTTCCGC--ATAAAACAAGATTTAATGT-----	536
	* * * * *	
Reticulata	ATACCCTGAAATGTCTTTAAGTCTTCTCGGTAATTCCTGCAAAAGTGTAAACTCAA	416
Medica	-----AAACTACACAATAAATGCACGCAGAAATGACAAGAAATTCATAAATCAAT	417
Clementina	-----AAGACGTTCAATTAATCGACTGACCAAAATATTATGGCAGTATG	553
Pineapple	-----AATAAATAGAATTTTATTAGTAGAATTTGAAT-----TTATGAATTTCTT	274
Valencia	-----AATAAATAGAATTTTATTAGTAGAATTTGAAT-----TTATGAATTTCTT	710
Maxima	-----AATAAATAGAATTTTATTAGTAGAATTTGAAT-----TTATGAATTTCTT	581
	* * * * *	
Reticulata	C-----TTAGCGAGCTCAAGTAAAAG-GTGGTCTTGTCTCTCTTTTCTCATAAACGTG	470
Medica	TCTACTAATAAAAGTCTATTATTACATTAATCTGTTTATGTAGAAAATAAGAATA	477
Clementina	GTGGATACACCAAACCTTGAATCAATGATTAGTAGGGATG---GCAAAAC---ATCGGGTC	607
Pineapple	GTTATTTCTGCG---TGCATTTATTGTGTAGTT-----TATAG---AAAGACTC	317
Valencia	GTCATTTCTGCG---TGCATTTATTGTGTAGTT-----TATGG---AAAGACTC	753
Maxima	GTCATTTCTGCG---TGCATTTATTGTGTAGTT-----TATGG---AAAGACTC	624
	* * * * *	
Reticulata	TATGAACCACCTTGCCCTAACATA---GGCACTTCCAATGCAGAGGGAGCTCC-----	522
Medica	TACAAA-GTAAATGTAAGGAAGAAA-----AAAGGCA-----	508
Clementina	GGGCTC-GGGCTTGGCCAAACCAACCCGACCTGATCAATAG-AGAAATAAAGCCCGACC	665
Pineapple	TTTAAA-AAATTTGTATGCAGGAAA--AAAAAGATAAATAAAAAAGATTATACAACAT	374
Valencia	TTTAAA-AAATTTGTATGCAGGAAA--AAAAAGAAAAGAAAAATAAGTAAATCA-----	805
Maxima	TTTCAA-AAATTTGTATGCAGGAAA--AAAAAGAAAAGAAAAATAAATAAATCA-----	676

Figura 9 – Continuação.

Reticulata	-----A-----GCGCCGCTTCGCTTGTCTGCTACAAATACATC---CTCTTCCTT	566
Medica	---TACAAAGTTGCAACAATATCTTAATGTTGAGCACTAACATCGAAA---TTCTATCTG	563
Clementina	TTAAAAAACCATACGTATTTATATTTAGGGTCGGGTCGGGCCGACCCGAATCGGGCCA	725
Pineapple	TCATCCGAATGTATGGATGATGATGCTTCTGGTaCAATATTGAC---CTCGTTCGC	431
Valencia	-----TCCGAATGTATGATGATGCTTCTGGCACAAAATTGAC---CTCGTTCGC	854
Maxima	-----TCCGAATGTATGATGATGCTTCTGGCACAAAATTGAC---CTCGTTCGC	725
	* * * * *	
Reticulata	GCTGTTGCTGGTATCATCTTTCTTAAGA--TGCTTACTGGTGAATTGCCAGGCCTCC	624
Medica	TTACAGTTATAAAGTACTTTTCGCGAAAACAAATTAATAAATTTCAAAATGATTATCAAC	623
Clementina	ACATCGGGTCGGCTAGGCTCGACCTACC-----GAA	758
Pineapple	ACAGTATGATGTACCCCCCccCcaaaaaa-a-----aaGAa	469
Valencia	ACAGTATGATGTACTCTTTCTGCCTATATA-TATGTATATTTATATA-----	902
Maxima	ACAGTATGATGTACTCTTCAACCCAACAAC-CCCCCCCCCCCCCCCC-ATATGAAT	783
	*	
Reticulata	TCCGTGATGCTTCTCCTTCTAAGCTGTAATACG--AGGCTTCATG----CAAGCTCAG	677
Medica	AAAAAGTTGATTGGAGATAATGGATTTAATATATTGTAGATTGTGATA--ATTTGTAAT	681
Clementina	ACCATTTTCAAC-CCACAATTCAATGTTGAAAAATCAACTC-TTCATTGCATATATAAG	816
Pineapple	TAAaATATCTTT-GTACTATTAAGACTTAAAAATT-AAACGCTTCAAAA-CTCAGAAAA	526
Valencia	-----	902
Maxima	AAAAATATCTTT-GTACTATTAAGACTTAAAAATTAACGCTTCAAAACTCAGAAAAA	842
Reticulata	TATTCCTTGAAATC---ATCACAATGAAGCCTCCCTTGCCTTTAAAACCACTGAA	734
Medica	AATTTCAAAAACTTCCATTTAACAGCGGTTGGTGAATGTGTGTGT-----AAA	731
Clementina	AATTCGAATGA-----GGCAATGAAGCATCTACCATTTAACTAAT--AAATAATTTAT	867
Pineapple	AATGAGTAAGAAAAATCAATCACATGAGCTTCTTCTCTGCCTATATA-----TAT	576
Valencia	-----	902
Maxima	AATGAGTAAGAAAAATAATCACATGAATCTCCTCTGCCTATATATATGATATTTAT	902
Reticulata	-AACCTCTGCAGTCTCAA--CCGAAAAAGAAATATATTCATCAAAACTTTTACACAT	791
Medica	ATAAT-----TTAATATTTGACAACAAGCGAAAGAATGTTGTTAAAACTCTTCAATAG	786
Clementina	TTTTT--TAAAACCATGATACACAATATATATCGAATATTTTAAATGCAATTA-----	920
Pineapple	ATATATATAACCTGTACATCACCACAACCATAGATTAAATTTGAGAATCCTTCCCAAGT	636
Valencia	-TATATATAACCTCGTGTATCACCACAACCACAGAATAATTTGAGAATCTTTGCCAAGT	961
Maxima	ATATATATAACCTCGTGTATCACCACAACCACAGAATAATTTGAGAATCTTTGCCAAGT	962
Reticulata	AT-----ATGTTAATTAGAGAATGATTTAAGTGTCCCAGCGGCTTGT-----	835
Medica	ATGTTCAATCTCACACATT-----CTACAAAAGCGGTTGTGAAAAAATT	832
Clementina	---ATTA AAAACACACAATGCAATTAATTA AAAATACACAATGTA-----	963
Pineapple	AT-ACCTGAAGCTAGCTTACACTGCATCTGTATATCCAATGTCTTCTTGCAAT- AATCC	694
Valencia	AT-AACTGTAAGCTAGCTTACACTACATCTGTATATCCAA-----	1000
Maxima	AT-AACTGTAAGCTAGCTTACACTACATCTGTATATCCAA-----	1001
	* * *	
Reticulata	-----	835
Medica	TTAATAAATTGACAAC TAGTGTAAAATCGTTATAAATTTTAAATCTCATTCAATCCATGAA	892
Clementina	-----	963
Pineapple	CTCAACCTTGGCTACCTCTGTAATGGTTTCAAATGTCT--TCCTCTTGCAACAATAGA	752
Valencia	-----	1000
Maxima	-----	1001
Reticulata	-----CGAGTTCGAATTTCTCA-GGAGATA	859
Medica	TTAGTAA-----AATTAATCTAAATCAATTC-----ATAATTC	926
Clementina	-----ATTCCACAACCATTTTATCCATACACAA	991
Pineapple	GCAGCCATCAGAATCATGGCAAAAAATAAGCCAGTCCAATGCCTTGTGAGaCCAAATAT	812
Valencia	-----	1000
Maxima	-----	1001
Reticulata	GAGAGTTAAAAAATGATTTGGGTTTTGCCACTTTTTTACATT-----	903
Medica	TGCAGATTAGAAGTAGATTGATATA-----	952
Clementina	TTCAATTTA-----	1000
Pineapple	GATAATTTGACAGTTGATAGGAGATCAGCAAACTACCAACCTTCAATTTGGGACCATGAT	872
Valencia	-----	1000
Maxima	-----	1001

Figura 9 – Continuação.

Reticulata	----TAAAAGGAATGAATAAGATAAACAGAGAGATCGATTC-----AAG----	943
Medica	-----ATCCATAT	960
Clementina	-----	1000
Pineapple	TTTTtGCAGTCACTGAATAGCAACTATACGGTATTGATTATTATTATTATTACGTAT	932
Valencia	-----	1000
Maxima	-----	1001
Reticulata	-TATTCGGATCTTGCATGTGCATGACAGAGTAAGCGAACTAATGAAAGGTACCTTGA---	999
Medica	TCATTCCACTTTTGCGAATTCAATACGGATTAATAA--AAAT-----	1001
Clementina	-----	1000
Pineapple	AAATTTCCTTTGTTCAATTCAAATTAGGACCATGAAT--AACTAAAACTAAaTGCTGTG	990
Valencia	-----	1000
Maxima	-----	1001
Reticulata	-----GA-	1001
Medica	-----	1001
Clementina	-----	1000
Pineapple	CATGTACAGGA	1001
Valencia	-----	1000
Maxima	-----	1001

Figura 9 – Fim.

Clementina	-----	0
Pineapple	ATGAGAATCTTTGCCAAGTATAACTGTAAGCTAGCTTACACTACATCTGTATATCCAATG	60
Medica	-----	0
Maxima	-----	0
Valencia	-----	0
Reticulata	-----	0
Clementina	ATGGCTTGCAAGTAACTCAATAGTTGCTTGTAAATGGCTCCAATGATCCGTTGCAAC--	58
Pineapple	TCTTCTTGCAATTAATCCCTCAACCTTGCTACCTCTGTAATGGTTTCAAATGCTTCTCT	120
Medica	-----	0
Maxima	-----ATGCTTCTTGCAATTAATGCCT	22
Valencia	-----	0
Reticulata	-----ATGAAGCTGCTGAGCTGGCTGGCT	24
Clementina	-----	58
Pineapple	CTTCCAACAAATAGAGCAGCCATCAGAATCATGGCAAAAAATAAGCCAGTCCAATGCCTT	180
Medica	-----	0
Maxima	CAACCT-----TGGTTACCTCTGTAATGGTT--TCAAATGCTTCTCT	63
Valencia	-----	0
Reticulata	AGT-----GATG--TGTATAAAGT--AAGTTGGGTGTT	56
Clementina	-----GGCGGTGAGCAATACCATGCGA	82
Pineapple	GTCAGCGCAAAATATGATAATTTGAC--AGTTGATAGGAGATCAGCAAACTACCAACCTT	238
Medica	-----	0
Maxima	CTTACAAC-AAATAAGCAGCCATCAGAATCATGGCAAAAAATAAGCCAGTCCAATGCCT	122
Valencia	-----	0
Reticulata	GTTACACCAACTAAAGCTGT-A-----ACAGATTATCCAGCTGGCTGGCA	102
Clementina	GTATTTGGAACCTGAACTCATAGAGTCTTTACCACTCCTTATACTTACGAGTTGTATG	142
Pineapple	CAATTTGGGACCATGATTTTTTGCAGTCACTGAATAGCAACTATAC-----GATGAAAC	292
Medica	-----	0
Maxima	TGATGAAGCATACAAAAGACGAGCAGAAGAGCTGAA-----	158
Valencia	-----	0
Reticulata	AGAGGTGGAGGTCAGAATTATAGAGTTTCCC-----	134
Clementina	CCAACAGATTAGATGAGTTGAAGCAAAAGGCTAAAGATTTGTTTGCATCCG--CCAAAGA	200
Pineapple	ATA-CAAAAGACGAGCAGAAGAGCTGAAGGGAAAAGTAAATGACAACAATTAAGGATGTAA	351
Medica	-----	0
Maxima	-----GGGAAAAGTGAAGATAGCGATTAAGGATGTAATCGAGCCTCTGGATCAGT	208
Valencia	-----	0
Reticulata	-----TGGAAATAATCAGAATTATTTGGTAGAGGTTCTGGATACAA	176
Clementina	AAGCACTAG-TGAACATTAAAGCTAACTGACTCGGTGCAAGTGGGAGTGGCATACC	259
Pineapple	CCGAGCCTCTGGATCAGTTGGAGCTGATTGACAACCTGCAAAAGACTTGGATTGGCTTATC	411
Medica	-----	0
Maxima	TGGAGCTGATTGATA-ACCTGCAAAAG--ACTTGGATTGGCTCATCGTTTTGAG-ACTGAG	264
Valencia	-----	0
Reticulata	CAATTCTGCTTTTGG-ATCTGGATTCAGACCAACTTTCCAGGGCAA-----G-CTGGAC	229
Clementina	ATTTTGAAGAAGAGATCAAAGAGGCCATGAATATTCTCAA-----AGGAG	304
Pineapple	ATTTTGAAGACTGAGATTCGGAACATATTGCACAATAACTACAACAATAATAAGATTATA	471
Medica	-----	0
Maxima	ATTAGGAACATA-----TTGAATAATATCTACAACAATAATAAGATTATA	310
Valencia	-----	0
Reticulata	CTACTGGACCTTTC-----TTTGGCTATGTTGCCATCAGAATCCAG-----G	272
Clementina	ATGCTACCATCAAAGATCTTAATGCAACGCTCACTGCATTTTCG-----CCTTCTACGTGA	359
Pineapple	ATTGGAGAAAAGAAAATCTGTATGCAACC-----TCCCTCGAGTTTAGACTACTTAGAC	525
Medica	-----	0
Maxima	ATTGGAGAAAAGAAAATCTGTATGCAACCTCCCTTGAATTCAG-----ACTACTTAGACA	365
Valencia	-----	0
Reticulata	ATTCATGAATCCTCAAGGTGCCTTTGACTTTCCAAGTGCAAAATGGTATTACTGTTGT	332
Clementina	ACACGGCCATCCAGTTAGTACAGGTGTTTGTATAAATCAGAAAAAGGGACGGGAGGTT	419
Pineapple	AACATGGCTATCCTGTTTCTCAAACGTTTCAATGGTTTAAAGACG-ACAAGGGGGGCT	584
Medica	-----	0
Maxima	ACATGGCTATCCTGTTTCTCAAGAGGTTTCAATGGTTTAAAGACG-GCCAGGGAGGCT	424
Valencia	-----	0
Reticulata	TCCAACAGCAAACATCACTGCAGAGTTTTCAATGGTTTAAAGACG-ACAAGGGAGGCT	391

Figura 10 - Alinhamento das sequencias codificadoras dos genes “Cs3g04230.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g021595m” (“Pineapple”), “Cg3g004080.1” (*C. maxima*), “Cm257240.1” (*C. medica*) e “MSYJ271170.1” (*C. reticulata*).

Clementina	CCATGACAATTTACGAGAAGACATAGAAGGGCTTTGAATTTATTTGAAGCTTCATTCT	479
Pineapple	TCATTTGTA-----ATGATTTCAAGGGAATAAAGCTTGCATGAAGCCTCGTATTA	636
Medica	-----	0
Maxima	TCATTTGTG-----ATGATTTCAAGGGAATACTGAGCTTGCACGAAGCCTCGTATTA	476
Valencia	-----	0
Reticulata	TCATTTGTA-----ATGATTTCAAGGAAATAATGAGCTTGCATGAAGCCTCGTATTA	443
Clementina	TGGAATTGAAGGAGAGGATGTTCTAGAAGAAGCCAATTTTTTGTACTGAGCATCTAAA	539
Pineapple	CAGCTTGGAAAGGAGAAAGCATCATGGAGGAGGCCTGGCAATTCACCAGTAAACATCTAAA	696
Medica	-----ATGGAGAAGGCCTGGCAATTCACCAGTAAACATCTTAA	38
Maxima	CAGCTTAGAAGGAGAAAGCATCATGGAGGAGGCCTGGCAATTCACCAGTAAACATCTTAA	536
Valencia	-----	0
Reticulata	CAGCTTGGAAAGGAGAAAGCATCATGGAGGAGGCCTGGCAATTCACCAGTAAACATCTTAA	503
Clementina	GGAGTCATTAGGGA-C----GTTGGGGAGCAAAATCATACTGGCTGAGCAGGTACAACA	593
Pineapple	AGAAGTGATGATCAGCAAGAGCAAGCAAGGGGATGTCTTTGTAGCAGAACAAACAAAGCG	756
Medica	AGAAGTGATGATCAGCAAGAGCAAGGAAAGCATGATATTTGTAGCAGAACAAAGCGAAGCG	98
Maxima	AGAAGTGATGATCAGCAAGAGCAAGGAAAGCATGATATTTGTAGCAGAACAAAGCGAAGCG	596
Valencia	-----	0
Reticulata	AGAAGTGATGATCAACAAGAGCAAGCAAGGGGATGTCTTTGTAGCAGAACAAAGTAAAGCG	563
Clementina	ATCTTTAGACATCCCTTCATATTGGAGGATGCCAAGAATTGAGGCTCAGAACTTCATCAA	653
Pineapple	TGCACTGGAGCTTCCCTCTGCTTTGGAAAGTTCCAATGTTAGAGGCAAGGTGGTTTCATAGA	816
Medica	TGTAAGTGAGCTTCCCTCTGCTTTGGAAAGTGCATGTTAGAGGCAAGGTGGTTTCATACA	158
Maxima	TGCACTAGAGCTTCCCTCTGCTTTGGAAAGTGCATGTTAGAGGCAAGGTGGTTTCATACA	656
Valencia	-----ATGTTAGAGGCAAGGTGGTTTCATAGA	26
Reticulata	CGCACTGGAGCTGCTCTCATATTGGAAAGTTCCAATGTTAGAGGCAAGGTGGTTTCATGGA	623
	* *	
Clementina	ATTATACCCACAGATGATGAAAGCAGTCCAATTTTGCTGACTTAGCAAGTGGATTA	713
Pineapple	CGTTTATGAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTGGAAATT	876
Medica	CGTTTATGAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTGGAGTT	218
Maxima	CGTTTATGAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTGGAGTT	716
Valencia	CGTTTATGAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTGGAAATT	86
Reticulata	CGTTTATGAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTGGAAATT	683
	* *	
Clementina	CAATTTAGTACAATCCATACACCAACAAGAAGTGAAGGAGTGGCAAGGTGGTGGAGTAA	773
Pineapple	CAACGTTTTGCAGGCAATTTACCAGGAAGAACTTAAAGATGTTTCAAGTGGTG-----	929
Medica	TAACACTTTGCAGGCAATTTACCAGGAAGAACTCAAAGACATTTGGGGTATCCATGTCT	278
Maxima	TAACACTTTGCAGGCAATTTACCAGGAAGAACTTAAAGACATTTCAAGGTGGTGGAAAGGA	776
Valencia	CAACGTTTTGCAGGCAATTTACCAGGAAGAACTTAAAGATGTTTCAAGGTGGTGGAAAGGA	146
Reticulata	CAACGTTTTGCAGGCAATTTACCAGGAAGAACTTAAAGATGTTTCAAGGTGGTGGAAAGGA	743
	** *	
Clementina	TCTGGGTTTTAAAGAGAACTAAGTTTTGCCAGAGACCGGTTGATGGAAAATTTATTTGTT	833
Pineapple	-----	929
Medica	TGACTGC-----	285
Maxima	TACAGGCTTGGAGAGAAATGAGCTTTGCGAGGGACAGCTTGGTAGCATCCTCTTATG	836
Valencia	TATAGGCTTGGAGAGAACTGAGCTTTGCGAGGGACAGCTTGGTAGCATCCTCTGATG	206
Reticulata	TATAGGCTTGGAGAGAACTGAGCTTTGCGAGGGACAGCTTGGTAGCATCCTCTGATG	803
Clementina	GGTGATGGCCTTTGTTCAAAGCACAGTTTTCTAAGTGCAGAATGGCCTCACAAAATT	893
Pineapple	-----	929
Medica	-----	285
Maxima	GAGCATGGGGATAGGGTCTGAGCCTCAATTCGCCTATTGCAGGAGAATAGTCACAATTGC	896
Valencia	GAGCATGGGGATAGTGTGAGCCTCAATTCGCCTACTGTAGGAGAATACTCACAATCAC	266
Reticulata	GAGCATGGGGATAGTGTGAGCCTCAATTCGCCTACTGTAGGAGAATACTCACAATCAC	863
Clementina	TGTATGCATATTAAGTGCATTGATGACATTTATGATGATATGGATCAATAGATGAGCT	953
Pineapple	-----	929
Medica	-----	285
Maxima	AATAGCTCAATTTACAGTGATTGATGACATTTATGATGTTTATGGAACTTTGGACGAACT	956
Valencia	ATTTGCTCAATTTACAGTGATTGATGATTTATGATGTTTATGGAACTTTGGATGAACT	326
Reticulata	ATTTGCTCAATTTACAGTGATTGATGATTTATGATGTTTATGGAACTTTGGATGAACT	923
Clementina	TGAACTCTTTACAGAAGCAGTGAAGGTTTTCCACCATCTTATATATTATCCTTTTGT	1013
Pineapple	-----	929
Medica	-----	285
Maxima	TGAGCTATTTCACTGCTGCTGTTGAGAGGTGGGACATCAATTA-----	998
Valencia	TGAGCTATTTGCTGCTGCTGTTGAGAGGACTTTGATAT-----	364
Reticulata	TGAGCTATTTGCTGATGCTGTTGAGAGGTGGGACATCAATTA-----	965

Figura 10 – Continuação.

Clementina	TATGGGGATTCCCCTAAAATCCGGTGGGAAATGGGGCAGTACTGGAGGAGCTGCCAGA	1073
Pineapple	-----	929
Medica	-----	285
Maxima	-----TGCTTTGAACCACCTTCGGGA	1019
Valencia	-----	364
Reticulata	-----TGCTTTGAACCACCTTCGGGA	986
Clementina	ATATATGCAGATTTGCTACTTGCCCATGTTAACTTTGGAAATGAGTTGGCATGTGATGT	1133
Pineapple	-----	929
Medica	-----	285
Maxima	CTATATGAAAATCTGTTTTCTTGCGCTTTACAACCTGGTTAATGAATTTACTTATTACGT	1079
Valencia	-----	364
Reticulata	CTATATGAAAATCTGTTTTCTTGCGCTTTACAACCTGGTTAATGAATTTACTTATTACGT	1046
Clementina	TATGAAAATTCATGGCCTCAATACTCTATCCTACATTAAGAAAAGAGTGGGAAAATCTGTG	1193
Pineapple	-----	929
Medica	-----	285
Maxima	ACTCAAACAACAGGATTTTGATATACTTCGAAGTATAAAAAATGCGTGGCTTGGCAATAT	1139
Valencia	-----ACTTCGAATGGCTTGGCAATAT	386
Reticulata	ACTCAAACAACAGGATTTTGATATACTTCGAAGTATAAAAAATGCGTGGCTTCGTAATAT	1106
Clementina	TACATCATACCTAGTAGAAGCCAGATGGTTTAGCAAAGGGTACACGCCAACTGCGAAGGA	1253
Pineapple	-----	929
Medica	-----	285
Maxima	ACAAGCCTACTTTGTGGAGGCGAAATGGTACCATTGGTAAGTACACGCCAACTCGGGA	1199
Valencia	ACAAGCCTACTTTGTGGAGGCGAAATGGTACCATTGGTAAGTACACGCCAACTCGGGA	446
Reticulata	ACAAGCCTACTTTGTGGAGGCGAAATGGTACCATTGGTAAGTACACGCCAACTCGGGA	1166
Clementina	ATACATAGAAAATGCATGGGTTTCACTGGGAAGCCCTGCTGCCATTGTCCATGCCTATAT	1313
Pineapple	-----	929
Medica	-----	285
Maxima	ATTCTTGGAAAATGGATTGGTATCAATAGGAGGCCCTATGGTTACAATGACTGCATACCT	1259
Valencia	ATTCTTGGAAAATGGATTGGTATCAATAGGAGGCCCTATGGTTACAATGACTGCATACCT	506
Reticulata	ATTCTTGGAAAATGGATTGGTATCAATAGGAGGCCCTATGGTTACAATGACTGCATACCT	1226
Clementina	CCTGTACAACCTCCAAGGAAGCAATGCCTTGACCGAAAATTCACCTCAGCTGCCTCAAAGT	1373
Pineapple	-----	929
Medica	-----	285
Maxima	TTCTGGGACAA-----ATCCAATCATTGAGAAG-----GAACTAGAATT	1298
Valencia	TTCTGGGACAA-----ATCCAATCATTGAGAAG-----GAACTAGAATT	545
Reticulata	TTCTGGGACAA-----ATCCAATCATTGAGAAG-----GAACTAGAATT	1265
Clementina	CGAACATGGCTATGATGAGATGATATATTGGTCATCTCTCATCAGTCGGCTCAGTAACGA	1433
Pineapple	-----	929
Medica	-----	285
Maxima	TTTAGAAAGTAATCGAGATATAATCACTGGTCATTCAAGATTCTTCGTCTTCAAGATGA	1358
Valencia	TTTAGAAAGTAATCGAGATATAATCACTGGTCATTCAAGATTCTTCGTCTTCAAGATGA	605
Reticulata	TTTAGAAAGTAATCGAGATATAATCACTGGTCATTCAAGATTCTTCGTCTTCAAGATGA	1325
Clementina	TTTGGGAAATCCGCGGTTGAGTTGAAGAGAGGGGACGTGGCGAAAATCTATTCAAGTCTA	1493
Pineapple	-----	929
Medica	-----	285
Maxima	TTTGGGAACGTATCGGATGAGATACAGAGAGGGGATGTTCCGAAAATCAATCCAGTGTTA	1418
Valencia	TTTGGGAACGTATCGGATGAGATACAGAGAGGGGATGTTCCGAAAATCAATCCAGTGTTA	665
Reticulata	TTTGGGAACGTATCGGATGAGATACAGAGAGGGGATGTTCCGAAAATCAATCCAGTGTTA	1385
Clementina	CATGATTGAAGAAGGCATATCAGAAGAAGAAGCAAGGGACCGTATAAAAAAGTTTGATAAT	1553
Pineapple	-----	929
Medica	-----	285
Maxima	CATGCACGAAACTGGTGCCTCGGAGGAAGTTGCTCATGAACACATCAAGGATATGATGAG	1478
Valencia	CATGCACGAAACTGGTGCCTCGGAGGAAGTTGCTCATGAACACATCAAGGATATGATGAG	725
Reticulata	CATGCATGAAACTGGTGCCTCGGAGGAAGTTGCTCGTGAACACATCAAGGATATGATGAG	1445
Clementina	TTACTCTGGAAAAGCTGAATGGCAAGAATCTTTATAAAAAGTATTTCCAGAAA----	1609
Pineapple	-----	929
Medica	-----	285
Maxima	ACAGATGTGGAAGAAGGTGAATGCATACAGAGCTGATAAAGATTCTCCCTTATAG----	1533
Valencia	ACAGATGTGGAAGAAGGTGAATGCATACAGAGCTGATAAAGATTCTCCCTTATAG----	780
Reticulata	ACAGATGTGGAAGAAGGTGAATGCATACAGAGCTGATAAAGATTTCCCTTATCGCAAAC	1505

Figura 10 – Continuação.

Clementina	GCATGGCGAAAAATGTGTTTAGACATGTCTAGAACTGCACATT---GCATTTTCCATGGAG	1666
Pineapple	-----	929
Medica	-----	285
Maxima	-----	1533
Valencia	-----	780
Reticulata	TACAGTCGAATTCATATTGAATGTTGT-GAGAGTGCCCATTTTATGTATCTACATGGAG	1564
Clementina	ATGGTATAGGAACATCAACCGGGTTTCTAGAGATCGTTTGGTCTCTTTAATACTTGAGC	1726
Pineapple	-----	929
Medica	-----	285
Maxima	-----	1533
Valencia	-----	780
Reticulata	ATGGGCATGGGGCTCAAACCAAGAGACTATGGATGTAGTTTTACATTGCTTTTTTCAGC	1624
Clementina	CTATACCAGTTGAATTGTAA-----	1746
Pineapple	-----	929
Medica	-----	285
Maxima	-----	1533
Valencia	-----	780
Reticulata	CAATTCCTTGGACGACAAACACATAGTGGCCACATCATCACCTGTACCAAAGGATGA	1683

Figura 10 – Fim.

Clementina	-----MAC-	3
Valencia	-----	0
Reticulata	MKLLS-----WLASDVYKLVGLLFTPTKAVTDYPAGLPRG--	36
Pineapple	MRIFAKYNCKLAYTTSVYPMSSCINPSTLATSVMGFKCLPLPTNRAAIRIMAKNKPVQCL	60
Maxima	-----MSSCINASTLVTSVMGFKCLPLTTNKAIRIMAKNKPVQCL	41
Medica	-----	0
Clementina	SNNSIVACNGSNDPLQRRSANYHASIWNPELIESFTTPYTYELYANRLDELKQKAKDLFA	63
Valencia	-----	0
Reticulata	GGQNYRGFPGNQNYFGRGSGYNNSAFGSGFRP---N----FPR-----	73
Pineapple	VSAKYDNL----TVDRRSANYQPSIWDHDFLQSLNSNYTDETYKRAEELKGVMTTIK	115
Maxima	-----DEAYKRAEELKGVKVIKAIK	61
Medica	-----	0
Clementina	SAKESTSELLKLTDSVQKLGVAHYHFEIEKEAMNILKG----DATIKDLNATSLHFRL	118
Valencia	-----	0
Reticulata	-QAGP-TGPFYGYVAYQNP-----FMNPQGAFFPSAN-----GDYT	109
Pineapple	DVTEP-LDQLELDNLRQLGLAYHFETEIRNLIHNNYNNKDYNNWRKENLYATSLEFRL	174
Maxima	DVIEP-LDQLELDNLRQLGLAHRFETEIRNLIHNNYNNKDYNNWRKENLYATSLEFRL	120
Medica	-----	0
Clementina	REHGHPVSTGVFDKFRKRDGRFHDNLREDIEGLLNFASFLGIEGEDVLEEANIFCTEH	178
Valencia	-----	0
Reticulata	GVPTANITADVFNFGKDDKGGFIC---NDFKEIMSLHEASYSFEGESIMEEAWQFTSKH	166
Pineapple	RQHGYVPSQDVFNFGKDDKGGFIC---NDFKGIISLHEASYSLLEGESIMEEAWQFTSKH	231
Maxima	RQHGYVPSQEVFNGLKDGQGGFIC---DDFKGILSLHEASYSLLEGESIMEEAWQFTSKH	177
Medica	-----MEKAWQFTSKH	11
Clementina	LKESLGT--LGSKIILAEVQVQSLDIPSYWRMPRIEAQNFIKLYPTDESSPILLTLAKL	236
Valencia	-----MLEARWIDVYEKREDKNQLLLELAKL	27
Reticulata	LKEVMINKSKQGDVFAEQVKRALELPLHWKVPMLERWFMDVYEKREDKNHLLLELAKL	226
Pineapple	LKEVMINKSKQGDVFAEQTKRALELPLLWKVPMLEARWIDVYEKREDKNHLLLELAKL	291
Maxima	LKEVVISKSKEEHVFAEQAKRALELPLHWKVPMLERWFIHVYEKREDKNHLLLELAKL	237
Medica	LKEVMINKSKEEHVFAEQAKRVLELPLHWKVPMLERWFIHVYEKREDKNHLLLELAKL	71

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Figura 11 - Alinhamento das sequencias de proteina dos genes “Cs3g04230.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g021595m” (“Pineapple”), “Cg3g004080.1” (*C. maxima*), “Cm257240.1” (*C. medica*) e “MSYJ271170.1” (*C. reticulata*).

Clementina	DYNLVQSIHQQELKELARWWSNLGFKEKLSFARDRLMENYLVMGLCFKAQFSKCRIGLT	296
Valencia	EFNVLQAIYQEELKDVSRLWKDIGLGEKLSFARDSLVASFVWSMGIVFEPQFANCRRLIT	87
Reticulata	EFNVLQAIYQEELKDVSRLWKDIGLGEKLSFARDSLVASFVWSMGIVFEPQFAYCRRRLIT	286
Pineapple	EFNVLQAIYQEELKDVSRLWKDIGLGEKLSFARDSLVASFVWSMGIVFEPQFAYCRRRLIT	310
Maxima	EFNVLQAIYQEELKDVSRLWKDIGLGEKLSFARDSLVASFVWSMGIVFEPQFAYCRRRLIT	297
Medica	EFNVLQAIYQEELKDVSRLWKDIGLGEKLSFARDSLVASFVWSMGIVFEPQFAYCRRRLIT	95
	::* :*:*:**:***:..	
Clementina	KFVCILTAIDDIYDVYGSIDELELFTFAVKSFPSPSYILSFCFMGISPKIRWEIGAVLEEL	356
Valencia	ITFALISVIDDIYDVYGTLELELFAAAVE-----RTLI-----	121
Reticulata	ITFALISVIDDIYDVYGTLELELFAAAVE-----RWDINYALNHL	327
Pineapple	ITFALISVIDDIYDVYGTLELELFAAAVE-----RWDINYALNHL	310
Maxima	ITFALISVIDDIYDVYGTLELELFAAAVE-----RWDINYALNHL	338
Medica	ITFALISVIDDIYDVYGTLELELFAAAVE-----RWDINYALNHL	95
Clementina	PEYMQICYLAMFNFGNELACDVMKIHGLNTLSYIKKEWENLCTSYLVEARWFSKGYTPTA	416
Valencia	-----YFEWLGNIQAYFVEAKWYHGKYTPTL	147
Reticulata	PDYMKICFLALYNLVNEFTYVVLKQQDFDILRSIKNAWLRNIQAYLVEAKWYHGKYTPTL	387
Pineapple	PDYMKICFLALYNLVNEFTYVVLKQQDFDILRSIKNAWLRNIQAYLVEAKWYHGKYTPTL	310
Maxima	PDYMKICFLALYNLVNEFTYVVLKQQDFDILRSIKNAWLRNIQAYLVEAKWYHGKYTPTL	398
Medica	PDYMKICFLALYNLVNEFTYVVLKQQDFDILRSIKNAWLRNIQAYLVEAKWYHGKYTPTL	95
Clementina	KEYIENAWWSVGSPPAIVHAYILLQLQGSNALTENSLSCLKVEHGYDEMIYWSSLISRLS	476
Valencia	GEFLENGLVSIGGPMVTMTAYL----SGTNPIIEKELEFLE---SNRDIHWSFKILRLQ	200
Reticulata	GEFLENGLVSIGGPMVTMTAYL----SGTNPIIEKELEFLE---SNQDIIHWSFKILRLQ	440
Pineapple	GEFLENGLVSIGGPMVTMTAYL----SGTNPIIEKELEFLE---SNRDIHWSFKILRLQ	310
Maxima	GEFLENGLVSIGGPMVTMTAYL----SGTNPIIEKELEFLE---SNRDIHWSFKILRLQ	451
Medica	GEFLENGLVSIGGPMVTMTAYL----SGTNPIIEKELEFLE---SNRDIHWSFKILRLQ	95
Clementina	NDLGNSAVELKRGDVAKSIQCYMIEEGISEEEARDRIKSLIYSWKKNLNGKNLYKSDPFE	536
Valencia	DDLGTSSDEIQRGDVPKSIQCYMHETGASEEVAHEHIKDMMRQMWKKNVAYRAD-KDSPL	259
Reticulata	DDLGTSSDEIQRGDVPKSIQCYMHETGASEEVAHEHIKDMMRQMWKKNVAYRAD-KDFPL	499
Pineapple	DDLGTSSDEIQRGDVPKSIQCYMHETGASEEVAHEHIKDMMRQMWKKNVAYRAD-KDSPL	310
Maxima	DDLGTSSDEIQRGDVPKSIQCYMHETGASEEVAHEHIKDMMRQMWKKNVAYRAD-KDSPL	510
Medica	DDLGTSSDEIQRGDVPKSIQCYMHETGASEEVAHEHIKDMMRQMWKKNVAYRAD-KDSPL	95
Clementina	S--MAKMCLDMSRTAH-CIFHGDGIGTSTGVSRLVSLILEPIPVEL-----	581
Valencia	*-----	259
Reticulata	SQTTVEFILNVRVSHFMYLHGDGHGAQNQETMDVVFTLLFQIPLDDKHIVATSSPVTK	559
Pineapple	-----	310
Maxima	-----	510
Medica	-----	95
Clementina	-	581
Valencia	-	259
Reticulata	G	560
Pineapple	-	310
Maxima	-	510
Medica	-	95

Figura 11 – Fim.

Clementina	-----TGGG-	4
Maxima	AAAGAAATTTTTTAATCCGTATTGAATTCGAAAAGTGAATGAAT-----ATGG	52
Reticulata	-----TGAGACTAT-----ATGG	13
Valencia	---ATCTATCTCGT-----TCCACTTGTCATCAGTTATCTCCATGGCCCTTCTCT	48
Pineapple	-----AATCT-	5
Medica	-----CATGATGCTT-----TCTCCTTCTAAGCTGAATA-----CGAG	34
Clementina	-----GAGAATATAATTAATATGATTTACAATTTGTAGGGGAATGC--TTAGAAGA	53
Maxima	ATTA-----TATCAAATCCACTTCTAATCTGAAGAA--TTATGAATT	92
Reticulata	A-----TACTAATCTTAAAT--ATAGGGACT	38
Valencia	AATTACTGCCAAGCAATTATTTTCCCTCAATACAGTTTCATCTTCATTT--TCCACAAC	106
Pineapple	-----	5
Medica	GCTTCATGCAAGC-----TCAGTATCCCTTGAAATCATCACAAT	76
Clementina	AACAGATACAATATAACAATATATACATATACACACACACACA-----CACAGAGTT	107
Maxima	GAATTTAGA--T-----TAAT-----TTTACTAATTCATGGATTG	125
Reticulata	AAATGAGCA--TTTATCCTTATTTAGAT---ACATACATTTGTAGTACAACCGAGATGC	92
Valencia	AAAAAATTA--TTTCCGTTAAATTTCTCAATTTCAACTTTACCACCATTTTGTGTGATA	164
Pineapple	-----ATGG--TTTGTGGTG-----	18
Medica	GAAGCCTCC--TTTGTGCTTTTAAACCATTGAAAACCTCTGCAGTATTACAGCAAATC	134
Clementina	TCTTAAATAGAAAGAAAGCATCAAGT---TGTTGAGAATAGTTGCAAGTTGTGAGAGGG	164
Maxima	AATGGGATTA---AATTATAACGATTTTACACTAGT--T---G---TC-----	165
Reticulata	CCTTAGGCATGA---GCTAAAAATCTATTTTCACTAAT--A---TGAGGG-----	135
Valencia	ATACTGCACACAA---GCTAGTATATCACCTTGAATAATTGTGAGTATGTGTGAGAATG	220
Pineapple	-----	18
Medica	AAATTAGATTCATCAAAATTTTAGGTATATATATAAAATGTTCCAATCAGAGATCCCT	194
Clementina	ATGCCA---AATTCATC---AATTAACCTGATACAATTCAGAGTCAAC--GATCAT	213
Maxima	-----AATTATTAGAATTTTTTCAACCG	190
Reticulata	-----AGACATATCTATCCTATCCAATCTA	160
Valencia	CACACCAAGAAAGTT-----CCCAGGAAAGACTGGAGGGTCACAATGGTCCC	268
Pineapple	-----	18
Medica	AACCGTATTAAAGTCAGGAATAAACTAACAAACAAAAAATAGACTCCAATGCAATGTA	254
Clementina	GTTTACGTTGAACCTTGCCTTCTTT---GACTATTATGGGTGTGTGAG-----	259
Maxima	GCTTTTGTAGAATGTTGTGAGATTG--AACATCTATTGAAGAGTTTTTAACA--ACATTCT	247
Reticulata	TCTTTTGTAGT---GTAATTATTTT---GAAATATAT--AATTTTTTTTTTCAAAAGTACT	212
Valencia	ACTTAAACCCAGACTCCTTAA-----GCTCTTATCGCCTTTGTGACAGAA---CAT	317
Pineapple	-----	18
Medica	ACTTGTCTTGTAGTATATTGAAATTTGTAATTTTTTTTTTATTTTATCTCATCCCTAAT	314
Clementina	-----GTTGCATTAATACCTCTATTCCCTCAAAGATTTTAG	296
Maxima	TTCGCTTGTGTCAAATATTAATAATTATT--TTACAACACACATTCACCAACCGCTGTTAA	306
Reticulata	TTATAACTATAACAATAA-----GATTTTAGTTAGATTTGTTAA	252
Valencia	TCCTAGACATGTACAAAACCATAGTTGTTTACTCACACCCTATTCCCTGCTTGCACC	377
Pineapple	-----	18
Medica	TTTAATACGGTTGGGAATCGCTATTGGAAATCCACTATATATGTCCAGCTA---CC	370
Clementina	ATAACC--TTTTTATATTACATTATTGATTTTTTTCATCAAAATAAATACA---CAAATA	350
Maxima	ATGGAAGTTTTTGAATTTATCAAAATATCACAATCTACAATATATTAATAATCCATTA	366
Reticulata	ATAAAACAGGTCT-----TTATCTCTTTTATAATTTTGTAGTATTTTGTAGTATTAATG	305
Valencia	ACAAAA--TTCTGGATCGCTCCACCATTCCACGTGAAT---AGTAT---CATATA	426
Pineapple	-----ATGTACGAGGTTA---TATATA	37
Medica	GTGCAT---TTAGTGCATGGTACCCCTCATTTGTCTATATAGTGTG---CCGTTA	423
Clementina	CACAGA--TGTCACCATACGTATATTAAGT---GTATATAGTATAATAAATAAC-----	400
Maxima	TCTCCAATCAACTTTTGTGATAATCATTTTAAATTTTATAATTTGTTTCCGCAAAA	426
Reticulata	ATTAACATTAAAGATTTCTTTGTAACCTTGCCTGTTCTTATTTTATGTAAGTACGTAAA	365
Valencia	CGTGAA-----CAG---TGCCGTA--TATGTGAATAGTAC-----	456
Pineapple	CATGACACGTAAACGACGACTTCT--GA-----AAAACCATtGTTTTTaaGGGA--	84
Medica	GATCAACATAGAACCTGCTTAAATGACAT---GGATATATTTCTGATTTTTAACAT--	478
Clementina	-TCTAAAATCACTGTTATTCTCATACATTCTAATAGTATTATAAACATATCATTATCCA	459
Maxima	GTACTTTATAACTGTAACAGATAGAATTCGATGTTAGT-----GCTCAACATTAAGAT	480
Reticulata	ACAAGTTTTTAAATGTAATAAATAGGACTTTTGAAGCAA-----AGTTAAATTTATGAA	419
Valencia	-----CCTTACGTGAATAGTACCTGACTCCAA--A-----AAT-----ACA	490
Pineapple	---TGC--CATTCAAGTTTCG-----	101
Medica	---TGATGCTCCGATGTTTTTAAAAAATCAAAGAATA-----AAA-----AAA	520

Figura 12 - Alinhamento das sequencias promotoras dos genes “Cs3g04230.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g021595m” (“Pineapple”), “Cg3g004080.1” (*C. maxima*), “Cm257240.1” (*C. medica*) e “MSYJ271170.1” (*C. reticulata*).

Clementina	TTTGATAATGACTACGGTTG---TTTCAAAGTATATAAAAAATGTTACAATAAGACGTT	516
Maxima	ATTGTTTGCAACTTGTATGCCTTTTTTTTTTCTTAAATTTACTT-----TGTAT	531
Reticulata	TTTTTTTTGTCATTAAATATGTGTATTATTATAATTATATGGCTTATAGAAACACTCTTT	479
Valencia	ATCAATAGCTCTGATACCAC-----TGTAGTAAATGGTGG-----GTG	530
Pineapple	-----	101
Medica	ATTGACACCTAATTTAAATATTTTATATTTTTTATTTTATTTGATCC-----ATT	569
Clementina	CAATTAATCGGACTG-ACCAAAA--TATTATGGCAGTATGGTGGATACACCA-----AA	567
Maxima	ATTCTTATTTCTACATAAAAAAAGATTTTAAATGTAATAAATAGAACTTTTATTAGTAGAA	591
Reticulata	AAAAAAATTTGTAGCGAAAAAAATGA-----CAAATAAATAACAATTATACAAC--AAG	532
Valencia	AAGCAGGACCGCAGCTAACATAAAATTTGGAAGAAAAAAGAACAAGCACAA-----GAG	585
Pineapple	-----AACTTTAGC-----CCACCAAAAGAAAA-----AAT	128
Medica	TACCAATTTGACTC-----TTAGAATTAAATATAATAAAGGACAA-----TAA	614
	* * *	
Clementina	CTTGATTCAATGATTAGTAGGGATGGCA-----AAACA-----TCGGGTGCGG-	609
Maxima	TTGAATTTATGAATTTCTGTCTTCTGC-GTGCATTATTGTGTAGTTTATTGAAAG-	649
Reticulata	CCAGCCCTTCAAGGGCGTGGTGGGTGG-TTGCATTGCGACTGTAACCTTACCACAA-	590
Valencia	AGGACATCAGAAATACGTGGTTCGGCTTT-----TAGCCTACGTCCA-CGGCGGAAGA	638
Pineapple	CTT-----	131
Medica	CTTGTAACAACTTTTAGAACATAAAATATTTTTATAAACTACATAATATCGATTTAAT	674
Clementina	-GCTC-----GGG-----CTTGGCCAACCCA-AC	632
Maxima	-ACTC-----TTTAAAAAT--TTGTATGACAGGAAAA	679
Reticulata	-ATTCGGGTTATTTTGTGGATGATAAGGGGAGTAAAACTGTATTTAGCCTTGCCAC	649
Valencia	CAGAAGGAAATATTTTACTAGTGAAAGGAGTTACA--AGT-ATTGTAGTATTTTA--G	692
Pineapple	-----	131
Medica	CTATAATAAATAATTTAAATGTACAATAAAAGTATATTAATT-TATCAATAATATTA--A	731
Clementina	CCGA----CCTGATCAATAGAGAATTAAGC----CCGACCTTAAAAAACCATACGT	682
Maxima	AAAAAGT--AAATAAATAAAGATTATACAACATTCATCGGAATGTATGGATGATGTATGT	737
Reticulata	CCCCCTTACCTTTAAGGAAAAAACAATGCCAGCGAATGT-----ACATATTTGA	704
Valencia	CTCA----CTTCCAAAATCTCAATACACCCAAACTCTCAGAACACTAATCACTCAAGA	747
Pineapple	-----	131
Medica	TCTA----TTTTTTGAAACAGCATAAAATCTATTTAATCAATTATAAATAAATTTAAT	786
Clementina	ATT-TATATTTAGGGTCGGGTCGGGCCCGACCCGAATCGGGCAACATCGGGTCGGGCTA	741
Maxima	GTC-----TTCTGGTACAATATTGACCTCGTTCGCAC--AGTATGATGACTCCTTTTT	789
Reticulata	ACC-----TGCTGGCATGTTAGAATCCCTCACAAGA--GGGAAGATGACTCCTTTTT	756
Valencia	GTT-----TATTAACCTTAAATACTC---TCAACTC--GAAAGGAAGGAAATGCTTCT	796
Pineapple	-----	131
Medica	ATATTATAAAATTAATTTAATAATAACATGAACAA--ATAACAACGTAATAAATTTTC	844
Clementina	GGCTCGACCCTACGAAACCATTTTCAACCACAATTCATGTTGAAAAATCAACTCTCTT	801
Maxima	TTTTCCCCCAATGAATAAATAAATTTGTACTATTAAGACTTAAAAATTAACGCTTT	849
Reticulata	TT-----TTTAATGAATATAATATCTTTGTCCAACCTAAGACTTACAAATTACATGCTTT	810
Valencia	CTC-----TCGATGGAATAC-----AACAGTTCTTCATTT	826
Pineapple	-----	131
Medica	ATA----A-----CTATCAACTAT	859
Clementina	CATTGCATATATAAAGAT--TCGAATGAGGCAATGAAGCATCTACCATTTAACTAATAAAA	859
Maxima	CAAAA-----CTCAAT---GAGTACGAAAAGTAAATCACATGAACCTTCTCCTGCGC	899
Reticulata	GAAAATCTCAGGGAAAAAT---GAATAAGAAAAATAAATCGCTTGCACTTCTCCGCTGCC	866
Valencia	GCACCTCTATTTATAAAAAAATGATGGCCAAGAAAGTCAAAACCGTGTCTCTTTTTTCA	886
Pineapple	-----	131
Medica	GGTTTAGTATTTAAATAT---GAACAATAGGAATATACTCTAAGTGTA--ATAATACA	913
Clementina	TAA-TTTATTTTTTAAACCATGATACACAAATATATATCGAATATTTTTAA--TGCAA	916
Maxima	TAT--ATATATATATAACCTCGTACATCACCAAAACATAGATTAATTTGAGAATCTTT	957
Reticulata	TATATATATATATAACCTTGTGCATAACCGCAAACCATAGATTAATTTGAGAATTTTT	926
Valencia	AAA--CCATGTTCTCAT-----TTTCTTCTCAAACCTGCTTCTTTTTCC-ATTTTC	935
Pineapple	-----	131
Medica	AAT--ATATTGGACTCATCTC---TTAAAATTTAAAACCTCTAATTTTTTCACTTTTT	967
Clementina	TAAATTA AAAACACACAATGCAATTA AATTA AAAATACACAATGTAATTCACAACCAT	976
Maxima	GCCAAGT-ATAACTGTAAAGTAGCTTACTCTACATCTATATATCCAA-----	1003
Reticulata	GCCAAGT-ATAACTATGTTAAGAGTATAGCTGAAGTCTGCTACTAGCTTAGCTGGTGAC	985
Valencia	TTTGA---TTTGCTGGCACCA-----AAGTCAAGTACCAAAATTTGGTCTGAC	980
Pineapple	-----	131
Medica	AACAA---ATAAGAAGGA-----CCGCAAAGTAATTTACTA-----	1000

Figura 12 – Fim.

Ichangensis	-----	0
Medica	-----	0
Maxima	-----	0
Reticulata	ATGTCTTCTTGCAATTAATCCCTCAACCTTGGTTACCTCTGTAATGGTTCAAATGTCTT	60
Valencia	-----	0
Pineapple	-----	0
Ichangensis	-----	0
Medica	-----	0
Maxima	-----	0
Reticulata	CCTCTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGC	120
Valencia	-----	0
Pineapple	-----	0
Ichangensis	-----	0
Medica	-----	0
Maxima	-----	0
Reticulata	CTTGTCAGCGCCAAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACCTACCAACCT	180
Valencia	-----	0
Pineapple	-----	0
Ichangensis	-----	0
Medica	-----ATGTCTTCTTGCAATTAATCCCTCAACCTTGGTTACCTCTGATGAAGCATAC	51
Maxima	-----	0
Reticulata	TCAATTTGGGACCATGATTTTTGTCAGTCGCTGAATAGCAAGTATACGGATGAAGCATAC	240
Valencia	-----	0
Pineapple	-----	0
Ichangensis	-----	0
Medica	AAAAGACGAGCAGAAGAGCTGAGGGGAAAAGTGAAGATAGCGATTAAGGATGTAATCGAG	111
Maxima	-----	0
Reticulata	AAAAGACGAGCAGAAGAGCTGAGGGGAAAAGTGAAGATAGCGATTAAGGATGTAATCGAG	300
Valencia	-----	0
Pineapple	-----	0

Figura 13 - Alinhamento das sequencias codificadoras dos genes Cs3g04260” (“Valência”), “orange1.1g045966m” (“Pineapple”), “Ci098410.1” (*C. ichangensis*), “CgUng021700.1” (*C. maxima*), “Cm249680.1” (*C. medica*) e MSYJ216420.1 (*C. reticulata*).

Ichangensis	-----	0
Medica	CCTCTGGATCAGTTGGAGCTGATTGATAACTTGCAAAGACTTGGATTGGCTCATCGTTTT	171
Maxima	-----	0
Reticulata	CCTCTGGATCAGTTGGAGCTGATTGATAACTTGCAAAGACTTGGATTGGCTCATCGTTTT	360
Valencia	-----	0
Pineapple	-----	0
Ichangensis	-----	0
Medica	GAGACTGAGATTAGGAACATATTGAATAATATCTACAACAATAATAAAGATTATAATTGG	231
Maxima	-----	0
Reticulata	GAGACTGAGATTAGGAACATATTGAATAATATCTACAACAATAATAAAGATTATAATTGG	420
Valencia	-----	0
Pineapple	-----	0
Ichangensis	-----	0
Medica	AGAAAAGAAAATCTGTATGCAACCTCCCTTGAGTTCAGACTACTTAGACAACATGGCTAT	291
Maxima	-----	0
Reticulata	AGAAAAGAAAATCTGTATGCAACCTCCCTTGAAATTCAGACTACTTAGACAACATGGCTAT	480
Valencia	-----	0
Pineapple	-----	0
Ichangensis	-----	0
Medica	CCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGACCAGGGAGGCTTCATTTGTGAT	351
Maxima	-----	0
Reticulata	CCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGACCAGGGAGGCTTCATTTGTGAC	540
Valencia	-----	0
Pineapple	-----	0
Ichangensis	-----	0
Medica	GATTTCAAGGGAATACTGAGCTTGCATGAAGCTTCGTATTACAGCTTAGAAGGAGAAAAGC	411
Maxima	-----	0
Reticulata	GATTTCAAGGGAATACTGAGCTTGCACGAAGCTTCGTATTACAGCTTAGAAGGAGAAAAGC	600
Valencia	-----	0
Pineapple	-----	0
Ichangensis	-----ATGGGGTA	9
Medica	ATCATGGAGGAGGCC TGGCAATTTACTAGTAAACATCTTAAAGAAAGTGATGATCAGCAAG	471
Maxima	-----	0
Reticulata	ATCATGGAGGAGGCC TGGCAATTTACCAGTAAACATCTTAAAGAAAGTGATGATCAGCAAG	660
Valencia	-----	0
Pineapple	-----	0
Ichangensis	AAAATGGAGGAGTT-----ATTGAATTTGAAAGCCTCGAGAAAATGCAGATCTGCCGG	62
Medica	AACATGGAAGAGGATGATTTGTAGCAGAACAAGCGAAGCGTGCACTGGAGCTCCCTCTG	531
Maxima	-----	0
Reticulata	AGCAAGGAAGAGCATGATTTGTAGCAGAACAAGCGAAGCGGGCACTGGAGCTCCCTCTG	720
Valencia	-----	0
Pineapple	-----	0
Ichangensis	CAATGCAATTCGCTTCCTCACGAAACGCC-----GTAGAAGC-----	99
Medica	CATTGGAAGTGCCAATGTTAGAGGCAAGGTGGTTCATACACATTTATGAGAGAAGAGAG	591
Maxima	-----	0
Reticulata	CATTGGAAGTGCCAATGTTAGAGGCAAGGTGGTTCATACACGTTTATGAGAAAAGAGAG	780
Valencia	-----	0
Pineapple	-----	0
Ichangensis	-----TTCCGTAGGACCGCCGACCTCGACGCTGAGGCTAACAAATCCAAA	144
Medica	GACAAGAACCACCTTTTACTTGAGCTCGCTAAGATGGAGTTTAAACACTTTGCAGGCAATT	651
Maxima	-----	0
Reticulata	GACAAGAACCACCTTTTACTTGAGCTCGCTAAGTGGAGTTTAAACACTTTGCAGGCAATT	840
Valencia	-----	0
Pineapple	-----	0
Ichangensis	TTACCGGAACAAGGTAGAGCT-----TCATCTGT--TGTTGTGGAAGCCGTA	189
Medica	TACCAGGAAGAAC TAAAAGAAATTCAGGGTGGGACATCAATTATGCTTTGAAGCACCTT	711
Maxima	-----	0
Reticulata	TACCAGGAAGAAC TAAAAGACATTTAGGGTGGTGGAAAGGATACAGGCTTTGGAGAGAAA	900
Valencia	-----ATGATTCACTGGATGGCACATCTT-----CAC	28
Pineapple	-----	0

Figura 13 – Continuação.

Ichangensis	CTTCACTTTACTGAAAGTCTGGGTGAAG---ATGTGCCATCAAGTGAGTACATTGGGCC	245
Medica	CCGGGCTATATG-AAAATGTGTTTTCTTGCCTTTACAACTTGTAAATGAATTTGCTTA	770
Maxima	-----ATGGGGGTAGGGTC	14
Reticulata	TTGAGCTTTGCG-AGGGACAGCTTGGTAGCATCCTTTTATGGAGCATGGGGATAGGGTC	959
Valencia	CCCGACTTTTCG-GTAAAGTGAATTAAGCTTTCAGAACGACGCATAAAAACTTAAATTTG	87
Pineapple	-----	0
Ichangensis	TGAGGCTGGCATCGAAGCTAGAAGATTTCT-----	274
Medica	-----TTACGTTCTCAACAACAGGATTTTGATTTGCTTCTGAGCATAAAAAATGCACCC	825
Maxima	TGAGCCTCAATTGCGCTATTGCAGGAGAATA-----GTCACAATTGCAATAGCTCTA	66
Reticulata	TGAGCCTCAATTGCGCTATTGCAGGAGAATA-----GTCACAATTGCAATAGCTCTA	1011
Valencia	-----TTCCTGTAACACACAGAAAATCTTTAGTTTCGGTATCGTAAATTCATTTCTTATA	142
Pineapple	-----	0
Ichangensis	-----ACGAACCCGTTGATGATATTGAATCCACTGTCAATGGCCATGATGTAAT	324
Medica	ATTCCTTTGGAGG-----ACAAA---CACATGGCT	852
Maxima	ATTACAGTGATTGATGACATATATGATGTTTATGGAACTTGGACGAA---CTTGAGCTA	123
Reticulata	ATTACAGTGATTGATGACATTTATGATGTTTATGGAACTTGGACGAA---CTTGAGCTA	1068
Valencia	AT---CTCATTAAATATACTTTTGAATTTTATTTGATCTTCATTAG---GCGTCAATT	195
Pineapple	-----	0
Ichangensis	TTAACTGTTCTGCTTCT-----TT-GATATTAGAAAATGTCTCA-----	363
Medica	TTACACGATCTCCTGGCACCAGGCTGA-----	882
Maxima	TTCACTGCTGCTGTTGAGAGGTGGGACATC-----	153
Reticulata	TTCACTGCTGCTGTTGAGAGGTGGGACATCCATTATGCTTTGAACCACCTTCGGACTAC	1128
Valencia	TT-----TATTTTTCATTAATAAAAAAAAAAGCACTTCCGGAGTCA	235
Pineapple	-----	0
Ichangensis	-----TGTATCGAGATTTGTGAGTTACTTGGTAG-----ATATGAGAAC	403
Medica	-----	882
Maxima	-----	153
Reticulata	ATGAAATGTGTTTTTTGCGCTTTACAACTTGTTAATGAATTTGCTTATTACGTACTC	1188
Valencia	TTGTAAGATCTTTTTCTTTTAAATTTAAAATTAGAT-----AGATCAAACCT	281
Pineapple	-----	0
Ichangensis	GTGCACTTGCG-----ATGTTTTATCTTGTGTTGGAAGCA	438
Medica	-----	882
Maxima	-----CATTATTGGCTTGGCTTAATACAA	177
Reticulata	AAACAACAGGATTTTGATATGCTTCGGAGTATTAATAATTCATGGCTTGGCTTAATACAA	1248
Valencia	ATTCATCGGGTT-----	294
Pineapple	-----	0
Ichangensis	GCATCATTTTTACTGGATATATTTGGGAAAAGTAAAGAGGAGCATCCTTCTCGCTGCATT	498
Medica	-----	882
Maxima	GCCGGCTTAGTGGAGGCGAAATGGTACCATAGTAAGTACACACCAACACTGGGAGAA---	234
Reticulata	GCCGGCTTAGTGGAGGCGAAATGGTACCATAGTAAGTACACACCAACACTGGGAGAA---	1305
Valencia	-----TTGTT---	299
Pineapple	-----	0
Ichangensis	CTATTGTCAGCATTGGTTTTGCTATTACTATGAGTATGCCTACTTGTATC-ATGAGAAG	557
Medica	-----	882
Maxima	---TTCTTGGA-AAATGGATTGGTATCAGTAGC---AGGCCCTATAGTAACAATGAGTGC	287
Reticulata	---TTCTTGGA-AAATGGATTGGTGTCAATAGC---AGGCCCTATAGTAACAATGAGTGC	1358
Valencia	---ACATTTC-TTTTGGACTGGTATCAATAGC---AGGCCCAATAGTACAATAAGTGC	352
Pineapple	-----	0
Ichangensis	AATCAGAGCTGCTGCAGCCAGAATGCATATTCAGAAGCTGCTACGTGGT-----GT	610
Medica	-----	882
Maxima	GTACCTTTCTGGTACAA---ATCCAATCATTGAGAAGGAAGTCTAGAAAGCAA	344
Reticulata	GTACCTTTCTGGTACAA---ATCCAATCATTGAGAAGGAAGTCTAGAAATTTCTAGAAAGCAA	1415
Valencia	ATACCTTTCTGGTACAA---ATCCGATCATTGAGAAGGAGCTAGAATTTCTAGAAAGTAA	409
Pineapple	-----	0
Ichangensis	TGAAATTTCTTCTCT-----GTGGTCCAGTTGATTGTTACG---	648
Medica	-----	882
Maxima	TCCAGATTTGTTCACTGGTCAAGATTTTTGCTTCAAGA-----	389
Reticulata	TCCAGATTTGTTCACTGGTCAAGATTTTTGCTTCAAGA-----	1460
Valencia	TCCAGATTTAGTTCACTGGTCAAGATTTTTGCTTCAAGATGTTGGGAACCTC	469
Pineapple	-----	0

Figura 13 – Continuação.

Ichangensis	-----CTCATTATTTTATTCTGGCGGAATTAGGTGTCAAGAACAGTTTTAATGCATCT	702
Medica	-----	882
Maxima	-----	389
Reticulata	-----	1460
Valencia	GTCAGTATGTTTTCTTTTATTCTTTTGATTTTTAAGAAGATAGAAAATGAATTAATCC	529
Pineapple	--AAGGAGC-----TGGAAATTTCTAGA--AAGTAAACAATATTCAGATATAATTC	50
Ichangensis	GTTTTCCCACTAGTCTTTGCTATAGTTGCTGCTGTGTTTACTTTCAAATATGATGGGGAA	762
Medica	-----	882
Maxima	-----TGATTTGGGAACCTTCG-----TCGGATGA	413
Reticulata	-----TGATTTGGGAACCTTCG-----TCGGATGA	1484
Valencia	TCTATATACGAATTGATTG-TGATTTTTTCCCAATAATTCAT-----CAGGATGA	581
Pineapple	GTCATCCA--AGATTTTCC-GTCTTCAAGATGATTGGGAACCTC-----AACGATGA	100
Ichangensis	GTTACTGATTGCCAGGCCTCGACAATCCAGCTGCTGATAATCAGGTGCCAAATACCAAT	822
Medica	-----	882
Maxima	GATACAGAGAGGGGATGTT-CCTAAATCAATCCAGTGTAC----ATGCATGAACTGGT	468
Reticulata	GATACAGAGAGGGGATGTT-CCGAAATCAATCCAGTGTAC----ATGCATGAACTGGT	1539
Valencia	GATACAGAGAGGGGATGTT-CCGAAATCAATCCAGTGTAC----ATGCATGAACTGGT	636
Pineapple	ATTAAGAGAGGGGATGTT-TGAAATCAATCCAGTGTAT----ATGCATGAACTGGT	155
Ichangensis	CGCAATGAGGATCCGGAAGCAAACGGCAGCATGCCTATGTTGGCG---GTAGTGACCAAT	879
Medica	-----	882
Maxima	GCCTCGGAGGAAGTTGCTCGTGAACACATCAAGGATATGATGAGACAGATGGGAGGAAG	528
Reticulata	GCCTCGGAGGAAGTTGCTCGTGAACACATCAAGGATATGATGAGACAGATGGGAGGAAG	1599
Valencia	GCCTCGGAGGAAGTTGCTCGTGAACACATCAAGGATATGATGAGACAGATGGGAGGAAG	696
Pineapple	GTCTCAGAGGAAGTTGCTCGTGAACACATAAAGGATTTGATGAGACAGATGGGAGGAAG	215
Ichangensis	GATGATTCTAAGAGACAAGTCCATATGCTCGTAGGACTGATGGTCCAT-----	928
Medica	-----	882
Maxima	GTGAATGCATACAGAGCTGATAAAGATTCTCCCGTATCTCAAAATACAGTTGACTTCATG	588
Reticulata	GTGAATGCATACAGAGCTGATAAAGATTCTCCCTATCTCAAAATACAGTTGACTTCATG	1659
Valencia	GTGAATGCATACAGAGCTGATAAAGATTCTCCCTATCTCAAAATACAGTTGACTTCATG	756
Pineapple	GTGAATGCATACAGAGCTAATAAAGATTCTCCCTTATCTCAAAATACAGCTGACTTCATG	275
Ichangensis	---ATGCTCGTAGGAGCTGACAATTTGA-----	954
Medica	-----	882
Maxima	TTGAATCTTGTGAGAATGTCCCATTTTATGTATCTACACGGAGATGGGCACGGTGTCAA	648
Reticulata	TTGAATCTTGTGAGAATGTCCCATTTTATGTATCTACACGGAGATGGGCACGGTGTCAA	1719
Valencia	TTGAATCTTGTGAGAATGTCCCATTTTATGTATCTACGTGGAGATGGGCACGGTGTCAA	816
Pineapple	TTGAATCTGGTGAGAGCGTCCCATTTTATGTATCTACATGGAGATGGGCATGGTGTCAA	335
Ichangensis	-----	954
Medica	-----	882
Maxima	AACCAAGAGACTATGGATGTAGCTTCTACATGGCTTTTTTCAGCCCATTCCTTGGAGGAC	708
Reticulata	AACCAAGAGACTATGGATGTAGCTTCTACATGGCTTTTTTCAGCCCATTCCTTGGAGGAC	1779
Valencia	AACAAAGAGACTATGGATGTAGCTTCTACATGGCTTTTTTCAGCCCATTCCTTGGAGGAC	876
Pineapple	AACCAGGAGACTATGGACGTAGCGTTTACATTGCTTTTTTCAGCCCATTCCTTGGAGGAC	395
Ichangensis	-----	954
Medica	-----	882
Maxima	AAACACATGGCTTTCACAGCACCAAAGGCTGATGAATCCCAGAGTGCAAGTTTCAGTTGA	768
Reticulata	AAACACATGGCTTTCACAGCACCAAAGGCTGATGAATCCCAGAGTGCAAGTTTCAGTTGA	1839
Valencia	AAACACATGGCTTTCACAGCACCAAAGGCTGATGAATCCCAGAGTGCAAGTTTCAGTTGA	936
Pineapple	GAAACATGGTTTTACACCATCTCTCGGTACCAAAGGCTG-----	436

Figura 13 – Fim.

Ichangensis	-----	0
Valencia	-----	0
Pineapple	-----	0
Medica	MSSCINPS-----	8
Maxima	-----	0
Reticulata	MSSCINPSTLVTSVNGFKCLPLTTNKAAIRIMAKNKPQCLVSAKYDNLVDRRSANYQP	60
Ichangensis	-----MGVKMEELLNLKASRKRCSAGNAIRF	26
Valencia	-----	0
Pineapple	-----	0
Medica	-----TLVTSDEAYKRRAEELRGKVKIAIKDVIPLDQLELIDNLQRLGLAHRF	57
Maxima	-----	0
Reticulata	SIWDHDFLQSLNSKYTDEAYKRRAEELGKVKIAIKDVIPLDQLELIDNLQRLGLAHRF	120
Ichangensis	LTKRRRSFRRTA-----DLDA-----EANNPKLPEQGRASSV	58
Valencia	-----	0
Pineapple	-----	0
Medica	ETEIRNILNNIYNNKDYNRKENLYATSLEFRLLRQHGYPVSQEVNFGKDDQGGFICD	117
Maxima	-----	0
Reticulata	ETEIRNILNNIYNNKDYNRKENLYATSLEFRLLRQHGYPVSQEVNGLKDDQGGFICD	180
Ichangensis	VVEAVLHFTE----SLGEDVPSSEYIGPEAGIEARRFHEPVDIESTVNGHDVNLTPVA	113
Valencia	-----	0
Pineapple	-----	0
Medica	DFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEVMISKMEEDVFAEQAKRALELPL	177
Maxima	-----	0
Reticulata	DFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEVMISKMEEHVFAEQAKRALELPL	240
Ichangensis	SLILENCSCIEICELGRYEKRALAMFYLVLEAASF-----LLDIFGKS----	157
Valencia	-----	0
Pineapple	-----	0
Medica	HWK---VPMLEARWFIIHYERREDKNH-LLLELAKMEFNTLQAIYQEELKEISG-----	227
Maxima	-----	0
Reticulata	HWK---VPMLEARWFIIHYEKREDKNH-LLLELAKLEFNTLQAIYOEELKDISGMWKDTG	296
Ichangensis	-----KRSILLAAFLLSAFGFAITMSMPTCI-----	183
Valencia	-----	0
Pineapple	-----	0
Medica	-----	227
Maxima	-----MGVGSEPFQFAYCRRIVTIAIALITVIDDIYDVYGTLDLELE	40
Reticulata	LGEKLSFARDSLVASFLW-SMIGSEPFQFAYCRRIVTIAIALITVIDDIYDVYGTLDLELE	355
Ichangensis	-----MRRIRAAAAARMHIQKLLRVVLEISFSVVQLIVTLIYFILAELGV-----KNS--	230
Valencia	-----	0
Pineapple	-----	0
Medica	-----WDINYALKHLPGYMKMC---FLALYNFVNEFAYVYLKQQDFDLILLSIKNAPI	276
Maxima	LFTAVERWDIHY-----WL	55
Reticulata	LFTAVERWDIHYALNHLPDYMKLC---FFALYNFVNEFAYVYLKQQDFDMLRSIKNSWL	412
Ichangensis	-----FNASVFPL-----	238
Valencia	-----MYSLDGTSSPRLF-----GKVNMIWELRQYVFFYFLLIFKKIEI----	39
Pineapple	-----KELEFLESN	9
Medica	PLEDKHMA-----FTASPGTK---G-----	293
Maxima	GLIQAGLVEAKWYHSKYPTLGEFLENGLVSVAGPIVTMSAYLSGTNPPIIQKELEFLES-	114
Reticulata	GLIQAGLVEAKWYHSKYPTLGEFLENGLVSIAGPIVTMSAYLSGTNPPIIQKELEFLES-	471
Ichangensis	----VFAIVAAVFTFKYDGEVTDLPGLD-NPAADNQVNTNRNEDPEANGSMP---MLA	289
Valencia	ELILYIRIDCVFFS-----PIIHQDEIQRGDVPKSIQCYMHETGASEEVAREHIK	89
Pineapple	NIPDIIQWSSKIFRLQDD-----LGTSTDELKRGDVPKSIQCYMHETGASEEVAREHIK	63
Medica	-----	293
Maxima	-NPDFVHWSCKIFRLQDD-----LGTSSDEIQRGDVPKSIQCYMHETGASEEVAREHIK	167
Reticulata	-NPDFVHWSCKIFRLQDD-----LGTSSDEIQRGDVPKSIQCYMHETGASEEVAREHIK	524
Ichangensis	VVTNDDSKRQGPYARRTDGYPARRSLTI-----	317
Valencia	DMMRQMWKKNVAYRADKDSPLSQNTVDFMLNLVRMSHFMYLRGDGHGAQNKETMDVASTW	149
Pineapple	DLMRQMWKKNVAYRANKDSPLSQTTADFMLNLVRASHFMYLRGDGHGVQNETMDVAFATL	123
Medica	-----	293
Maxima	DMMRQMWKKNVAYRADKDSPLSQNTVDFMLNLVRMSHFMYLRGDGHGAQNQETMDVASTW	227
Reticulata	DMMRQMWKKNVAYRADKDSPLSQNTVDFMLNLVRMSHFMYLRGDGHGAQNQETMDVASTW	584
Ichangensis	-----317	
Valencia	LFQPIPLEDKHMAFTAPKADEFPEYSFS	177
Pineapple	LFRPIPLEDEDMVFTPSLGTGG*-----	145
Medica	-----	293
Maxima	LFQPIPLEDKHMAFTAPKADEFPECSFS	255
Reticulata	LFQPIPLEDKHMAFTAPKADEFPECSFS	612

Figura 14 - Alinhamento das sequencias de proteina dos genes Cs3g04260” (“Valência”), “orange1.1g045966m” (“Pineapple”), “Ci098410.1” (*C. ichangensis*), “CgUng021700.1” (*C. maxima*), “Cm249680.1” (*C. medica*) e MSYJ216420.1 (*C. reticulata*).

Maxima	----TGCTCCATAAGAAGGATGCTACCAAGCTGTCCCTCGCAAAGCTCAATTTCTCTCCA	56
Pineapple	-----TCTCTATGATTGGATATTGTT-----	21
Medica	TTGGATATACAGATGTAGT--GTAAGCTAGCTTACAGTTATACTTGGCAAAGATTCTCAA	58
Ichangensis	--GTAGAAGCTCCGTAGG--ACCGCCGACCTCGACG---CTGAGGCTAACAAATCCCAA	52
Valencia	-----	0
Reticulata	-----	0
Maxima	AGACCTGT-----ATCCTTCCACTACCTTGATAAGGAAATT-----GAAACGAATATT	104
Pineapple	ATTAATCATTCTCT-TTACTTT-TCCCTTCAGCTTTTCTGCTTGCT-TTGATATGTTTC	78
Medica	ATTATTCTATGGTTTGGTGGTATGACGAGGTTTATATATATAAATACATATATATA	118
Ichangensis	ATTACCG-----GTCCATGTTCCCTTTTGTAGTTACTCATGATTCAAGTTAATT-	103
Valencia	-----GTGCCAACTTTATTTATCAACTGCGAACTAAATTTATTTA	41
Reticulata	-----ACAATAATGAC	11
	*	
Maxima	ACGATACA--TGTTGTATATCTATATATATAGAGTCAGCTTTTCATCTGGAATTCTG	161
Pineapple	ACCCTGGCGGTTAATTTTGGATATGTTCCAAA-----T-----	113
Medica	GGCAGAGGAGAAGTTCAT---GTGATTTATTTTCTTACTCATTTTTCTGAGTTTTGA	175
Ichangensis	---TAGGTTAGCTTGTTCATGTTATTTCTCAATTAATAATAGTAGCAATCTATAGTAT	159
Valencia	ATCATAAGATAAAGTGTATT-TATATCTTCTATGAATCCACATGGTGATCACATAAATAC	100
Reticulata	CTCGTTCGCACAGTATGATG-TACTCCTTTTTT-----TTCCCCCAAATGA	58
	*	
Maxima	AAGAGCTTTCTGTAATGCAGACAATAGCCTTTTATAAAGTGATAAGGGCTTTACAATA	221
Pineapple	TTCCAATGAAAAAAC-----TGAACAAATTAATTAGGATAACAAAAATGAAAAA	163
Medica	AAGCG-TTTAATT-----TTAAGTCTTAATAGTACAAAGA-TATT-----	214
Ichangensis	TACTTATTTAGTCTTTGC-CCTAATAAGAACCATTATATGAAGAAGC-AAATGAAATA	217
Valencia	ATATAATATGATTAATGGACTTTAATAAAAAATTAATGCAATTAAGA-TATTTGCATA	159
Reticulata	ATAAAATAC-----CTTTGTACTATTAAGA-C-----T	85
	* **	
Maxima	GNNNNNTAATTAATTAANNNNN-----TAAAAATTTAGGTTAAA	261
Pineapple	AAAATAATCATGTACTAATAGTCAATACCGTGTAGCCGCTACCCAACGACTGCAGAAAG	223
Medica	-----TTTATTCATATGGGGGGGGGGTGGAAAGGAGTACATCATACTGTGCGAACG	267
Ichangensis	TCAGCATCTTTGCGTTTGAGAAAAACGAAATGGAGTGATAAAAAATATTTTTTTTAAA	277
Valencia	AAATACCTCATTTTTTTATTAA-----TCAGAAAAAATGTTTATTACA	203
Reticulata	TAAAAATTAACGCTTTCAAAC-----TCAGAAAAAATGAGCAGGAAA	129
Maxima	TT----TTGAAGGAGTAGATTTCGGTTGTAAGTAGTTTTTTTTAGCAATTATTAACAATT	317
Pineapple	T-----CATG-----ATC	231
Medica	AG---GT-----CAATATTGTCCACAAGACACA-T-----ACATCATCCACACAT	309
Ichangensis	TAATAATTGAGAAATGAATATAATGTTTTCAAAATCA-G-----TAATT-----TT	321
Valencia	A-----TTAATAAACACATATGCTTTTAAAGAGCA-T-----ATTTTCCCAACAATA	250
Reticulata	A-----ATAAATC---ACATGAACCTCTCCTCTGCC-T-----ATA-----	161
Maxima	ATCCGATAAATGGGATGACATGTCATTTT--TATCAATATATATCATATGATATGTCATG	375
Pineapple	CCAAATTGAAGATGGGTAGCTTGCTGATTTTCTAACAATTGTTGGATTACCAAGCTGGGC	291
Medica	-----TCCGATGATTTAT	322
Ichangensis	AAAAATGGAAAAATGCGTTGGTGGCATTTTTAAATTAATAATGGAAAAATGGAGAAATTTAG	381
Valencia	AGCAACTAAACATTCCTTGGTCTACAT---GACCAAACTTCCCGCTTCTGAAAAATGCAT	306
Reticulata	-----	161
Maxima	TTTTACTAGGTAATGGGATGACATG---TCTTTTTTAATCAAAGTTTCATCAATCTTA	432
Pineapple	GCAGACTGGCCTGATTCATTCACTCTGATGGTTGCTCTATTTGTGGAAAGTAGTGGAGG	351
Medica	TT-----CTTTTTCTTTTCTT--TTTTTCTCTGCATACAAATTTTTTAAAGAATC	371
Ichangensis	T-----AAAAT--TTCTTACTACTATTTGGGATTGGTAGATGAAG	419
Valencia	TC-----TGTTGACGCTCTAG--TTCTGTACGGTACAAGTATGCGTACTCATG	355
Reticulata	-----	161
Maxima	AA-----A--AACTAGATTACCCTTAGAATGTCAGCGTTTGCAAACGGAAGTTAAC--	481
Pineapple	ACACTTGAAACCATTTAAACAAGTAGTGAAGGCTGATGGGATGGTGAAGAAAGACATT--	409
Medica	TTT-----CCATAAACTACACAATAAATGCACGCAGAAATGACAAGAAATTCATAA	422
Ichangensis	AAAAGTGGAGA-GATTTGGCCGCAATTGAAGGTGAC-----AGATCCACTTGATTTGTG	472
Valencia	GTAACAGCAAATCCAAATGCAGCAGAAGGATGCTCCTCTTCCCAATCAACAAAAAAGTAT	415
Reticulata	-----	161
Maxima	--AGATTAGTGGACGGCAGAAGTGTGTTGTCAAC---TTAGGA-----	519
Pineapple	---GGATGGATGTAAGCTCACTGTTTTCTAATGCGCTTCAAATAACCTTT-----TTGA	461
Medica	ATTCAAATCTA-CTAACAAAAGTTTTATTATACATTAATAATCTGTGTTT-----A	473
Ichangensis	CGGGAATTTTATAGGTGAAAAATTTCACTGTGAGATAGATGCAGAGAAATCTCTATTAT	532
Valencia	TGTCATTCATTATGTGAAAAATTTTAAATCAGAAATTTGGAGGCCAATTGT-----	466
Reticulata	-----	161

Figura 15 - Alinhamento das sequencias promotora dos genes Cs3g04260” (“Valência”), “orange1.1g045966m” (“Pineapple”), “Ci098410.1” (*C. ichangensis*), “CgUng021700.1” (*C. maxima*), “Cm249680.1” (*C. medica*) e MSYJ216420.1 (*C. reticulata*).

Maxima	TATATAAGTGATACAC--T-----TGAAAAGTGTTC	549
Pineapple	TAAGCTGCTAAATTAATCTATGGTTTTtCTTTtCTTTCTtCCGTTTTtTtEAAGG	521
Medica	TGCGGAAATAAGACAC--AAA-----GTAAGTTTAAGGAAAAAAAAAAGGAACA	521
Ichangensis	TGAGATTGTGAGAAAA--TTTAGTATTGGT--TT--CTTTTAAAGAAATCTCCCGTGAAAG	587
Valencia	-----GTTCGAAAC--TCTGATATTTACTTCGATCTATCCAAAACAAAAATGAAAA	517
Reticulata	-----TATATA-----	167
Maxima	CACACGTTTGATACGGGTGTCATTGTTACTGTTACATGACGTACTTTCACAGTGACGGT	609
Pineapple	TGCAA-----GCTTGTGTATATAGAG-----GAAAGGAGATTGTATCCACGTCT	568
Medica	CAAAGTTGCAACAATATCTTAATGTTGAGGACTAACATCGAAATCTATTTGTTACAGT	581
Ichangensis	ATCTTGTGAGTTATGATAGAAAAGGTAA-----AAGAGGATT-----AGT	628
Valencia	TGAATACTCGAGCAATATTCAAATATCGA-----AAGAGCATATTTTCAAAATTA--AGT	570
Reticulata	-----TA-----	169
Maxima	ACGTATGACGTTCTGACGCAATTCATAGACGATCGATG--ACAGTGGCATTGACCGATG-	666
Pineapple	TTtATTTTCTTATTGATCATATCATATATCATCTAGAGCAGAGGTTTATTGTGTGTAA	628
Medica	TATAAAGTACTTTTGGCGAAAAATAAATTAAT--AAATT--TCAAAATAATTA--TCAACAA	636
Ichangensis	GAATAAAAAATTTAAAAA--AATGATTGAA--AAAGA--AGAAGGAATTG--CAGTCAA	680
Valencia	GAGGAAAAAAATTTTCAG--TATCAATTAT--CATCA--ACG--GGTCTTG--ATGTTAA	621
Reticulata	-----	169
Maxima	-ATGTGGCATTGACTGATGAGGTGA-CACGATCCTGTTGGGCTAAAAATCTTATGTACTG	724
Pineapple	AAGTTATTAAATGCTAATTAATTTTTTCTTTTTCT--AGACGTTGGAGATTTTTCTTTCT	687
Medica	AAAGTAG--ACTGGCAGGTAGATGCTACTCAAAGTATAGTCAAAATGTATGACCCGAA	695
Ichangensis	TAAAAA--AAAGAAAAAAGAAATTTTTTTTGTATTTTATTTTAGCGGTTATGTCCGG	739
Valencia	GAATAAG-CA-----TTAAATGAGCTGCTCAGGTCTGC	654
Reticulata	-----	169
Maxima	TTGATGGTGACGTGGCAGCATATCAGTGGATAAAAAATCTCGCGTACGGTACATGCATCA	784
Pineapple	TTT-----TTAATTTTAAATGCGCTT	708
Medica	ACTATGAACCCAAAG-----CAGGAGGCAACAATAGTCATACTTTTTCATGAGGGA	747
Ichangensis	TGTTTTATAAATAG-----AAGA-----	758
Valencia	TGATGAATCAGCAAG-----CTGTTAAGCAAT--ATGCTGAGTCATCAGCCA	699
Reticulata	-----	169
Maxima	CA--TAGGATTATTTTCAA--CCAAACCGCTCTAGTGTTCACCGGTCAAACCGTTACTG	841
Pineapple	GGGAAAGTATCATTTGTTTT-----TtGTGTTTAGTGTGAATGGAT--TTAAAAATAT--T	760
Medica	AT-----TCTAACTTGCTAATGCATGTGTTATAATAATCAACGATGTCGATTTCTTT	802
Ichangensis	--AAACAATAAATTAGTG--TTCT--CTGATTTTATCTGATAAGTGT--TGAAAAAATTTAT	812
Valencia	CGTCAGCAGTCAGTTATGGAGGCT--GTTGCTTTGCTTAAGAAGCATCTGGACAAGTATAT	758
Reticulata	-----	169
Maxima	TTTCATCCCGAGTCAAACCGTGTACTGTTTCATCCGCGTGGTC-----AAACCGTGA	895
Pineapple	CAAAATCTGAATTCATATGCATAATTGATATATATATATTTTTGGGGGGTAAAGTCGTTt	820
Medica	ATAATACTCACAGTGAACAGAAAA--CGGTAGAAAGCATGTGTTAAATAATCAACGAAACT	860
Ichangensis	TTAAAAA--GCGAGTAACG-----ACACATGC--AACATATACA	847
Valencia	ATAA--AT--CCCTGTAATCCCAA--TGTTGTTACAAGCGGCCGAGGT--CACGCTCATG	811
Reticulata	-----	169
Maxima	CTG--TTGACTGATGACGTGGCGCAATCCTGAGCT-----	928
Pineapple	ATTTTTCTGGATGAAAAACATCTAAAACCTTAATAATTT-----TCATTTTTGCC	870
Medica	ATTTCTATAAGTGTATAGATCACCAAAAAACAATGTTTAAAGTCTTTTAAATCTCTATA	920
Ichangensis	CTTTTTCTACATGAGGGAGTCCGGTCGCCAAACCGCCACCAGGATAAGGAGAGTGATGTC	907
Valencia	ATTTTGTGCTTATAGAAGCTCCTGGACATAAACCCCGTAATCTCAGTTC--ATTTTGTA	870
Reticulata	-----	169
Maxima	-----GTCCAACTGTTTTTA-----ATC	947
Pineapple	ACTGTAATAATATAT--ATACTTGTATTTTATTTTATACGATTTCCCGGATTTCTGcTT	929
Medica	-----TTTTGAGTTTTG--TATATTTTTTAAATTCCTATATTTTT--AAAAAT-----	963
Ichangensis	CTTTTCAGTGTGTACGGACGCTTACTGTGCTT-----	939
Valencia	GCTTAATGAAATGAATTTGGCTCACTATTCTTCTATCAAAACTTTT--AGTATTTTCCCTT	929
Reticulata	-----	169
Maxima	CGATGCCATGATTTA--CTCCATGTATCTATAAAAAGGGGGCCT----CCCCCTCT	999
Pineapple	GGCAACGACCAGTCAAGATGACAAGATTGTCAGAAAAGGATTAAGTACTAAGTACCCAAAA	989
Medica	-----ATCTTAAA--GTTCTTGTGCTTAAAAATATTGATA-----CTCTA-----	1001
Ichangensis	GGCTGGCCAGAAGGA--TAAATCAGTTTTTTAGGGA--GAAAGGTCAAATAATCCATACA	995
Valencia	CACCGCAAAACAACA--CAGCAACATCTTTAACTCTTGAATCTTCCAGCTCCGGTGCA	987
Reticulata	-----	169
Maxima	A-----A----- 1001	
Pineapple	AAAaTATTATTA-- 1001	
Medica	----- 1001	
Ichangensis	G-----CTGAA-- 1001	
Valencia	AGCCTCAGTCGCAA 1001	
Reticulata	----- 169	

Figura 15 – Fim.

Medica	-----ATGTCCTTAGAAGTTTCAGCCTCTCCT	27
Pineapple	-----	0
Maxima	ATGTCCTCTTGCAATAATCCCTCAACCTTGGTTACCTCTATAAATGGTTTCAAATGTCTT	60
Valencia	-----	0
Reticulata	ATGTCCTCTTGCAATAATCCCTCAACCTTGGTTACCTCTGTAATGGTTTCAAATGTCTT	60
Medica	GCTAAGG-----	34
Pineapple	-----	0
Maxima	CCTCTTGCAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGC	120
Valencia	-----	0
Reticulata	CCTCTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGC	120
Medica	-----TCATCCAAAATGCTGGAAAAGATTCTACTCGTGGTTCTGCAAATTTCTCCTCA	87
Pineapple	-----	0
Maxima	CTTGTCAGCGCCAAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACCTACCAACCT	180
Valencia	-----	0
Reticulata	CTTGTCAGCGCCAAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACCTACCAACCT	180
Medica	AGCATTGGGGAGATCATTTCTTTCAATATACTTGTGACTCCCAGGAAACTGATGATCAA	147
Pineapple	-----ATGAAACATAC	11
Maxima	TCAATTTGGGACCATGATTTTTTGCAGTCATTGAATAGCAACTATACGGATCAAACATAC	240
Valencia	-----	0
Reticulata	TCAATTTGGGACCATGATTTTTTGCAGTCGCTGAATAGCAAGTATACGGATGAAGCATAC	240
Medica	AATGTAAGCATCTAGAGCTGAAGAAAGAAATTAGAAGAATGCTGAAAGCTTCTAACAAG	207
Pineapple	AAAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGACAGCGATTAAAGGATGTAACCGAG	71
Maxima	AGAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGACAGCGATTAAAGGATGTAACCGAG	300
Valencia	-----	0
Reticulata	AAAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGATAGCGATTAAAGATGTAATCGAG	300

Figura 16 - Alinhamento das sequencias codificadoras dos genes “Cs3g04290.1” (“Valência”), “orange1.1g043404m” (“Pineapple”), “Cg3g004050.1” (*C. maxima*), “Cm205460.1” (*C. medica*) e “MSYJ216420.2” (*C. reticulata*).

Medica	ACTACACATACACTTGAATTGATAGATGCAATTCAGCGGTTAGGAGTGTCTACCATTTT	267
Pineapple	CCTCTGGATCAGTTGGAGCTGATTGATAATTTGCAAAGACTTGGATTGGCTTATCATTTT	131
Maxima	CCTCTGGATCAGTTGGAGCTGATTGACAACCTTGCAAAGACTTGGATTGGCTTATCATTTT	360
Valencia	-----	0
Reticulata	CCTCTGGATCAGTTGGAGCTGATTGATAAATTCGCAAAGACTTGGATTGGCTCATCGTTT	360
Medica	GAAATGAGATTGATGAAATCTTGGGAAAGATGCACAAGACTTATCGAGACTGTGATCTT	327
Pineapple	GAGCCTGAGATTCGGAACATATTGCGTAATATCCACAACCATAATAAGATTATAATT--	189
Maxima	GAGACTGAGATTCGAAACATATTGCATAATATCTACAACAATAATAAGATTATAATT--	418
Valencia	-----	0
Reticulata	GAGACTGAGATTAGGAACATATTGAATAATATCTACAACAATAATAAGATTATAATT--	418
Medica	TGTGATAATGAAATGATGGGCTCTATTATCTCTCTTTCAGTTTCGATTGTTTCAGACAA	387
Pineapple	-----GGAGAAAAGAAAATCTGTATGCAACCTCCCTTGAATTCAGACTACTTAGACAA	242
Maxima	-----GGAGAAAAGCAAAATCTGTATGCAACCTCCCTTGAATTCAGACTACTTAGACAA	471
Valencia	-----	0
Reticulata	-----GGAGAAAAGAAAATCTGTATGCAACCTCCCTTGAATTCAGACTACTTAGACAA	471
Medica	AATGGCTATAGAATTTCCGCTGATGTTTTCAATACGTTCAAGGGAAGCGATGGGAAATTT	447
Pineapple	CATGGCTATCCTGTTTCTCAAGGG-TTTTCAGTGGTTTTAAAGACGACAAGGTAGGCTTC	301
Maxima	CATGGCTATCCTGTTTCTCAAGAGGTTTTTCAGTGGTTTTAAAGACGACAAGGGAGGCTTC	531
Valencia	-----	0
Reticulata	CATGGCTATCCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGACAGGGAGGCTTC	531
Medica	ATGGCATCTCTTGCAAAGATGTTTCGAGGAATGTTAAGCTTCTATGAAGCTACACATCTC	507
Pineapple	AT-----TTGTGATGaTTTCaGGGAATACTGAGCTTGCATGAAGCCTCGTATTAC	352
Maxima	AT-----TTGTGATGATTTCAAGGGAATACTGAGCTTGCATGAAGCCTCGTATTAC	582
Valencia	-----	0
Reticulata	AT-----TTGTGACGATTTCAAGGGAATACTGAGCTTGCACGAAGCCTCGTATTAC	582
Medica	AGGGTTCATGAAGAAAATATACTAGATGAAGCGCTTGCTTTCACCAC TAGTCACCTTGAG	567
Pineapple	AGCTTAGAAGGAGAAAAGCATCATGGAGGAGGCTGGCAATTCACCAGTAAGCATCTTAAA	412
Maxima	AGCTTAGAAGGAGAAAAGCATCATGGAGGAGGCTGGCAATTCACCAGTAAGCATCTTAAA	642
Valencia	-----	0
Reticulata	AGCTTAGAAGGAGAAAAGCATCATGGAGGAGGCTGGCAATTTACCAGTAACATCTTAAA	642
Medica	TCAGTGGCAAAAC-----AAGTCAGTTCCTCCACTAGCTGAACAAGTCAAG	612
Pineapple	GAAATGATGATCACCAGCAACAGCAAGGAAGAGGATGATTTGTAGCAGAACAAGCGAAG	472
Maxima	GAAATGATGATCATCAGCAACAGCAAGGAAGAGTATGATTTGTAGCAGAACAAGCGAAG	702
Valencia	-----	0
Reticulata	GAAGTGATGAT---CAGCAAGAGCAAGGAAGAGCATGATTTGTAGCAGAACAAGCGAAG	699
Medica	CACGCCTTAGTTAGCCTATCCACAAGGGCTTAGAAAAGGCTTAGGCAAGACATTACATT	672
Pineapple	CGGGCGCTGGAGCTCCCTCTGCATTGGAAAAGTGCCTATGTTAGAGGCAAGGTGGTTCATA	532
Maxima	CGTGCCTGGAGCTCCCTCTGCATTGGAAAAGTGCCTATGTTAGAGGCAAGGTGGTTCATA	762
Valencia	-----	0
Reticulata	CGGGCACTGGAGCTCCCTCTGCATTGGAAAAGTGCCTATGTTAGAGGCAAGGTGGTTCATA	759
Medica	CCTATCTATCAAGGAGAATCCTCCACAATGAAGCTCTATTAACCTTTGCAAAGTTAGAT	732
Pineapple	CACGTTTATGAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTTGGAG	592
Maxima	CACGTTTATGAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTTGGAG	822
Valencia	-----	0
Reticulata	CACGTTTATGAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTTGGAG	819
Medica	TTTAACAGATTGCAAAGCTTCACCAGAAGGAACCTCGGTGATATTTCAAGGTGGTGAAA	792
Pineapple	TTTAACACTTTGCAGGCAATTTACAGGAAGAACTTAAAGACATTTCAAGGTGGTGAAA	648
Maxima	TTTAACACTTTGCAGGCAATTTACAGGAAGAACTTAAAGACATTTCAAGGTGGTGAAA	882
Valencia	-----	0
Reticulata	TTTAACACTTTGCAGGCAATTTACAGGAAGAACTTAAAGACATTTCAAGGTGGTGAAA	879

Figura 16 – Continuação.

Medica	GAATTAGACTTTGCGCATAAACTACCTTTTCGTAAGAGATAGAATTGCAGAGGGCTACTTT	852
Pineapple	-----	648
Maxima	GATACAGGCTTTGGAGAGAAATTGAGCTTTGCGAGGGACAGCTTGGTAGCATCCTCTTA	942
Valencia	-----	0
Reticulata	GATACAGGCTTTGGAGAGAAATTGAGCTTTGCGAGGGACAGCTTGGTAGCATCCTTTT	939
Medica	TGGGCGTAGGAGTGATTTTCGAGCCCAATATTGCTTTGCTAGAAAATTTTACGAAA	912
Pineapple	-----ATCGCGTTGAGCCTCAATTCGCTACTGCAGGAGAGTGCTCACAAATC	696
Maxima	TGGAGCATGGGGATAGGGCTGAGCCTCAATTCGCTATTGCAGGAGAATAGTCACAATT	1002
Valencia	-----ATGGGGTAGGGCTGAGCCTCAATTCGCTATTGCAGGAGAATAGTCACAATT	54
Reticulata	TGGAGCATGGGGATAGGGCTGAGCCTCAATTCGCTATTGCAGGAGAATAGTCACAATT	999
	* * ***** ** * * * * * * * * *	
Medica	GTGGTTTATATGACATCTATTATTGATGACATCTATGATGTATGGCAAAATGAAGAA	972
Pineapple	TCGATAGCCCTAATTACAGTGATTGATGACATTTATGATGCTATGGAACATTGGATGAA	756
Maxima	GCAATAGCTCTAGTTACAGTGATTGATGACATTTATGATGTTTATGGAACTTTGGACGAA	1062
Valencia	GCAATAGCTCTAATTACAGTGATTGATGACATATATGATGTTTATGGAACTTTGGACGAA	114
Reticulata	GCAATAGCTCTAATTACAGTGATTGATGACATTTATGATGTTTATGGAACTTTGGACGAA	1059
	* * * * * ***** * * * * *	
Medica	CTTGAGCTTTTACTTCAGCTATTGAAAGTGAAGTAGAGAAATATTTGGTCTCCAGGGA	1032
Pineapple	CTTGAGcTATTCACTGATGCTGTTGaGA-----GTGGACATCAAT	797
Maxima	CTTGAGCTATTCACTGCTGCTTTGAGAGGATTGTTGGCAAACATAATGTGGACATCCAT	1122
Valencia	CTTGAGCTATTCACTGCTGCTTTGAGAGG-----TGGACATCCAT	156
Reticulata	CTTGAGCTATTCACTGCTGCTTTGAGAGG-----TGGACATCCAT	1101
	***** ** * * * * * * * * * *	
Medica	AAGTTATACCGACTCCATTATGCGAAAGAAGCAATGAAGAATCAAGTTAAGCATTACTTC	1092
Pineapple	TATGCTTTGAA-GCACCTTCCGGGcTATAT--GAAATGTGTTTTCTTGCCTTTACAAC	854
Maxima	TATGCTTTGAA-CCACCTTCCGGACTACAT--GAAATGTGTTTTTTTGCCTTTACAAC	1179
Valencia	TATGTTTGA-----	165
Reticulata	TATGCTTTGAA-CCACCTTCCGGACTACAT--GAAATGTGTTTTTTTGCCTTTACAAC	1158
	* * *	
Medica	-----	1092
Pineapple	TTTGTTAATGAATTTGCTTATTACGTTCTCAACAACAGGATTTTGATATGCTTCGAGC	914
Maxima	TTTGTTAATGAATTTGCTTATTACGTACTCAACAACAGGATTTTGATATGCTTCGAGT	1239
Valencia	-----	165
Reticulata	TTTGTTAATGAATTTGCTTATTACGTACTCAACAACAGGATTTTGATATGCTTCGAGT	1218
Medica	-----TTTGAAGCTAAATGGTGCAT	1113
Pineapple	ATAAAAA-aTGCAGGCTTGGCTTAATACAAGCCTACTTGGTGGAGGCGAAATGGTACCAT	973
Maxima	AATAAAAAATTCATGGCTTGGCTTACTACAAGCCTGCTTAGTGGAGGCGAAATGGTACCAT	1299
Valencia	-----	165
Reticulata	ATTAAAAATTCAGTATGAAAATGTTAATTTTGCTCTCCCGCGTTCCGTTCTTTGAT	1278
Medica	CAGAATTATGTTCCGACGGTGGATGAGTACATGACGGT--TGCATTAATTAGCTCTGCC	1171
Pineapple	AGCAAGTACACACCGAAACTGGAAGAATACCTT--GGAAATGGATTGGTaTCAATAACGG	1031
Maxima	AGTAAGTACACGCCAACGCTGGGAGAATTCCTT--GGAAATGGATTGGTATCAATAGGAG	1357
Valencia	-----	165
Reticulata	---TTATCCTTTTAAATTACGATGTTTTGTCTCAAAAATAATAAATTGTAAGTAC---	1332
Medica	ACCCAAATTTGTCAACCATATCTTTTGTGGCATGGGAGACATTGTAACATAAAGAACTCTT	1231
Pineapple	GCCCTTTAATTATaCGATTTTATATCTTTCTGGTACAAATCCAATCATTAAAGAAGGAAC	1091
Maxima	GCCCTATGGGTACAATGACATTCATACCTTTCTGGGACAAATCCAATCATTGAGAAGGAAC	1417
Valencia	-----	165
Reticulata	-----	1332
Medica	TTGAATGGTTATTGAGCAATCCTAGATCGATTAGGGCTTCTTGTGCGATTGGCAGACTAA	1291
Pineapple	TGGAATTTCTAGAAAGTAATCCAGATATAGTTCACTGGTCAATCCAAGATTTTCCGCTGTC	1151
Maxima	TAGAATTTTGTAGAAAGTAATCAAGATATAATTCAGTGGCCATCAAGATTCTTCGCTTTC	1477
Valencia	-----	165
Reticulata	-----	1332

Figura 16 – Continuação.

Medica	TGAATGACATGGTGTACACAAAGTTTGAACAAAGCAGAGGGCACGTTGCCTCAAGCGTTG	1351
Pineapple	AAGATGATTTGGGAAC TTCATCG-----	1174
Maxima	AAGATGATTTGGGAAC TTCATCGGATGAGATACAGAGAGGGGATGTTCCGAAATCAATCC	1537
Valencia	-----	165
Reticulata	-----	1332
Medica	AGTGTTACATCAACCAATATGGAGCAACAGAAGAGGAAGCATACAGTGAGTTTCGGAAAC	1411
Pineapple	-----	1174
Maxima	AGTGTTACATGCATGAAACTGGTGCCCTCGGAGGAAGTTGCTCGTGAAACACATCGAGGATA	1597
Valencia	-----	165
Reticulata	-----	1332
Medica	AAGTTTCAAATGCATGGAAGGATATAAATGAGGAATGCC-TGC----GCCCAACTCTTGT	1466
Pineapple	-----	1174
Maxima	TGATGAGACAGATGTGGAAGAAGGTGAATGCATACAGAGCTGATAAAGATTCTCCCTTAT	1657
Valencia	-----	165
Reticulata	-----	1332
Medica	GCCAGTGCCACTTCTTATGCGAATTCTCAATCTTACACGAGCTGCAGATGTCGTTTACAA	1526
Pineapple	-----	1174
Maxima	CTCAAAAT--ACAGTTGACTTCATGTTGAATCTTGTGAGAATGTCCCATTTTATGTATCT	1715
Valencia	-----	165
Reticulata	-----	1332
Medica	GTATAAAGATGGCTACACTG---ACACCGAAGAGCTGAAAGATTTTATTGCTTCTCTGCT	1583
Pineapple	-----	1174
Maxima	ACGTAGAGATGGGCACGGTGCTCAAAACCAAGAGACTATGGATGTAGCTTCTACATGGCT	1775
Valencia	-----	165
Reticulata	-----	1332
Medica	TATTAATCCTGTGCCCATATGA-----	1605
Pineapple	-----	1174
Maxima	TTTTCAGCCCATTCCTTGGAGGACAACCACATGGCTTCCACAGCACAACGGCTGATGA	1835
Valencia	-----	165
Reticulata	-----	1332
Medica	-----	1605
Pineapple	-----	1174
Maxima	ATCCCAGAGTGCAAGTTTCAGTTGA	1860
Valencia	-----	165
Reticulata	-----	1332

Figura 16 – Fim.

Medica	-----MSLEVSASPAKVIQ---NAGKDSTRGSANFPP	29
Valencia	-----	0
Reticulata	MSSCINPSTLVTSVNGFKCLPLTTNKAAIRIMAKNKPQCLVSAKYDNLTVDRRSANYQP	60
Pineapple	-----	0
Maxima	MSSCINPSTLVTSINGFKCLPLATNKAAIRIMAKNKPQCLVSAKYDNLTVDRRSANYQP	60
Medica	SINGDHFQYTCDSQETDDQNVKHLELKEIRRMLKASNKTHTTLEIDAIQRLGVSYHF	89
Valencia	-----	0
Reticulata	SIWDHDFLQSLNSKYTDEAYKRAEELKGVKIAIKDVIPLDQLEIDNLQRLGLAHRF	120
Pineapple	-----DETYKRAEELKGVKTAIKDVIPLDQLEIDNLQRLGLAYHF	44
Maxima	SIWDHDFLQSLNSNYTDQTYRRRAEELKGVKTAIKDVIPLDQLEIDNLQRLGLAYHF	120
Medica	ENEIDEILGKMHKTYRDCDLCDNENDGLYYLSLQFRLFRQNGYRISADVFNTFKGSDGKF	149
Valencia	-----	0
Reticulata	ETEIRNILLNNIYNNKDYNDY---WRKENLYATSLEFRLLRQHGYPVSVQEVFNGLKDDQGGF	177
Pineapple	EPEIRNILLRNHNKDYNDY---WRKENLYATSLEFRLLRQHGYPVSVQEVSGFKDDKGVG	101
Maxima	ETEIRNILLNIIYNNKDYNDY---WRKANLYATSLEFRLLRQHGYPVSVQEVSGFKDDKGGF	177
Medica	MASLAKDVRGMLSFYEATHLRVHEENILDEALFTTSHLESVAK----QVSSPLAEQVK	204
Valencia	-----	0
Reticulata	IC---DDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEVMI-SKSKEEHVFAEQAK	233
Pineapple	IC---DDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEMMITSNSKEEDVFAEQAK	158
Maxima	IC---DDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEMMIISNSKEEYVFAEQAK	234
Medica	HALVQPIHKGLERLERHYIPIYQGESSHNEALLTFAKLDFNRLQKLHQELGDISRWK	264
Valencia	-----	0
Reticulata	RALELPLHWKVPMLERWFIVHYEKREDKNHLLLELAKLEFNTLQAIYQEEELKDISGWMK	293
Pineapple	RALELPLHWKVPMLERWFIVHYEKREDKNHLLLELAKLEFNTLQAIYQEEELKDISG---	215
Maxima	RALELPLHWKVPMLERWFIVHYEKREDKNHLLLELAKLEFNTLQAIYQEEELKDISGWMK	294
Medica	ELDFAHKLPFVRDRIAEQYFVAVGVYFEPQYSFARKLFTKVVMYTSIIDDYDVGKIEE	324
Valencia	-----MGVGESEPQFAYCRRIVTIAIALITVDDIYDVGTLDE	38
Reticulata	DTGLGKLSFARDSLVAFLWSMIGSEPFAYCRRIVTIAIALITVDDIYDVGTLDE	353
Pineapple	-----MGIAFEPQFAYCRRVLTISIALITVDDIYDVGTLDE	253
Maxima	DTGLGKLSFARDSLVAFLWSMIGSEPLAYCRRIVTIAIALVTVDDIYDVGTLDE	354
	:*: ** :*: :* : : :*****: :*	
Medica	LELFSAIESEVEKYLVSQ-----GKLYRLHYA	352
Valencia	LELFATAVER-----WDIHYV*-----	54
Reticulata	LELFATAVER-----WDIHYALNHLDPYMKLCFFALYNFVNEFAYYVLKQQDFDMLRSI	407
Pineapple	LELFATAVER-----WDIYALNHLDPYMKLCFFALYNFVNEFAYYVLKQQDFDMLRSI	307
Maxima	LELFATAVERIVGKLMWDIHYALNHLDPYMKLCFFALYNFVNEFAYYVLKQQDFDMLRSN	414
	***** :* :	
Medica	KEAMKNQVKHYFEEKWCHQNY---VPTVDEYMTVALISSAHPNLSTISFVGMGDIVTKE	409
Valencia	-----	54
Reticulata	KNSVCKMLILPLPPFRSFDLSFLNYDVVFSKIINCN-----	443
Pineapple	KNWGLLIQAYLVEAKWYHSKY---TPKLEEYLENGLVSITGPLIITISYLSGTNPIIKK	364
Maxima	KNSWLGLLQACLVEAKWYHSKY---TPTLGEFLENGLVSIGGPMGTMTSYLSGTNPIIEK	471
Medica	SFEWLFNSPRIRASCAVGRMLMNDMVSHKFEQSRGHVASSVECYINQYGATEEEAYSEFR	469
Valencia	-----	54
Reticulata	-----	443
Pineapple	ELEFLESNPDIVHMSSKIFRLQDDLGTSS-----	393
Maxima	ELEFLESNQDIHWPFKILRLQDDLGTSSDEIQRGDVPKSIQCYMHETGASEEVAREHIE	531
Medica	KQVSNWAKDINEECLRPT-LVPVPLLMRILNLTAAADVYKYKDYDT-EELKDFIASL	527
Valencia	-----	54
Reticulata	-----	443
Pineapple	-----	393
Maxima	DMMRQMKKVNAYRADKDSPLSQNTVDFMLNLRMSHFMYLRRDGHGAQNETMDVASTW	591
Medica	LINPVPI-----	534
Valencia	-----	54
Reticulata	-----	443
Pineapple	-----	393
Maxima	LFQPIPLEDNHMASTAPTADEFPECSFS	619

Figura 17 - Alinhamento das sequencias de proteínas dos genes “Cs3g04290.1” (“Valência”), “orange1.1g043404m” (“Pineapple”), “Cg3g004050.1” (*C. maxima*), “Cm205460.1” (*C. medica*) e “MSYJ216420.2” (*C. reticulata*).

Medica	-----	0
Valencia	-CAGCTGAGCTGTCTATTCTGCTCATACTCTCTGACGTCAACAGCTTGGTGGTT-----	54
Maxima	TCTTGACAAACTTATTTTGTACAAACTGATGGCATGATAAGATTGGTTGAATTAAT	60
Pineapple	-----	0
Reticulata	-----	0
Medica	-----ATATTTAATTTCTATTACTTATGAAGGCTATTGA-----	34
Valencia	-----TCCTTA-----GCTTGA	66
Maxima	ATTACTGGCCACATGATTGTTTTTATATTTTATATTTTATTCAGCCAATGAATTA	120
Pineapple	-----	0
Reticulata	-----	0
Medica	-----GTCTTGAGAAAAAAGGTTG--CTAAAGCTTGCTGATGTAAGTCTTTAG	81
Valencia	GCAGCTTCTCTTTCTGCACAGTGAGATTCT	97
Maxima	ATAACACATCAGTTTGACAAAATAAATTTGTACAAGAGTTTGGCTGTATCATCACTC	180
Pineapple	-----	0
Reticulata	-----	0
Medica	TG-----CCTTCATGCTTCCGCATTTATAGG---CGTGGCCGAGAGAAGACACAG	129
Valencia	-----TCTAACAGTATGCAACCTCCCTTGAATTCAGAC	130
Maxima	TAAAAAATATCGACATCGTTGATTATTGTAACACATGCATTAGCAAGTAGAATTC	240
Pineapple	-----	0
Reticulata	-----	0
Medica	TAGTAGCAATAATTACCATTATTTTTACGTTAAAAGTATTTAAATTTTTTCAAAT--	187
Valencia	TACTTAGACAACATGGCTATCCTGTTTCTCAAGGTACATTTCAATTA--TTCGCTTCCTTC	189
Maxima	TCATGAAAAAGTATGACTATTTTTGCCTCCAGATTGGGTTTCATAGTTTTGATACATAC	300
Pineapple	-----TC	2
Reticulata	-----	0
Medica	-----TTGGATTAATTTAATTAGA-----	207
Valencia	TTCATGCACATGCATGATCTGAATACTTG-AATCGATCTCTGTTTTCTTCTT--TT	246
Maxima	ATT-TGCAGTATAATTTGAGTAGACATCTACCTGCCAGTCTACTTTTTGTTGATAATT	359
Pineapple	TGC-TCCCACTAACTTTGAGTTGACATCTACCTGCCAaTCTACTTTTTTGTGATAATC	61
Reticulata	-----	0
Medica	-----	207
Valencia	TTTTAATAATGTAAGAAATGGA---CG-----AAACCAAAATCAGTTTTAT	290
Maxima	ATTTTGAATTTATTAATTTGTTTCCGCAAACTGACTTTATAACTGTAACAAATATAAT	419
Pineapple	ATTTTGAATTTATTAATTTGTTTCCGCAAAAGTACTTTATAACTGTAACAAATAGAAT	121
Reticulata	-----	0
Medica	-----	207
Valencia	ATCTCTATCTCCTGAGAAATCGAACTCGACAAGGGCGCCGCTAGGGATACTTCAATCG	350
Maxima	TTCGATGTTAGTCCCAACATTAAGATATTGTT---GCAACTTTTGTTCCTTTTTTT	475
Pineapple	TTCGATGTTAGTCCCAACATTAAGATATTGTT---GCAACTTTGTATGCCTTTTT---	174
Reticulata	-----	0
Medica	-----	207
Valencia	TTCTCTAATTAACA-----	364
Maxima	TTTTTCCCTTAACTTACTTTGTGAATCTTATTTCCGATAAAAAAGATTTAATGTA	535
Pineapple	---TTTCCCTTAACTTACTTTGTATATTCTTATTTCTCCAcAAAAAAGATTTAATGTA	231
Reticulata	-----	0
Medica	-----TGTATCTTCGACACTTTGGTAGATTGGTGTGTGAA	242
Valencia	-TATATGTGCAAAAGTTTGTAGATATAATTTTTTTTTTCGGTTGAGCACTGCAGAGG	423
Maxima	ATAAATAGAACTTTTATTAGTAGAATTGAATTTATGAATTTCTGTCAATTTCTGCGTGCA	595
Pineapple	ATAAATAGAACTTTTATTAGTAGAATTGAATTTATGAATTTCTGTATTCTGCGTGCA	291
Reticulata	-----	0
Medica	TTTAATAATTCGATTCCAAAAATGAAACCT-----AATCTGAACGAAGATTGAAAAATA	296
Valencia	TTTT--CAGTGGTTTTAAGGACGACAAGGGAGGCTTCATTTGTGATGATTTCAAG-GGAA	480
Maxima	TTTTATTGTAGTTTATGAAAGACTCTTTCAA--AATTTGTAT-----GCAG-GAAA	646
Pineapple	TTTTATTGTAGTTTATAGAAAGACTCTTTAAAA--AATTTGTAT-----GCAG-GAAA	342
Reticulata	-----	0
Medica	AAAATTGTAATTGAAAAGTTGATTATTA--GAATAAAAACTTCGCAAGAAGGGAAATG	355
Valencia	TACTGAGCTTGATGAAGCTCGTATTACAGCTTAGAAGGAGAAAGCATCATGGAGGAGG	540
Maxima	AAAAGAAAAAGAAAAATAAATAAA-TCA-----TCCGAATGTGTATG	688
Pineapple	AAAAAaGATAAATAAAAAaGATTA-TACAACATTCATCC---GAATGTATGGATGATG	397
Reticulata	-----	0

Figura 18 - Alinhamento das sequencias promotoras dos genes “Cs3g04290.1” (“Valência”), “orange1.1g043404m” (“Pineapple”), “Cg3g004050.1” (*C. maxima*), “Cm205460.1” (*C. medica*) e “MSYJ216420.2” (*C. reticulata*).

Medica	ACCCCACTCTGTGGCAAAATGTAACATTACCCCGTCTCAAAAGTTTTAAATATA	415
Valencia	CCTGGCAATTCACGTATCCATTTGATTGCAT-----AACTCATATATATAGACAAGAC	595
Maxima	TATGTGCTTCTGGCACAAAATTGACCTCGTTGCGACAGTATGATGTACTCCTTCCAACC	748
Pineapple	TATGTGCTTCTGGTACAATAATTGACCTCGTTGCGACAGTATGATGTACCCCCCCcCC-	456
Reticulata	-----ACAATAATGACCTCGTTGCGACAGTATGATGTACTCCTTTTTTTT	45
	* * * *	
Medica	TCACAGCCCTCCCG----ATGTGACATATAATTGTCATTACTTTTGTATTTTATCTGTTA	471
Valencia	AGACAGACACACAC-----ACACACACATCAAAGATTTGATTTTATAATTTA-----	642
Maxima	CAACAACCCCCCCCCCCCCCCCCCATATGAATAAAAAATATCTTTGACTA-T-----	800
Pineapple	c-----aaaaaaaaaGaaTAAaATATCTTTGACTA-T-----	489
Reticulata	T-----CCCCCAAAATGAATAAAATACCTTTGACTA-T-----	78
	* * * * *	
Medica	TGATTTGCGGTTGACCAATGACATGATTTGTCCATTGATAAGGTTCAAAAAAGGCAAT	531
Valencia	----CATAACTTGAAAATTTAATCACAT-----	667
Maxima	----TAAGACTTAAAAAATTAACCGCTTCAAAACTC-----AGAAAAAATGAGT	847
Pineapple	----TAAGACTTAAAAAT-TAAACGCTTCAAAACTC-----AGAAAAAATGAGT	534
Reticulata	----TAAGACTTAAAAAT-TAAACGCTTCAAAACTC-----AGAAAAAATGAGC	123
	* * * * *	
Medica	TCCTAAGTTAAGTTAATGTATCTTACAGTCTGATTAATAATATCAACTATTAGATATCT	591
Valencia	-----GTATATTAATTAATTC	683
Maxima	AAGAAAAATAAAT-CACATGAACTTCTCCTCGCCTATATATATGTATATTTATATATAT	906
Pineapple	AAGAAAAATCAAT-CACATGAGCTTCTCTCTGCCTATATAT-----ATATATAT	583
Reticulata	ACGAAAAATAAAT-CACATGAACTTCTCCTCGCCTATATAT-----ATATAT--	170
	* * * *	
Medica	TCAATTTCAATCCAACGG----TTGAAGTTAATTTATGACAGTAATAACAAAAAGGG	646
Valencia	TTAGGTGCAAACTCCGCCTTTACAGTAGTTAAAGGCATGAGCTCTACTTT-----	735
Maxima	ATAACCTCGTGCATCACCACAAACCACAGAATAATTGAGAATCTTTGCCAAG----TA	961
Pineapple	ATAACCTGTACATCACCACAAACCATAGATTAATTGAGAATCCTTCCAAG----TA	638
Reticulata	-----	170
Medica	TAACCGGCTGAATTGGTTAGGAATAATTGATGGGCAACCGGACCAAAAGGTTTACCTTT	706
Valencia	-----ATATAGTGACAGACATTGCACCAGAGTATGACTCTA	770
Maxima	TAA-----CTGTAAAGTAGCTTACACTACATCTGTATATCCAATG-	1001
Pineapple	TAC-----CTGTAAAGTAGCTTACACTGCATCTGTATATCCAATGT	679
Reticulata	-----	170
Medica	CATCATCGTTTGA----GAAGACAAAAATACTAAGAAAGGGGAGGGAATGATTT----	758
Valencia	TATATCGAGCTATGTAAAGCCCTTATACACTTTATAAAGTGCTATTGTCTGCATTACAG	830
Maxima	-----	1001
Pineapple	CTTCTGCATTAATCCCTCAACCTTGGCTACCTCTGTAATGGTT-----T	725
Reticulata	-----	170
Medica	-----AGGGATTGTG-GAGGAGAATAGAAATTTGGTAAATTTGAGGAAATAAG	807
Valencia	AAAGACTCTTCAGAATCCAGATGAAAAGCTGACTCTATA---TATATAGATATATACA	886
Maxima	-----	1001
Pineapple	CAAAATGCTTCTCTTGAACAAATAGAGCAGCCATCAGA-----A	766
Reticulata	-----	170
Medica	AGATGGGATTTGATCTAATTAACCAATCTATAGATCTCCAACCATGAGTAAATTAAGG	867
Valencia	ACATGTATCGTAATATTCGTTTCAATTTCTTATCAAGGTAGT----GGAAGGATACAG	941
Maxima	-----	1001
Pineapple	TCATGGCAAAAAATAAGCCAGTCCAATGCCTTGTGAGCaCAAATATGATAATTTGACAG	826
Reticulata	-----	170
Medica	AAGA---ATGAATATAGAAAT--TAAAGAGGCCATTACTGTTGTTGATCAGCTGCCTGCA	922
Valencia	GTCTTGGAGAGAAATGAGCTTTGCGAGGGACAGCTGGTAGCATCCTTCTTATGGAGCA	1001
Maxima	-----	1001
Pineapple	TTGATA-GGAGATCAGCAAACCTACCAACCTTCAATTTGGGACCATGATTTTTGCGAGTCA	885
Reticulata	-----	170
Medica	GAGAATTGCAAATTTTCAGT-----AAATTACATGTATCGGTAATTGA	965
Valencia	-----	1001
Maxima	-----	1001
Pineapple	CTGAATAGCAACTATACGGTATTGATTATATTATTATTATTACGTATAAAATTCCTTTG	945
Reticulata	-----	170
Medica	TTGATTAACAAATGCAACAA-----AATCAAATGTACTCA-----	1001
Valencia	-----	1001
Maxima	-----	1001
Pineapple	TTCAATTTCAAATTAGGACCATGAATAACTAAAACTAAaTGCTGTGCATGTACAGG	1001
Reticulata	-----	170

Figura 18 – Fim.

Clementina	---ATGGCTTGCAGTAACAACCTCAATAGTTGCTTGTAAATGGCTCCAATGATCCGTTGCCAA	57
Valencia	-----	0
Medica	ATGTCTTCTTCCATTAATCCCTCAACCTTGGTTAC-----CTCTGTAAATGGTTTCAA	53
Reticulata	-----	0
Pineapple	-----	0
Maxima	-----	0
Clementina	CGGCGGTGAGCCAATTAC---CATGCGAGTATTTGGAACCTGAACTCATAGAGTCCTTT	114
Valencia	-----	0
Medica	ATGTCTTCTTCAACAATAAAGCAGCCATCAGAAATCATGGCCAAAAATAAGCCACT	113
Reticulata	-----	0
Pineapple	-----	0
Maxima	-----	0
Clementina	ACCACTCCTTATACTTACGAGTTGTATGCCAACAGATTAGATGAGTTGAAGCAAAAAGGCT	174
Valencia	-----	0
Medica	CCAATGCCTTGTAGGAAGC----ATACAAAAGACGAGCAGAAGGGCTGAAGGGAAAAGTG	168
Reticulata	-----	0
Pineapple	-----	0
Maxima	-----ATG	3
Clementina	AAAGATTTGTTTGCATCCGCCAAAGAAAGCACTAGTGAACATTTAAAGCTAACTGACTCG	234
Valencia	-----ATGTAC	6
Medica	AAGATAGCGATTAAGGA---TGTAATCGAGCCTCTGGATCAGTTGGAGCTGATTGATAAC	225
Reticulata	ATGACAACAATTAAGGA---TGTAACCGAGCCTCTGGATCAGTTGGAGCTGATTGACAAC	57
Pineapple	-----	0
Maxima	ACAACGATTAATAAGGA---TGTAACCGAGCCTCTGGATCAGTTGGAGCTGATTGACAAC	60
Clementina	GTGCAGAAGTTGGGAGTGGCATAACCATTTTGAAGAAGAGATCAAAGAGGCCATGAATATT	294
Valencia	TTGCAAAGACTTGGATTGGCTTATCATTTTGAGACTGAGATTCGGAAAAATTTGCATAAT	66
Medica	TTGCAAAGACTTGGATTGGCTCATCGTTTGGAGACTGAGATTAGGAACATATTGAATAAT	285
Reticulata	TTGCAAAGACTTGGATTGGCTTATCATTTTGGAGACTGAGATTCGGAAACATATTGCACAAT	117
Pineapple	-----CTTGGATTGGCTTATCATTTTGGAGACTGAGATTCGGAAAAATTTGCATAAT	51
Maxima	TTGCAAAGACTTGGATTGGCTTATCATTTTGGAGACTGAGATTCGGAAAAATTTGCATAAT	120
	* * * * *	

Figura 19 - Alinhamento das seqüências codificadoras dos genes “Cs3g04340.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g046807m” (“Pineapple”), “Cg3g004140.1” (*C. maxima*), “Cm257260.1” (*C. medica*) e “MSYJ054830.1” (*C. reticulata*).

Clementina	CTCA-----AAGGAGATGCTACCATCAAAGATCTTAATGCAACGCTACTG	339
Valencia	ATCTACAACAGTAATAAAGATTATAATTGGAGAAAAGAAAATCTGTATGCAACCTCTCTC	126
Medica	ATCTACAACAAATAAAGATTATAATTGGAGAAAAGAAAATCTGTATGCAACCTCCCTT	345
Reticulata	ATCTACAACAAATAAAGATTATAATTGGAGAAAAGAAAATCTGTATGCAACCTCCCTC	177
Pineapple	ATCTACAACAGTAATAAAGATTATAATTGGAGAAAAGAAAATCTGTATGCAACCTCTCTC	111
Maxima	ATCTACAACAGTAATAAAGATTATAATTGGAGAAAAGAAAATCTGTATGCAACCTCTCTC	180
	** *	
Clementina	CATTTTCGCCTTCTACGTGAACACGGCCATCCAGTTAGTACAGGTGTGTTTGTAAATTC	399
Valencia	GAGTTTAGACTACTTAGACAACATGGCTATCCTGTTTCTCAAGACGTTTTCAATGGTTTT	186
Medica	GAGTTTCAGACTACTTAGACAACATGGCTATCCTGTTTCTCAAGAGGTTTTCAATGGTTTT	405
Reticulata	GAGTTTAGACTACTTAGACAACATGGCTATCCTGTTTCTCAAGACGTTTTCAATGGTTTT	237
Pineapple	GAGTTTAGACTACTTAGACAACATGGCTATCCTGTTTCTCAAA-CGTTTTCAATGGTTTT	170
Maxima	GAGTTTAGACTACTTAGACAACATGGCTATCCTGTTTCTCAAGACGTTTTCAATGGTTTT	240
	* *	
Clementina	AGAAAAGGGACGGGAGGTTCCATGACAATTTACGAGAAGACATAGAAGGGCTTTTGAAT	459
Valencia	AAAGACGCAAGGGAGGCTTCATTTGTAATGATT-----TCAAGGAAATTAATGAGC	237
Medica	AAAGACGGCCAGGGAGGCTTCATTTGTAATGATT-----TCAAGGGAATTAATGAGC	456
Reticulata	AAAGACGCAAGGGAGGCTTCATTTGTAATGATT-----TCAAGGAAATTAATGAGC	288
Pineapple	AAAGACGCAAGGGAGGCTTCATTTGTAATGATT-----TCAAGGAAATTAATGAGC	221
Maxima	AAAGACGCAAGGGAGGCTTCATTTGTAATGATT-----TCAAGGAAATTAATGAGC	291
	* *	
Clementina	TTATTTGAAGCTTCATTCCTTGAATTGAAGGAGAGGATGTTCTAGAAGAAGCCAATATT	519
Valencia	TTGCACGAAGCCTCGTATTACAGCTTTGAAGGAGAAAGCATCATGGAGGAGGCTGGCAA	297
Medica	TTGCACGAAGCCTCGTATTACAGCTTTGAAGGAGAAAGCATCATGGAGGAGGCTGGCAA	516
Reticulata	TTGCATGAAGCCTCGTATTACAGCTTTGAAGGAGAAAGCATCATGGAGGAGGCTGGCAA	348
Pineapple	TTGCACGAAGCCTCGTATTACAGCTTTGAAGGAGAAAGCATCATGGAGGAGGCTGGCAA	281
Maxima	TTGCATGAAGCCTCGTATTACAGCTTTGAAGGAGAAAGCATCATGGAGGAGGCTGGCAA	351
	** *	
Clementina	TTTTGTACTGAGCATCTAAAGGAGTCATT-AGGGACGTT----GGGGAGCAAAATCATA	573
Valencia	TTCAACAGTAACATCTTAAAGAAGTGATGATCAGCAAGAGCAAGCAAGGGGATGCTTTT	357
Medica	TTTACAGTAACATCTTAAAGAAGTGATGATCAGCAAGAGCAAGCAAGGGGATGCTTTT	576
Reticulata	TTCAACAGTAACATCTTAAAGAAGTGATGATCAGCAAGAGCAAGCAAGGGGATGCTTTT	408
Pineapple	TTCAACAGTAACATCTTAAAGAAGTGATGATCAGCAAGAGCAAGCAAGGGGATGCTTTT	341
Maxima	TTCAACAGTAACATCTTAAAGAAGTGATGATCAGCAAGAGCAAGCAAGGGGATGCTTTT	411
	** *	
Clementina	CTGGCTGAGCAGGTACAACAATCTTTAGACATCCCTTCATATTGGAGGATGCCAAGAATT	633
Valencia	GTGCGAGAACCAAGCAAGCGCGCACTGGAGCTCCCTCTGCATTGGAAAAGTTCCAATGTTA	417
Medica	GTAGCAGAACCAAGCAAGCGCGCACTAGAGCTCCCTCTGCATTGGAAAAGTTCCAATGTTA	636
Reticulata	GTAGCAGAACCAAGCAAGCGCGCACTGGAGCTCCCTCTGCATTGGAAAAGTTCCAATGTTA	468
Pineapple	GTGCGAGAACCAAGCAAGCGCGCACTGGAGCTCCCTCTGCATTGGAAAAGTTCCAATGTTA	401
Maxima	GTAGCAGAACCAAGCAAGCGCGCACTGGAGCTCCCTCTGCATTGGAAAAGTTCCAATGTTA	471
	* *	
Clementina	GAGGCTCAGAACTTCATCAAATATACCCACAGATGATGAAAGCAGTCCAATTTTGCTG	693
Valencia	GAGGCAAGGCAATTTACAGGAAGAACTTAAAGATTTTGAAGGTATCCATGCTT-----	472
Medica	GAGGCAAGGTGGTTTATACAGCTTTATGAGAAAAGAGAGGGAACAAGAACCACTTTTACTT	696
Reticulata	GAGGCAAGGTGGTTTATAGACGTTTATGAGAAAAGAGAGGGAACAAGAACCACTTTTACTT	528
Pineapple	GAGGCAAGGTGGTTTATAGACGTTTATGAGAAAAGAGAGGGAACAAGAACCACTTTTACTT	461
Maxima	GAGGCAAGGTGGTTTATAGACGTTTATGAGAAAAGAGAGGGAACAAGAACCACTTTTACTT	531
	***** *	
Clementina	ACTCTAGCCAAGTTGGATTACAATTTAGTACAATCCATACCAACAAGAACTGAAGGAG	753
Valencia	-----GGTTGCAACTC-----	483
Medica	GAGCTCGCTAAGTTGGAGTTAAACATTTGCAGGCAATTTACCAGGAAGAAGCTTAAAGAC	756
Reticulata	GAGCTCGCTAAGTTGGAAATCAACGTTTTGCAGGCAATTTACCAGGAAGAAGCTTAAAGAT	588
Pineapple	GAGCTCGCTAAGTTGGAAATCAATGTTTTGCAGGCAATTTACCAGGAAGAAGCTTAAAGAT	521
Maxima	GAGCTCGCTAAGTTGGAAATCAAAATTTGCAGGCAATTTACCAGGAAGAAGCTTAAAGAT	591
	* * * * *	
Clementina	TTGGCAAGGTGGTGGAGTAATCTGGTTTTAAAGAGAAAAGTAAAGTTTGCCAGAGACCGG	813
Valencia	ATATTTATGTGGTGGAAAGGATATAGGCTTTGCAGAGAAAAGTAAAGTTTGCCAGAGACCGG	543
Medica	ATTTCAAGGTGGGACATCCATATGCTTTGAACCACTTCCGGACTACATGAAATTTGTT	816
Reticulata	GTTTCAAGGTATCCATGCTTGGTTGCATAA-----	618
Pineapple	TTTTG-----	526
Maxima	GTTTCAAGGTGGTGGAAAGGATATAGGCTTTGGAGAGAAAAGTAAAGTTTGCCAGAGACCGG	651
	*	
Clementina	TTGATGGAAAATTATT-----TGTTGGTGTAGGGCTTTGTTTCAAAGCACAGTTT	864
Valencia	TTGGTAGCATCCTTCGTACGGAGCATGGGGAGCATGGGGATAGTGTTTAAGCCCTCAATTA	603
Medica	TTTTTTGCG-----CTTTACAACCTTGTAAATGA--ATTGTTTATACGTAAGTT	865
Reticulata	-----	618
Pineapple	-----	526
Maxima	TTGGTAGCA-----TCCTTCGTATGGAGCACGGGGATAGTGTTTGAGCCCTCAAAATC	702

Figura 19 – Continuação.

Clementina	TCTAAGTGCAGAATTGGCCTCACAAAATTTGTATGCATATTAACCTGCGATTGATGACATT	924
Valencia	GCCTACTGTAGGAGAATACGCACAATCACGTTTGCTCTAATTTTCAGTGATTGATGATATT	663
Medica	CATTACAGAAAGACTC--TTCAGAATCCAGATT-----GAAAGCTGA----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	GCCTACTGTAGGAGAATCTACAATCACGTTTGCACTAATTTTCAGTGATTGATGACATT	762
Clementina	TATGATGTATATGGATCAATAGATGAGCTTGAACCTTTACAGAAGCAGTGAAAAGTTTT	984
Valencia	TATGATGTTTATGGAACTTTGGATGAACTTGAGCTATTTGCTGATGCTGTTGAGAGGTGG	723
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	TATGATGTTTATGGAACTTTGGAAGAAGCTTGAGCTATTTGTTGATGCTGTTGAGAGGTGG	822
Clementina	CCACCATCTTATATATTATCCTTTTGTTTTATGGGGATTCCCCATAAAATCCGGTGGGAA	1044
Valencia	GACATCAATTA-----	734
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	GACATCAATTA-----	833
Clementina	ATTGGGGCAGTACTGGAGGAGCTGCCAGAATATATGCAGATTGCTACTTGGCCATGTTT	1104
Valencia	-----TGCTTTGAACCACCTTCCGGACTATATGAAATCTGTTTTCTTGCCTTTAC	786
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	-----TGCTTTGAACCACCTTCCGGACTATATGAAATCTGTTTTCTTGCCTTTAC	885
Clementina	AACCTTGGAAATGAGTTGGCATGTGATGTTATGAAAATTCATGGCCTCAATACTCTATCC	1164
Valencia	AACCTGGTTAATGAATTTACTTATTACGTACTCAAAACACAGGGTTTTGATATACTTCGA	846
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	AACCTGGTTAATGAATTTACTTATTACGTACTCAAAACACAGGATTTTGATATACTTCGA	945
Clementina	TACAT-----TAAGAAAGAGTGGGAAAATCTGTGTACATCATACTAGTA	1209
Valencia	AGTATAAAAAATGCCTTACGTAAAAATTTATGGCTTCGCAATATACAAGCCTACTTAGTG	906
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	AGTATAAAAAATGCG-----TGGCTTCGCAATATACAAGCCTACTTAGTG	990
Clementina	GAAGCCAGATGGTTTAGCAAAGGGTACACGCCAACTGCGAAGGAATACATAGAAAAATGCA	1269
Valencia	GAGCGAAATGGTACCATTGGTAAAGTACACGCCAACACTGGGAGAATTTCTGGAAAAATGGA	966
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	GAGCGAAATGGTACCATTGGTAAAGTACACGCCAACGCAGGGAGAATTTCTGGAAAAATGGA	1050
Clementina	TGGGTTTCAGTGGGAAGCCCTGCTGCCATTGTCCATGCCTATATCTTGCTACAACCTCAA	1329
Valencia	TTGGTATCAATAGGAGGCCCTATGGTTACAATGACTGCATACCTTTCTGGGACA-----	1020
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	TTGGTATCAATAGGAGGCCCTATGGTTACAATGACTGCATACCTTTCTGGGACA-----	1104
Clementina	GGAAGCAATGCCTTGACCGAAAATTCAGCTGCCTCAAAGTCGAACATGGCTATGAT	1389
Valencia	-----AATCCAATCATTGAGAAGG-----AACTAGAATTTTAGAAAAGTAATCAA	1065
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	-----AATCCAATCATTGAGAAGG-----AACTAGAATTTTAGAAAAGTAATCAA	1149
Clementina	GAGATGATATTTGGTCATCTCTCATCAGTCGGCTCAGTAACGATTTGGGAAATCCGCG	1449
Valencia	GATATAGTTCACTGGTCATTCAAGATTTCTCGTCTTCAAGATGATTTGGGAACTTCATCG	1125
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	GATATAATTCAGTGGTCATTCAAGATTTCTCGTCTTCAAGATGATTTGGGAACTTCATCC	1209

Figura 19 – Continuação.

Clementina	GTTGAGTTGAAGAGAGGCGACGTGGCGAAATCTATTCACTGCTACATGATTGAAGAAGGC	1509
Valencia	GATGAGATACGGAGAGGGGATGTTCCGAAATCGATCCAGTGTACATGCATGAAACTGGT	1185
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	GATGAGATACAGAGAGGGGATGTTCCGAAATCAATCCAGTGTACATGCATGAAACTGGT	1269
Clementina	ATATCAGAAGAAGAAGCAAGGGACCGTATAAAAAAGTTTGATAATTTACTCCTGGAAAAAG	1569
Valencia	GCCTCGGAGGAAGTTGCCCGTGAACACATCAAGGATATGATGAGACAGATGTGGAAAGAAG	1245
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	GCCTCGGAGGAAGTTGCTCGTGAACACATCAAGGATATGATGAGACAGATGTGGAAAGAAG	1329
Clementina	CTGAATGGCAAGAATCTTTATAAAAGTGATTTCCAG---AAAGCATGGCGAAAAATGTGT	1626
Valencia	GTGAATGCATACAGAGCTGATAAAGATTCTCCCTTATCGCAAACTACAGTCGAGTTCATA	1305
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	GTGAATGCATACAGAGCTGATAAAAACCTCCCTTATCGCAAACTACAGTGGAGTTCATA	1389
Clementina	TTAGACATGTCTAGAAGTGCACATT---GCATTTTCCATGGAGATGGTATAGGAACATCA	1683
Valencia	TTAAATGTTGTGAGAGTGTCCCATTTTATGTATCTACATGGAGATGGGCATGGTGCTCAA	1365
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	TTGAATGTTGTGAGAGTGTCCCATTTTATGTATCTAAATGGAGATGGGCATGGGGCTCAA	1449
Clementina	ACCGGGTTTCTAGAGATCGTTTGGTCTCTTTAATACTTGAGCCTATACCAGTTGAATTG	1743
Valencia	AACCAAGAGACTATGGATGTAGTTTTACATTGCTTTTCAGCCAATTCCCTTGGACGAC	1425
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	AACCAAGAGACTATGGATGTAGTTTTACATTGCTTTTCAGCCAATTCCCTTGGACGAC	1509
Clementina	TAA-----	1746
Valencia	AAACACGTGTTGCCACATCATCACCTGGCACCAAAAGGATGA	1467
Medica	-----	906
Reticulata	-----	618
Pineapple	-----	526
Maxima	AAACACATGGTTGCTACATCATCACCAGGCACCAAAAGGATGA	1551

Figura 19 – Fim.

Clementina	-----MACS----NNSIVACNGSNDPLQRRSANYHASIWNPOLIESFTT	40
Medica	MSSSINPSTLVTSVNGFKCLPLTTNKAIRIMAKNKPLQC-----	40
Valencia	-----	0
Reticulata	-----	0
Pineapple	-----	0
Maxima	-----	0
Clementina	PYTYELANRLDELKQKAKDLFASAKESTSELLKLTDSVQKLGVAHYFEEIKEAMNLIK	100
Medica	--LDEAYKRAEGLKGVKIAIKD-VIEPLDQLELIDNLQRLGLAHRFETEIRNLIHNIY	97
Valencia	-----MYLQRLGLAYHFETEIRKILHNIY	24
Reticulata	-----MTTIKD-VTEPLDQLELIDNLQRLGLAYHFETEIRNLIHNIY	41
Pineapple	-----LGLAYHFETEIRKILHNIY	19
Maxima	-----MTTINKD-VTEPLDQLELIDNLQRLGLAYHFETEIRKILHNIY	42
	**:*:* **:: :	
Clementina	GDA----TIKDLNATSLHFRLLRHGHPVSTGVDFKFRKRDRGRFDNLRDIEGLNLF	155
Medica	NNNKDYNWRKENLYATSLEFRLLRQHGYPVSQEVFNGLKDGQGGFIC--DDFKGIISLH	154
Valencia	NSNKDYNWRKENLYATSLEFRLLRQHGYPVSQDVFNGFKDDKGGFIC--NDFKEIMSLH	81
Reticulata	NNNKDYNWRKENLYATSLEFRLLRQHGYPVSQDVFNGFKDDKGGFIC--NDFKGIISLH	98
Pineapple	NSNKDYNWRKENLYATSLEFRLLRQHGYPVSQDVFNGFKDDKGGFIC--NDFKEIMSLH	76
Maxima	NSNKDYNWRKENLYATSLEFRLLRQHGYPVSQDVFNGFKDDKGGFIC--NDFKEIMSLH	99
	.:* ****.*****:** ** :.: . * :* : : : *	
Clementina	EASFLGIEGEDVLEEANIFCTEHLKESLGT--LGSKIILAEVQVQSLDIPSYWRMPRIEA	213
Medica	EASYYSLEGESIMEEAWQFTSKHLKEVMISKSEEHVFAEQAKRALELPLHWKVPMLA	214
Valencia	EASYYSFEGESIMEEAWQFTSKHLKEVMISKSKQGDVFAEQAKRALELPLHWKVPMLA	141
Reticulata	EASYYSLEGESIMEEAWQFTSKHLKEVMISKSKQGDVFAEQAKRALELPLHWKVPMLA	158
Pineapple	EASYYSFEGESIMEEAWQFTSKHLKEVMISKSKQGDVFAEQAKRALELPLHWKVPMLA	136
Maxima	EASYYSFEGESIMEEAWQFTSKHLKELMISKSKQGDVFAEQAKRALELPLHWKVPMLA	159
	***: .:* ** : : ** * : : ** * : : : : : : : : ** * : : **	
Clementina	QNFIKLYPTDDESSPILLTAKLDYNLVQSIHQQLKELARWNSLGFKEKLSFARDRLM	273
Medica	RWFIDVYEKREDKNHLLLELAKLEFNTLQAIYQEELKDE-----	252
Valencia	RQFTRKNLKFEGI-----HAWLQLIFMWWKDIGLAEKLSFARDSLV	183
Reticulata	RWFIDVYEKREDKNHLLLELAKLEFNVLQAIYQEELKDVSRYPCLVA-----	205
Pineapple	RWFIDVYEKREDKNHLLLELAKMEFNVLQAIYQEELKDF*-----	175
Maxima	RWFIDVYEKREHKNHLLLELAKLEFKILQAIYQEELKDVSRWWKDIGLGEKLSFARDSLV	219
	: * . . . : * :	
Clementina	ENYLLV---MGLCFKAQFSKCRIGLTKFVCILTAIDDIYDVYGSIDELFTEAVKSFPP	330
Medica	-----IS----	254
Valencia	ASFVRSMGSMGVFKPQLAYCRRIRITITFALISVIDDYDVGTLDELFAFAVE----	239
Reticulata	-----	205
Pineapple	-----	175
Maxima	ASFVMS---TGIVFEPQIAYCRRIRITITFALISVIDDYDVGTLDELELFADAVE----	272
Clementina	SYILSFCFMGISPRIWEIGAVLEELPEYMQICYLAMFNFGNELACDVMKIHLNLTLSYI	390
Medica	-----GWDIHYALNHLPDYMKLCFFALYNFVNEFVYVLAQKDSSEFQI	299
Valencia	-----RWDINYNLHLPDYMKFCFLALYNLNEFTYVYLKQQGDFDILRSI	284
Reticulata	-----	205
Pineapple	-----	175
Maxima	-----RWDINYNLHLPDYMKICFLALYNLNEFTYVYLKQQGDFDILRSI	317
Clementina	KK-----EWENLCTSYLVEARWFSKGYTPTAKEYIENAWVSVGSPAIVHAYILLQLQGS	445
Medica	ES-----	301
Valencia	KNALRKILWLNRNIQAYLVEAKWYHGKYPTLGEFLENLVSIIGPMVTMTAYL----SGT	340
Reticulata	-----	205
Pineapple	-----	175
Maxima	KN-----AWLRNIQAYLVEAKWYHGEYPTQGEFLENLVSIIGPMVTMTAYL----SGT	368
Clementina	NALTENSLSCLKVEHGYDEMIYWSSLISRLSNDLGNLGSVELKRGDVAKSIQCYMIEEGIS	505
Medica	-----	301
Valencia	NPIIEKELEFL---ESNQDIVHWSFKILRLQDDLGTSSDEIRRGDVPKSIQCYMHETGAS	397
Reticulata	-----	205
Pineapple	-----	175
Maxima	NPIIEKELEFL---ESNQDIHWSFKILRLQDDLGTSSDEIRRGDVPKSIQCYMHETGAS	425
Clementina	EEEARDRIKSLIYSWKKLNGKNLYKS-DFPESMAKMLDMSRTAHC-IFHGDGIGTSTG	563
Medica	-----	301
Valencia	EEVAREHIKDMRMQMWKKNVAYRADKNSPLSQTTFEFLNVVRSVSHMYLHGDGHGAQNG	457
Reticulata	-----	205
Pineapple	-----	175
Maxima	EEVAREHIKDMRMQMWKKNVAYRADKNSPLSQTTFEFLNVVRSVSHMYLHGDGHGAQNG	485
Clementina	VSRDLVSLILEPIPVEL-----	581
Medica	-----	301
Valencia	ETMDVVFTLLFQIPLDDKHVATSSPGTKG*	488
Reticulata	-----	205
Pineapple	-----	175
Maxima	ETMDVVFTLLFQIPLDDKHVATSSPGTKG-	516

Figura 20 - Alinhamento das sequências de proteína dos genes “Cs3g04340.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g046807m” (“Pineapple”), “Cg3g004140.1” (*C. maxima*), “Cm257260.1” (*C. medica*) e “MSYJ054830.1” (*C. reticulata*).

Medica	-----TGGATATATAGATG-----TAGAGTAAGCTAGCTTACAGT	35
Clementina	-----TGGGGAGAAT-----ATAATTAATATGATTACAA	30
Maxima	-----ATTAAGATATTCTTTGTAACCTTGACATA	28
Valencia	CTTGTAAGAATGGCTAGGGTATTG-----ACGTTATGGC	38
Pineapple	-----	0
Reticulata	CTTCCAAGCTAATACGAGGCTTCATGCAAGCTATTATCCCTTGAATCATTACAAA	60
Medica	TA-----TACTT---GGCG---AAGAT-TCTCAAATTAATCTATGGTT-----TGT	74
Clementina	TTT-----GTAGGGGAATGCTTAGAAGAA-----ACA	57
Maxima	TTCTATTTTTATGTAAGT-----AAAAACAAGTTTTTAAT---GTAATAATA-	73
Valencia	TGGACCCCTTCTGTGTTGAAAAGAAAGCCCTCGGACATACGATTGATGGTCTCCTCGAGCT	98
Pineapple	-----	0
Reticulata	TGAAGCCCCCTTGTCTGCTTTAAAACCATTGAAAACGTCTGCAGTGTCTCAACAAAAAAG	120
Medica	--GGTGATGTACGAGGTTATATATATATATAGGCAGAGGAGAAGTTCATGTGATTTATTT	132
Clementina	GATACAATATAACAAT-----	75
Maxima	--GGACTTTTGAAGCAAAGTTAAATTTATG-----AATTTTTTT	111
Valencia	GATGCAGTTTGCATTAATGCCA-CTCCA-----TTTGTT	132
Pineapple	-----	0
Reticulata	AACTACATTCATCAAAATTTTCGCATACATATGCTAATTAGAGAATGACTTAAGTGTCTC	180
Medica	TTCGTACTC-----ATTTTTCTGAGTTTTGAAAGCGTTAATTTTTAAGTCTTAA	183
Clementina	-----ATATACAT	83
Maxima	GTCATTAATA-----TGTGT-ATTTATATAATTTATAGGCTT	148
Valencia	GCAATCCATCTTGAAGTCCATCAAGCCTCGCTCTAAATTTCAATCCTTCTTGTGTAG	192
Pineapple	-----	0
Reticulata	AGCGGCCTTGTGAGTTCGAATTCCTCGGAGATAGAG-AATAAAAAATTGATTTGGGCG	239
Medica	TAGTACAAAAGTATTTTTATTCATTTGGGGGAAAAAAGGAGTACATCATACTGTGCGGA	243
Clementina	ATACACACACACACACACAGAGTTCTTAAAAAGAAAGAAAGCATCAAGTT-GTTGAGA	142
Maxima	ATAGAAAAGTCTTTAAAAAATTTGTAGCGAAAAAATGACAAATAAATAACAATTTATA	208
Valencia	TTG--CCATGAGAACAATAAAGTTTTTGAACAAGATAATGCGGCTCTGATACCAATTTGAT	250
Pineapple	-----	0
Reticulata	TTG--TCCACTCTTTAAATTTTTTTTTAAAAAGGA-AAAAACAGAGAGATCGATTCAA	296
Medica	A---CGAGGTCAATATTGTACCAGAAGACAC--GTACATCATCCATACATCCGATGAA	297
Clementina	A----TAGTTGCAAGTTGTGAGAGGGATGCC-----AAATTCATCAATTAACCT---	187
Maxima	CAACAAGCCAGCCCCCTCAAGGGCGTGGTGGGTTGGTTGCATTGCAGCTGTAACCT---	265
Valencia	A-----GGTCCAGTCAGATGCTCGCTAAC-----AAT---	278
Pineapple	-----	0
Reticulata	A-----TAT----TCAGACCTTGCATGCG-----CAT---	319
Medica	TGTTGTATAATCTTTATTTATCTTTTTTTCTGCATACAAATTTTTAAAGAT	357
Clementina	-GATACAATTGCAGAGTCAACGATCATGTTTC--ACGTGAACTTGCTTTCTTTGACTACT	244
Maxima	-CTACAAAATCCGGGTTCACTTCTGTGGATG--ATAAGGGGGTT-----AAAACTGT	316
Valencia	-GACTAAAAAGATGATAACTTTGTTCTGCTTT--TGTTGAGAACG-----ACCCGAGAT	329
Pineapple	-----	0
Reticulata	-GACAAAAAAGCGAGTTAATGATGTA----CCTTGAGAA-----ACAGGAT	364
Medica	CTTTCAATAAACTACAC--AATAAATGCACGCAGAAATGACAAGAAATTC--ATAAAT	412
Clementina	TATTGGGTGTGAGGTTGCATTAATACCTCTATTCCCTCAAA-GATTTAGATAACCT	303
Maxima	ATTTGGGTTTGCCACCCCCCTTACCTTTAAGGAAAAAACAACAA-----ACATGACAG	369
Valencia	AATTAGGTTTGATAAATGCTGATCTTTATTCGCAGCGGAAAACATAATTTATAGTAGCTA	389
Pineapple	-----	0
Reticulata	AGCCATGTTGTCTAAGTAGTCTAAACTCGAGGGAGGTTGCATACAGATTT-TCTTTCTC	423
Medica	CAATTCTACTAAT---AAAAGTCTATTTATTACATTA--AAATCTGTTTTATGTAGAA	467
Clementina	TTT-----TTATATTACATTATTGATTTTTTCATCAAAATAAAT	341
Maxima	CGAATGT-----ACATATTTGAACCTT-GCTGGCAGTTGAGAATCCCC	410
Valencia	ACCTTACAAGTCTTT-TAT-----TCCTAGCGAACCAATATCAGCTAGATTATAGTAAAA	442
Pineapple	-----	0
Reticulata	CAATTATAATCTTTATTTGTTGTAGATATTGTGCAATATGTTCCGAATCTCAGTCTCA	483
Medica	ATAAGAATATACAAAGTAAATGTAAGGAAGAAAAAGGCATACAAAGT-----	515
Clementina	ACACAAATACACAGATGTCAACATACGTATTAAGTGTATATAGTATAATAAAAACT	401
Maxima	TCACAAGAGGGGAAGTGTACTT-----TTTTATTAATGAATATAATATCTTTGCTCTACT	465
Valencia	---T---AAAAACAAGAAATA-----TTTAAAGATAACT-TAGAGGCCGAATCCAAT	490
Pineapple	-----AGTC-----TTTGCAAGT-----	13
Reticulata	AAATGATAAGCCAATCCAAGTC-----TTTGCAAGT-----TGTCATCAGCTCCAAT	532

Figura 21 - Alinhamento das sequências promotoras dos genes “Cs3g04340.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g046807m” (“Pineapple”), “Cg3g004140.1” (*C. maxima*), “Cm257260.1” (*C. medica*) e “MSYJ054830.1” (*C. reticulata*).

Medica	-TGCAACAATATCTTAATGTTGAGCACTAACATCGAAATTC-----TAT-CTGTTACA	567
Clementina	CTAAATCACTGTTA-TTCTCATACATTCTAATAGTATTAT-AAACATATCATTATCCA	459
Maxima	AAGACTTACAAATATATGCTTTGAAATCTCAGGGAAATGAATAAGAAAAATAAATCG	525
Valencia	CAAACATGACCACCACA----CTTGATTCTCTTCCAAACAGGAAACGAATATTTTGACG	546
Pineapple	-----	13
Reticulata	GATCCAG-----A----GGCTCGGTTACATCCTTAATGTTGTCATTACTTTTCCC	579
Medica	GTTATAAAGTACTTTTGCGGAAACAAATTAATAAATTTCAAATGATTATCAACAAAA	627
Clementina	TTTGATAATGACTACGGTTGTTTCAAAGTATATAAAAAAT---ATGTTACAATAAGACGT	515
Maxima	CTTGCACTTCTCTGCTGCC----TATATATATATAT-----ATATATATATAACCT	574
Valencia	TGGTAATTCCTGCTCTCGTTTCGACATTCAATAAACTCATCCTGCACATGAAACACGG	606
Pineapple	-----	13
Reticulata	TTC-AGCTCTTCTGCTC-----ATCTTTGTATGTTTCATCCTGTACACGCACAGCAT	631
Medica	GTTGA-----TTGGAGATA-----ATGGA-TTTTAATATATTGTAGATT	665
Clementina	TCAATTAATCGGACTGACCAAAATATTATGGCAGTATGGTGGATACACCAAACTGTAT--	573
Maxima	TGTGC-----ATAACCACAAACCATAGATTAATTTGAGAATTTTGCCAAAGTATA--	624
Valencia	TCTGC-----ATGAAGCCA-TGCATGGCTTGCATGAG-CACAGCTCAAACGTACCCT	656
Pineapple	-----	13
Reticulata	TTAGT-----TTTAGCTA-TTCATGGTGCCAATTGG-AAATGAACAAGGAAATTA	681
Medica	-GTGATAATTTGTAATAATTTCAAAAACTCCATTTAACAGCGGTTGGTGAAT-----	718
Clementina	-TCAATGATTAGTAGGGATGGCAAAACATCGGGTCGGGCTCGGGCTTGGCCAAACCCAAC	632
Maxima	---ACTGTAAGCTAGCTT-ACACTACATCTGTATGTC-----	657
Valencia	TTGAACCTGTAGTTAGGTT--TTGGTGATCT-TACTGA-----	691
Pineapple	-----	13
Reticulata	----ATATGTAATAATA----ATAATAATCA-ATATCG-----	710
Medica	---GTGTGTTGTA---AAATAATTTAATATTTGACAACAAGCGAAAGAATGTTGTT--	769
Clementina	CCGACCTGATCAATAGAGAATTAAGCCCGACCTTAAAAAACCATACGTATTTATATTTT	692
Maxima	---CTATGCTTTC-----TTGCATTGTTCCATCAACCTCGTTTACCCTCTGTAA	702
Valencia	---TCTCCTTGGC-----TCCTTATCATCCATCAACCTCGTTTACCCTCTGTAA	736
Pineapple	-----	13
Reticulata	---TATAGTTGCT-----ATTCACTGACTGCAAAAAATCATGGTCCCAAAATG	755
Medica	-----AAAACTCTCAATAGATGTTCAA-----TCTCAACAACATTCTACA	810
Clementina	AGGGTCGGG---TCGGGC--CCGACCCGAATCGGGCC--AACATCGGGTCGGGCTAGG	743
Maxima	ATGGTTTCAAATGCTCCTCTTGCAACAAATCGAGCAGCCACTAGAATCATTACCATAA	762
Valencia	ATGGTTTCAAATGCTCCTCTTGCAACAAATCGAGCAGCCACTAGAATCATTACCATAA	796
Pineapple	-----	13
Reticulata	AAGGTTGGTAGTTTGTCTGATCTCCTATCAACTGTCAA---ATTATCATATTTGGCGCTG	811
Medica	AAAGCGGTTGTGAAAAATTTTAATAATTGACAAC--TAGTGTAATTCGTT--ATAAA	866
Clementina	CTCGACCTACCGAAACCAATTTCAACCCCAAAATCAATGTTGAAAAATCAACTTCTTCA	803
Maxima	ATA-AGCCAGTCCAATGCCTTGTGAGCGCCAAATAT-----GATAA	802
Valencia	ATA-AGCCAGTCCAATGCCTTGTGAGCGCCAAATAT-----GATAA	836
Pineapple	-----	13
Reticulata	ACA-AGGCATTGGACTGGCTTATTTTTGCCATGAT-----TCTGA	851
Medica	TTTTTAATCTC-----ATTCAATCCATGAATTAGTAAAAATTA	903
Clementina	TTGCATATAAAGAAATTCGAATGAGGCAATGAAGCATCTACCATTTAACTAATAAATAAT	863
Maxima	TTTGACAGTTGACA-----GGAGATCAGCAAACACCAACCTGAAATTTGGGACCATG	855
Valencia	TTTGACAGTTGACAGTTGACAGGAGATCAGCAAACACCAACCTCAATTTGGGACCATG	896
Pineapple	-----	13
Reticulata	TGGCTGCTCTATTTGTTG---GAAGAGGAAGACATTTGAAACCATTACAGAGGTAGCCA	908
Medica	ATCTA---AATTCATTCATAATTCTGCAGATTAGAAGTAGATTGTATATAATCCATAT	959
Clementina	TTATT---TTTTAAACCATGATACACAAATATATC-GAATATTTTAAATGCAATT	918
Maxima	ATTTT-----TTGCAGTCAGTGAATAGCGGCTATACGGT-ATTTAT-----TATTATT	902
Valencia	ATTTT-----TTGCAGTCAGTGAATAGCGGCTATACGGT-ATTTAT-----TATTATT	943
Pineapple	-----	13
Reticulata	AGGTTGAGGGATTAATGCAAGAAGACATTGGATATACAGA-TGTAGTGAAGCTAGCTTA	967
Medica	TCATTCCACTTTTGCGAATTCATACGGATTAA-AAAAAATCTTT-----	1005
Clementina	AAATTAAAAACACACAATGCAATTAATTAATAACACAATGTAATTCACAACCACTTT	978
Maxima	CATTT-CAAATGGGACCATGAATAACTAAA---AACTAAATGCCGTTTATGTACAGGAT	958
Valencia	CATTT-CAAATGGGACCATGAATAACTAAA---AACTAAATGCCGTTTATGTACAGGAT	999
Pineapple	-----	13
Reticulata	CAGTT-ATACTGGCAAAGA-----TTCTCATAATCTAT	1000
Medica	-----	1005
Clementina	TATCCATACACAATTCAATTTAA-----	1001
Maxima	GAAACATACAAAAGACGAGCAGAGAGCTGAAGGGAAAAAGTA	1000
Valencia	G-----	1000
Pineapple	-----	13
Reticulata	G-----	1001

Figura 21 – Fim.

Clementina	---ATGGCTTGCAAGTAACAACCTCAATAGT-----TGCT-----	30
Medica	ATGTCTTCTTCCATTAATCCCTCAACCTTGGTTACCTCTGTAATGGTTCAAATGTCTT	60
Maxima	ATGTCTTCTTGCATTAATCCCTCAACCTTGGTTACCTCTATAAATGGTTCAAATGTCTT	60
Reticulata	-----	0
Valencia	ATGTCTTCTTGCATTAATCCCTCAACCTTGGTTACCTCTATAAATGGTTCAAATGTCTT	60
Pineapple	-----	0
Clementina	-----TGTAATGGC-----	39
Medica	CCTCTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCACTCCAATGC	120
Maxima	CCTCTTGCAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGC	120
Reticulata	-----	0
Valencia	CCTCTTGCAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGC	120
Pineapple	-----	0
Clementina	-----TCCAATGATCCGTTGCAACGGCGGTCAGCCAATTACCATGCG	81
Medica	-----	120
Maxima	CTTGTCAGCGCCAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACACCAACCT	180
Reticulata	-----	0
Valencia	CTTGTCAGCGCCAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACACCAACCT	180
Pineapple	-----	0
Clementina	AGTATTTGGAACCCCTGAACTCATAGAGTCCTTTACCACTCCTTATACTTACGAGTTGTAT	141
Medica	-----CTTGATGAAGCATAAC	135
Maxima	TCAATTTGGGACCATGATTTTTTGCAGTCATTGAATAGCAACTATACGGATCAAACATAC	240
Reticulata	-----	0
Valencia	TCAATTTGGGACCATGATTTTTTGCAGTCATTGAATAGCAACTATACGGATCAAACATAC	240
Pineapple	-----ATGAAACATAC	11
Clementina	GCCAACAGATTAGATGAGTTGAAGCAAAGGCTAAAGATTTGTTTGCATCCGCCAAAGAA	201
Medica	AAAAGACGAGCAGAAGGGCTGAAGGGAAAAGTGAAGATAGCGATTAAGGAT---GTAATC	192
Maxima	AGAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGACAGCGATTAAGGAT---GTAACC	297
Reticulata	-----	0
Valencia	AGAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGACAGCGATTAAGGAT---GTAACC	297
Pineapple	AAAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGACAGCGATTAAGGAT---GTAACC	68

Figura 22 - Alinhamento das sequencias codificadoras dos genes “Cs3g04360.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g043404m” (“Pineapple”), “Cg3g004050.1” (“*C. maxima*”), “Cm257260.1”, (*C. medica*) e “MSYJ098750.1” (*C. reticulata*).

Clementina	GGTTTTAAGAGAACTAAGTTTTGCCAGAGACCGGTTGATGGAAAAATTTTGTGGTG	837
Medica	GCTTTGAACCACCTCCGGACTACATGAAATTGTGTTTTTTCGCGTTTACAACCTTGT-	839
Maxima	GGTCTTGGAGAGAAATTGAGCTTTGCGAGGGACAGCTTGGTAGCATCCTTCTTATGGAGC	948
Reticulata	GGTCTTGGAGAGAAATTGAGCTTTGCGAGGAACAGGTTGGTAGCGTCCCTTCTTATGGAGC	507
Valencia	GCCCTTGGAGAGAAATTGAGCTTTGCGAGGAACAGGTTGGTAGCGTCCCTTCTTATGGAGC	948
Pineapple	-----	642
Clementina	ATGGGCTTTGTTTCAAAGCACAGTTTTCTAAGTGCAGAATTGGCCTCACAAAATTTGTA	897
Medica	-TAATGAATTTGTTTATTACGTACTTGCAATTACAGAAAGA--CTCTTCAGAATTCAGAA-	895
Maxima	ATGGGGATAGGGCTGAGCCTCAATTGGCCTATTGCAGGAGAAATAGTCAAAATTCGAATA	1008
Reticulata	ATGGGGATCGCGTTTGGAGCCTCAATTGCCTACTGCAGGAGAGTGCTCAAAATTCGATA	567
Valencia	ATGGGGATCGCGTTTGGAGCCTCAATTGCCTACTGCAGGAGAGTGCTCAAAATTCGATA	1008
Pineapple	ATGGGGATCGCGTTTGGAGCCTCAATTGCCTACTGCAGGAGAGTGCTCAAAATTCGATA	702
	* * * * *	
Clementina	TGCATATTAAGTGCAGTTGATGACATTTATGATGTATATGGATCAATAGATGAGCTTGAA	957
Medica	-----TT----GAAAGCTGA-----	906
Maxima	GCTCTAGTTACAGTATTGATGACATTTATGATGTTTATGGAACCTTTGGACGAATTTGAG	1068
Reticulata	GCCCTAATTACAGTATCGATGACATTTATGATGTCTATGGAACATTTCGATGAATTCAG	627
Valencia	GCCCTAATTACAGTATTGATGACATTTATGATGTCTATGGAACATTGGATGAACCTTGAG	1068
Pineapple	GCCCTAATTACAGTATTGATGACATTTATGATGTCTATGGAACATTGGATGAACCTTGAG	762
	** * **	
Clementina	CTCTTTACAGAAGCAGTGAAGTTTTCCACCATCTTATATATTACCTTTTGTTTTATG	1017
Medica	-----	906
Maxima	CTATTCAGTGTGCTGTTGAGAGGATTTGTTG-----	1099
Reticulata	ATATTCAGTGTGCTGTTGAGAG-----	650
Valencia	ATATTCAGTGTGCTGTTGAGAG-----	1091
Pineapple	cTATTCAGTGTGCTGTTGAGAG-----	785
Clementina	GGGATTTCCCTAAAAATCCGGTGGGAAATGGGGCAGTACTGGAGGAGCTGCCAGAATAT	1077
Medica	-----	906
Maxima	-----GCAAACATAATGTGGGACATCCATTATGCTTTGAACCACCTCCGGACTAC	1149
Reticulata	-----GTGGGACATCAATTATGCTTTGAAGCACCTCCGGGCTAT	690
Valencia	-----GTGGGACATCAATTATGCTTTGAAGCACCTCCGGGATAT	1131
Pineapple	-----TGGGACATCAATTATGCTTTGAAGCACCTCCGGGcTAT	824
Clementina	ATGACAGATTGCTACTTGGCCATGTTTAACTTTGGAAATGAGTTGGCATGTGATGTATG	1137
Medica	-----	906
Maxima	ATGAAATGTGTTTTTTCGCTTTACAACCTTTGTTAATGAATTTGCTTATTACGTACTC	1209
Reticulata	ATGAAATGTGTTTTTTCGCTTTACAACCTTTGTTAATGAATTTGCTTATTAC-----	744
Valencia	ATGAAATGTGTTTTTTCGCTTTACAACCTTTGTTAATGAATTTGCTTATTACGTCTC	1191
Pineapple	ATGAAATGTGTTTTTTCGCTTTACAACCTTTGTTAATGAATTTGCTTATTACGTCTC	884
Clementina	AAAATTCATGGCCTCAATACTCTATCCTACATTAAGAAAGAGTGGGAAAAATCTGTGTACA	1197
Medica	-----	906
Maxima	AAACAACAGGATTTTGATATGCTTCGGAGTAATAAAAAATTCATGGCTTGGCTTACTACAA	1269
Reticulata	-----TGGCTTGGCTTAATACAA	762
Valencia	AAACAACAGGATTTTGATATGCTTCAGGATTAATAAAAAATTCATGGCTTGGCTTAAATACAA	1251
Pineapple	AAACAACAGGATTTTGATATGCTTCAGGATTAATAAAAAATTCATGGCTTGGCTTAAATACAA	943
Clementina	TCATACCTAGTAGAAGCCAGATGGTTTAGCAAAGGGTACACGCCAAGTGCAGGAAATAC	1257
Medica	-----	906
Maxima	GCCTGCTTAGTGGAGGCAAAATGGTACCATAGTAAGTACACGCCAAGCTGGGAGAAATTC	1329
Reticulata	GCCTACTTGGTGGAGGCAAAATGGTACCATAGCAAGTACACGCCAAGCTGGGAGAAATAC	822
Valencia	GCCTACTTGGTGGAGGCAAAATGGTACCATAGCAAGTACACGCCAAGCTGGGAGAAATAC	1311
Pineapple	GCCTACTTGGTGGAGGCAAAATGGTACCATAGCAAGTACACGCCAAGCTGGGAGAAATAC	1003
Clementina	ATAGAAAAATGCATGGGTTTTCAGTGGGAAGCCCTGCTGCCATTGTCATGCCTATATCTTG	1317
Medica	-----	906
Maxima	TTGGAAAAATGGATTGGTATCAATAGGAGGCCCTATGGGTACAATGACTTCATACCTTTCT	1389
Reticulata	TTGGAAAAATGGATTGGTATCAATAACGGGCCCTTTAATTATAACGATTTTATATCTTTCT	882
Valencia	TTGGAAAAATGGATTGGTATCAATAACGGGCCCTTTAATTATAACGATTTTATATCTTTCT	1371
Pineapple	TTGGAAAAATGGATTGGTATCAATAACGGGCCCTTTAATTATAACGATTTTATATCTTTCT	1063
Clementina	CTACAACCTCAAGGAAGCAATGCCTTGACCGAAAAATCACTCAGCTGCCTCAAAGTCGAA	1377
Medica	-----	906
Maxima	GGGAC-----AAATCCAATCATTGAGAAG-----GAACTAGAAATTTTA	1428
Reticulata	GGTAC-----AAATCCAATCATTGAGAAG-----GAACTGGAAATTTCTA	921
Valencia	GGTAC-----AAATCCAATCATTGAGAAG-----GAACTGGAAATTTCTA	1410
Pineapple	GGTAC-----AAATCCAATCATTGAGAAG-----GAACTGGAAATTTCTA	1102

Figura 22 – Continuação.

Clementina	CATGGCTATGATGAGATGATATATTGGTCATCTCTCATCAGTCGGCTCAGTAACGATTTG	1437
Medica	-----	986
Maxima	GAAAGTAATCAAGATATAATTTCACTGGCCATTCAAGATTCCTCGTCTTCAAGATGATTTG	1488
Reticulata	GAAAGTAATCCAGATATAGTTCACTGGTCATCCAAGATTTTCCGTCTACAAGATGATTTG	981
Valencia	GAAAGTAATCCAGATATAGTTCACTGGTCATCCAAGATTTTCCGTCTGCAAGATGATTTG	1478
Pineapple	GAAAGTAATCCAGATATAGTTCACTGGTCATCCAAGATTTTCCGTCTGCAAGATGATTTG	1162
Clementina	GGAAATTCGGCGTTGAGTTGAAGAGAGGCGACGTGGCGAAATCTATTCAAGTGTACATG	1497
Medica	-----	986
Maxima	GGAACTTCATCGGATGAGATACAGAGAGGGGATGTTCCGAAATCAATCCAGTGTACATG	1548
Reticulata	GGAACTTCATCGGACGAGATACAGAGAGGGGATGTTCCGAAATCAATCCAGTGTACATG	1841
Valencia	GGAACTTCATCGGACGAGATACAGAGAGGGGATGTTCCGAAATCAATCCAGTGTACATG	1538
Pineapple	GGAACTTCATCG-----	1174
Clementina	ATTGAAGAAGGCATATCAGAAGAAGAAGCAAGGGACCGTATAAAAAGTTTGATAATTTAC	1557
Medica	-----	986
Maxima	CATGAAACTGGTGCCTCGGAGGAAGTTGCTCGTGAACACATCGAGGATATGATGAGACAG	1688
Reticulata	CATGAAACTGGCGCCTCGGAGGAAGTTGCTCGTGAACACATCAAGGATATGATGAGACAG	1181
Valencia	CATGAAACTGGTGCCTCGGAGGAAGTTGCTCGTGAACACATCAAGGATATGATGAGACAG	1598
Pineapple	-----	1174
Clementina	TCCTGGAAAAGCTGAATGGCAAGAAATCTTTATAAAAAGTGATTTTC----CAGAAAGCAT	1613
Medica	-----	986
Maxima	ATGTGGAAGAAGTGAATGCATACAGAGCTGATAAAGATTCTCCCTTATCTCAAAATACA	1668
Reticulata	ATGTGGAAGAAGTGAATGCATACAGAGCTGATAAAGACTCTCCCTTGACTCGAAACACT	1161
Valencia	ATGTGGAAGAAGTGAATGCATACAGAGCTGATAAAGACTCTCCCTTGACTCGAAACACT	1658
Pineapple	-----	1174
Clementina	GGCGAAAATGTGTTTAGACATGTCTAGAAGTGCACATT--GCATTTTCCATGGAGATGGT	1671
Medica	-----	986
Maxima	GTTGACTTCATGTTGAATCTTGTGAGAATGTCCCATTTTATGTATCTACGTAGAGATGGG	1728
Reticulata	ACTGAGTTCCTCTTGAATCTTGTGAGAATGTCCCATTTTATGTATCTACGTAGAGATGGG	1221
Valencia	ACTGAGTTCCTCTTGAATCTTGTGAGAATGTCCCATTTTATGTATCTACGTAGAGATGGG	1718
Pineapple	-----	1174
Clementina	ATAGGAACATCAACCGGGTTTCTAGAGATCGTTGGTCTCTTTAATACTTGAGCCTATA	1731
Medica	-----	986
Maxima	CACGGTGCTCAAAACCAAGAGACTATGGATGTAGCTTTACATGGCTTTTTCAGCCCAT	1788
Reticulata	CATGGTGTCAAACCAAGAGACTATCGATGTCGGCTTTACATTGCTTTTTCAGCCCAT	1281
Valencia	CATGGTGTCAAACCAAGAGACTATCGATGTCGGTTTTACATTGCTTTTTCAGCCCAT	1778
Pineapple	-----	1174
Clementina	CCAGTTGAATTGTAA-----	1746
Medica	-----	986
Maxima	CCCTTGGAGGACAACCACATGGCTTCCACAGCACCACGGCTGATGAATCCAGAGTGC	1848
Reticulata	CCCTTGGAGGACAAGACATGGCTTTCACAGCATCTCCTGGCACCAGACTAA-----	1335
Valencia	CCCTTGGAGGACAAGACATGGCTTTCACAGCATCTCCTGGCACCAGAGCTGA-----	1824
Pineapple	-----	1174
Clementina	-----	1746
Medica	-----	986
Maxima	AGTTTCAGTTGA	1868
Reticulata	-----	1335
Valencia	-----	1824
Pineapple	-----	1174

Figura 22 – Fim.

Clementina	-----MA--CSNNSIVACNGSNDPLQRRSANYHA	27
Medica	MSSSINPSTLVTSVNGFKCLPLTTNKAAIRIMAKNKLQCLD-----	42
Maxima	MSSCINPSTLVTSINGFKCLPLATNKAAIRIMAKNKPQCLVSAKYDNLTVDRRSANYQP	60
Reticulata	-----	0
Valencia	MSSCINPSTLVTSINGFKCLPLATNKAAIRIMAKNKPQCLVSAKYDNLTVDRRSANYQP	60
Pineapple	-----	0
Clementina	SIWNPELIESFTTPYTYELYANRLDELKQKAKDLFASAKESTSELLKLTDSVQKLGVAHYH	87
Medica	-----EAYKRRAEGLKGVKIAIKDVIEP-LDQLELIDNLQRLGLAHR	84
Maxima	SIWDHDFLQSLNSNYTDQTYRRRAEELKGVKTAIKDVTEP-LDQLELIDNLQRLGLAYH	119
Reticulata	-----	0
Valencia	SIWDHDFLQSLNSNYTDQTYRRRAEELKGVKTAIKDVTEP-LDQLELIDNLQRLGLAYH	119
Pineapple	-----DETYKRRAEELKGVKTAIKDVTEP-LDQLELIDNLQRLGLAYH	43
Clementina	FEEEEKEAMNLIKGD-----TIKDLNATSLHFRLREHGHVPSTGVFDKFRKRDRGRFHD	142
Medica	FETEIRNLIHNIYNNKDYNRKENLYATSLEFRLLRQHGYPVSQEVFNGLKDGQGGFI-	143
Maxima	FETEIRNLIHNIYNNKDYIWRKANLYATSLEFRLLRQHGYPVSQEVFSGFKDDKGGFI-	178
Reticulata	-----MCKSFDEYNNFFRLSTAEVFSGFKDDKGGFI-	31
Valencia	FPEEIRNLIHNIHNNKDYNRKENLYATSLEFRLLRQHGYPVSQEVFSGFKDDKGGFI-	178
Pineapple	FPEEIRNLIHNIHNNKDYNRKENLYATSLEFRLLRQHGYPVSQEVFSGFKDDKGVGFI-	102
Clementina	NLREDIEGLLNLFEASFLGIEGEDVLEEANIFCTEHLKESLGTG---SKIIIAEQVQOS	199
Medica	--CDDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEVMI-SKSKEEHVFAEQAKRA	200
Maxima	--CDDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEMMIISNSKEEYVFAEQAKRA	236
Reticulata	--CDDFKGILSLHEASYSLLEGESITEEAWQFTSKHLKEMMITSNSKEEDVFAEQAKRA	89
Valencia	--CDDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEMMIISNSKEEYVFAEQAKRA	236
Pineapple	--CDDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEMMITSNSKEEDVFAEQAKRA	160
Clementina	LDIPSYWRMPRIEAQNFIKLYPTDDESSPILLTAKLDYNLVQSIHQELKELARWWSNL	259
Medica	LLEPLHWKVPMLERWFIHVYKREKDNHLLLELAKLEFNTLQAIYQEEELKDISG----	255
Maxima	LLEPLHWKVPMLERWFIHVYKREKDNHLLLELAKLEFNTLQAIYQEEELKDISGMMKDT	296
Reticulata	LLEPLHWKVPMLERWFIHVYKREKDNHLLLELAKLEFNTLQAIYQEEELKDISGMMKDT	249
Valencia	LLEPLHWKVPMLERWFIHVYKREKDNHLLLELAKLEFNTLQAIYQEEELKDISGMMKDT	296
Pineapple	LLEPLHWKVPMLERWFIHVYKREKDNHLLLELAKLEFNTLQAIYQEEELKDISG----	215
Clementina	GFKEKLSFARDRLMENYLVLVGLCFKAQFSKCRIGLTKFVCILTAIDDIYDVYGSIDLE	319
Medica	-----	255
Maxima	GLGEKLSFARDSLVASFLWSMGIGSEPLAYCRRIVTIAIALVTVIDDIYDVYGTLDLEL	356
Reticulata	GLGEKLSFARNRLVASFLWSMGIAFEPQFAYCRRVLTISIALITVIDDIYDVYGTFDLELQ	209
Valencia	ALGEKLSFARNRLVASFLWSMGIAFEPQFAYCRRVLTISIALITVIDDIYDVYGTLDLEL	356
Pineapple	-----MGIAFEPQFAYCRRVLTISIALITVIDDIYDVYGTLDLEL	255
Clementina	LFTAVKSFPPSYILSFCFMGISPRIWEIGAVLEELPEYMQICYLAMFNFGNELACDVM	379
Medica	-----WDIHYALNHLPDYMKLCFFALYNFVNEFVYVVL	288
Maxima	LFTAIVER-----IVGKLMWDIHYALNHLPDYMKLCFFALYNFVNEFAYYVL	403
Reticulata	IFDTAIE-----RWDINYLKHLPGYMKMCFALYNFVNEFAYY--	248
Valencia	IFDTAVA-----RWDINYLKHLPGYMKMCFALYNFVNEFAYYVL	397
Pineapple	LFTDAVE-----RWDINYLKHLPGYMKMCFALYNFVNEFAYYVL	296
Clementina	KIHGLNTLSYIKKEWENLCTSYLVEARWFSKGYTPTAKEYIENAWSVGSPAIVHAYIL	439
Medica	ALQKDSSEFQIES-----	301
Maxima	KQQQDFMLRSNKNWSLGLLQACLVEAKWYHSKYTPTLGEFLENGLVSIGGPMGMTSYL-	462
Reticulata	-----WLGLIQAYLVEAKWYHSKYTPKLEEYLENGLVSIITGLIITISYL-	293
Valencia	KQQQDFMLLSIKNAWGLLIQAYLVEAKWYHSKYTPKLEEYLENGLVSIITGLIITISYL-	456
Pineapple	KQQQDFMLLSIKNAWGLLIQAYLVEAKWYHSKYTPKLEEYLENGLVSIITGLIITISYL-	355
Clementina	LQLQGSNALTENSLCLKVEHGYDEMIYSSLSIRLNDLGNSAVELKRGDVAKSIQCVM	499
Medica	-----	301
Maxima	---SGTNPIIKELEFL---ESNQDIHWPFKILRLQDDLGTSSDEIQRGDVPKSIQCVM	516
Reticulata	---SGTNPIIKELEFL---ESNPDIVHWSKIFRLQDDLGTSSDEIQRGDVPKSIQCVM	347
Valencia	---SGTNPIIKELEFL---ESNPDIVHWSKIFRLQDDLGTSSDEIQRGDVPKSIQCVM	510
Pineapple	---SGTNPIIKELEFL---ESNPDIVHWSKIFRLQDDLGTSS-----	393
Clementina	IEEGISEEEARDRIKSLIYSWKKLNKGNLYKS-DFPESMAKMLDMSRTAHC-IFHGDG	557
Medica	-----	301
Maxima	HETGASEEVAREHIEDMMRQMKWKVNAYRADKDSPLSQNTVDFMLNLVRMSHFMYLRRDG	576
Reticulata	HETGASEEVAREHIKDMRQMKWKVSAYTADKDSPLTRTTTEFLNLVRMSHFMYLHGDG	407
Valencia	HETGASEEVAREHIKDMRQMKWKVNAYTADKDSPLTRTTTEFLNLVRMSHFMYLHGDG	570
Pineapple	-----	393
Clementina	IGTSTGVSRLVSLILEPIVEL-----	581
Medica	-----	301
Maxima	HGAQNQETMDVASTWLFQPIPLEDNHMASTAPTADFPECSFS	619
Reticulata	HGVQNQETIDVGFLLFQPIPLEDKDMAFTASPGTKD-----	444
Valencia	HGVQNQETIDVGFLLFQPIPLEDKDMAFTASPGTKG*-----	607
Pineapple	-----	393

Figura 23 - Alinhamento das sequências de proteínas de proteínas dos genes “Cs3g04360.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g043404m” (“Pineapple”), “Cg3g004050.1” (*C. maxima*), “Cm257260.1”, (*C. medica*) e “MSYJ098750.1” (*C. reticulata*).

Reticulata	-----	0
Clementina	-----	0
Medica	-----TTGGATATATAGATGAGA-----	19
Valencia	AATTGATATCGAATTCACAAAAGTCAATGGGATATAAATTATGTCAAATCCACATCAA	60
Pineapple	-----	0
Maxima	-----A-----	1
Reticulata	-----AA-----	2
Clementina	-----	0
Medica	-----GTAAGTAGCTTACAG-----	35
Valencia	TTCTTAGAGTTATGAATTAATTTGGATTA-ATTTCAATTAATTCATGAATGGGTGAGAT	119
Pineapple	-----	0
Maxima	CTCTTGATC----AAACTATTTTGTACAAACTGATGTGGCATGATAAGATTGGTTGAAT	57
Reticulata	CGAATATT-----ACGACA-----	16
Clementina	-----TGGGGAGAATATAATTAATATGATTTACAATTTAGGGGAATG-----	44
Medica	TTATACTT-----GGCGAAGATT-----	53
Valencia	TGAAAATTTATAACGATTTTACACCTATTGTCATTTATTAGAATTTTTCACAACGCGCT	179
Pineapple	-----	0
Maxima	TAAATATTACT-----TGCCCATATG---ATTTGTTTTATTATTTTA-----TA	100
Reticulata	-----CGTGATTTATATATCTGTATATAGAAATCAGCT-----	50
Clementina	CTTAGAAGAAACAGATACAATATAACAATATATATACATATACACACACACACACAGAG	104
Medica	-----CTCAAATTAATCTTATG-----	69
Valencia	TTTGTAGGACGTTGTGAAATTTGAAAGCCCATTTGAAAGAGTTTATAACAACA---TTCTTTC	236
Pineapple	-----	0
Maxima	TTTTTATTGAGCAATGAATTAATAACACATCAGTTGTACAAAAAATTTGTACAAGA	160
Reticulata	-----TTCTGTCTGGAATTCGAAGAATATTTCTC-----	80
Clementina	GTTTCTTAAATAGAAA-----GAAAGCATCAAGTTGTGAGAATAGTTGCAAGTTGT	157
Medica	GTTTGTGGTGATG-----	82
Valencia	GTTTGTGTCAAATTTAAATTTATTTTACAACACACTTTTACCAACCGTTGTTAAATGG	296
Pineapple	-----	0
Maxima	GTTTGTGGCTGTATCAT----CACTCTA--AAAAAATATCGAC-ATCGTTGATTATTGT	212
Reticulata	-----TGATACAAGCATCTCATTTTATA-----AA-GCAGTGA-----	113
Clementina	GAGAGGGATGCCAAATTCATCAATTAACCTGATACAATTCGAGA-----GTCAACGATCA	212
Medica	-----TACGAGGTTATAT-----ATAT-----	99
Valencia	AAGTTTCTGAAATTTGTACAATTTACAATCTACCGATACATTAAATCCATTATCT	356
Pineapple	-----	0
Maxima	AA----ACACATGCATTAGCAAGTTAGAATTCCTCATGAAAA-----GTATGACT	260
Reticulata	CTTGTGGCTTACAATGC-----ATTTACA-----	138
Clementina	TGTTTACGTTGAACTTGCCCTTCTTTGACTATTATTGG-GTGTGTGA-----G-----	259
Medica	ATATAGGCA-GAGGAGAAGTTCAATGATTTATTTTCGTAC-----TCATTTT-----	147
Valencia	ATTTAGACA-GTAGATACATACATTTGTACTATATAGCCCGGAAATCTGCTCCCACTAAC	415
Pineapple	-----CTGCTCCCACTAAC-----	14
Maxima	ATTTT----TTGCCTCCAGATTTGGGTTTATAGTTTGTATACATACATTTGCAGTATAA	315
Reticulata	TATAGAGTTATCTTAGTTCGAG----ATTCTTTAATGCAACGTTTGGAAATAATTTA	193
Clementina	GTTGCATTAATACCTCTATCCCTCAAAGATTTAGATAACCTTTTTTATATTACATTT	318
Medica	TTCTGAGTTTTGAAAGCGTTTAAAT---TTTTAAGTC-TTAAATAGTACAAAAGTATTTT	201
Valencia	TTTTGAGTTGACATCTACCTGCCAGTCTACTTTTGG-TTGATAATCATTTTGTAAATTTT	473
Pineapple	TTTTGAGTTGACATCTACCTGCCAaTCTACTTTTGG-TTGATAATCATTTTGTAAATTT	72
Maxima	TTTTGAGTAGACATCTACCTGCCAGTCTACTTTTGG-TTGATAATTTTGTAAATTTT	373
	* * * * *	
Reticulata	ATATACATTTATATAAAGGTAGGCTGGTGCCTTTACTGCTGTAAAAGCGGAGTCTG	253
Clementina	--ATTGATTTTTCATCAAAAATAACACAAAATACACAGATGTCACCATAC-GTATATTA	375
Medica	--ATTCATTTGGGGGAAAAAAGGAGTA---CATCATACTGTCCGAAC-GAGGTC-A	253
Valencia	--ATTAATTTGTTTTT-----CGCAAAA-GTACTTTA	502
Pineapple	--ATTAATTTGTTTTT-----CGCAAAA-GTACTTTA	101
Maxima	--ATTAATTTGTTATC-----CGCAAAC-GTACTTTA	402
	** **** *	
Reticulata	CACTTGAGAATAATTTAAT---AAACATATGATTAATTTGT-ACAAGTTATCTATTGAT	309
Clementina	--AGTGTATATAGTATAATAAAAACTCTAAAATCACTGTTATTCCTCATACATTCTAA	433
Medica	--ATATTGTA-----CCAGAAGACAGTACAT---CATCCAT-ACATTTCCGAT	295
Valencia	--TAACTGTA-----ACAAATAGAATTTGATGTTAGTCTCAACATTAAGAT	548
Pineapple	--TAACTGTA-----ACAAATAGAATTTGATGTTAGTCTCAACATTAAGAT	147
Maxima	--TAACTGTA-----ACAAATATAATTTGATGTTAGTCTCAACATTAAGAT	448
	* * * * *	

Figura 24 - Alinhamento das sequencias promotoras dos genes “Cs3g04360.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g043404m” (“Pineapple”), “Cg3g004050.1” (*C. maxima*), “Cm257260.1”, (*C. medica*) e “MSYJ098750.1” (*C. reticulata*).

Reticulata	---AAATCAAATCTTTGCAATA-TATATGAGTTATGCAATCAAGGCATAGATACCCTG	364
Clementina	TAGTATTATAAACATATCATTATC-----CAT-TTGATAATGACTAC	474
Medica	GAAATGTTGATAAATCTTTATTTATTTATCTTTTTTTTCTGCAT-ACAAATTTTTTAAA	354
Valencia	-ATTGTTTGCA--ACTTTGTATGCCTTTT-----TTTCCTTAAA-CTTAGTTTGTATAT	598
Pineapple	-ATTGTTTGCA--ACTTTGTATGCCTTTT-----TTTCCTTAAA-CTTAGTTTGTATAT	197
Maxima	-ATTGTTTGCA--ACTTTTGTCTTTTTTTTTTTTCTTAAA-CTTACTTTGTGTAA	504
	* * *	
Reticulata	AAATGCTTTAAGTTCTTCTGGTAAATG--CCTGCAAAGTGTAACTCCAACCTTAGC	422
Clementina	GGTTGTTTCAAAGTATAAAAA-----TATGTTACAATAAGACGTCAATTAATC	525
Medica	GAGTCTTTCAATAAACTACACAATAAATGCACGCAGAAATGACAAGA-AATTCATAAATT	413
Valencia	TCTTATTTCTCCATAAAAAGATT--TT---AATGTAATAAATAGAAGCTTTTATTAGTA	653
Pineapple	TCTTATTTCTCCATAAAAAGATT--TT---AATGTAATAAATAGAAGCTTTTATTAGTA	252
Maxima	TCTTATTTCCGCATAAAAAGATT--TT---AATGTAATAAATAGAAGCTTTTATTAGTA	559
	* * * * *	
Reticulata	GAGCTCAAGTAAAAGTGG--T-----TCTTGTCTC-----TC-TTTTCTCATAAAC	467
Clementina	GGACTGACCAAAATATTGGCAGTATGGTGGATACACCAAACTTGATTCAATGATTAGT	585
Medica	CAATTCTACTAATAAAAGT-----TCTATTTATT--ACATTAAGTCTGTTTTAT	462
Valencia	GAATTGAATTTATGAAT-T-----TCTTGTATTTCTGCGTGCAATTTATGTGTAGT	704
Pineapple	GAATTGAATTTATGAAT-T-----TCTTGTATTTCTGCGTGCAATTTATGTGTAGT	303
Maxima	GAATTGAATTTATGAAT-T-----TCTTGTCTTTCTGCGTGCAATTTATGTGTAGT	610
	* * * * *	
Reticulata	GTG-TATGAACCACCTTGCCTCTAACATAGGCACTTTC-----CAATGCA	511
Clementina	AGGGATGGCAAAACATCGGGTCGGGCTCGGGCTTGGCCAACCAACCCGACCTGATCAA	645
Medica	GTAGAAATAAGAAATATA---CAAAGTAAATGTAAAGGAAGAAAA-----A--	503
Valencia	TTA-TAGAAAGACTCTT---TAAAAAATTTGTATGCAGGAAAA-----AAA	746
Pineapple	TTA-TAGAAAGACTCTT---TAAAAAATTTGTATGCAGGAAAA-----AAA	345
Maxima	TTA-TGAAAGACTCTT---TAAAAAATTTGTATGCAGGAAAA-----AAA	652
	* * *	
Reticulata	GAGGGAGCTCCAGCGCCCGCTTCGCTTGTCTGCTACAAATACATCCTCTTCTTGTCTGT	571
Clementina	TAGAGAATTAAGCCGACCTTAAAAAACCATACGATTTTATTTAGGGTCGGGTCGG	705
Medica	-AG-----GCATACAAAGTT-----GCAAAACATATCTTAATGT	536
Valencia	AAGATAAATAAAAAAGATTATACAACATTATCCGAATGTATGGATGATGTATGTCT	806
Pineapple	AaGATAAATAAAAAAGATTATACAACATTATCCGAATGTATGGATGATGTATGTCT	405
Maxima	GAAAAAGAAAAATAAATAAATCA-----TCCGAATGTGTATGTATGTGTCT	699
	* * *	
Reticulata	TGCTGGTGATCATCTTTCTTAAAGTGCTACTGGTGAATGCCAGGCCTCCTCCGTGA	631
Clementina	GCCCGACCCGAATCGGGCAACATCGGGTCGGGCTAGGCTCGACCTACCGA-----	757
Medica	TGAGCACTAACATCGAAATCTATCTGTACAAGTTATAAAGTACTTTTGGGGAAAAA	596
Valencia	TCTGGTTCAATATTGACCTCG---TTCGCACA-GTATGATGTACGCCCCCCACCC---	858
Pineapple	TCTGGtaCAATATTGACCTCG---TTCGCACA-GTATGATGTAcCCCCCCCcCc---	456
Maxima	TCTGGCACAATAATTGACCTCG---TTCGCACA-GTATGATGTACTCCTTCCAAACCAACA	755
	** * *	
Reticulata	TGCTTCTCCTTCTAAGCTGTAATACGAGGCTTATGCAAGCTCAGTATCCCTTGAAT	691
Clementina	-----AACCATTTCAA-----CCCACAATCAATG-----	783
Medica	TTA-ATAAATTTCAAATGATTATCAA-----CAAAAAGTTGATTGGAGATAATGGAT	648
Valencia	-----AAAAAAAAGGA-----ATAAAATATCTTTG-TACTATTAAGA	895
Pineapple	-----aaaaaaaaaGA-----aTAAaATATCTTTG-TACTATTAAGA	493
Maxima	ACCCCCCCCCCCCCCATATGAA-----TAAAAATATCTTTG-TACTATTAAGA	807
	* * *	
Reticulata	CATCACAAA-TGAAGCCTCCCTTGTCTTTAA-----AA-CCACTGAAAAACCT	739
Clementina	-TTGAAAA-TCAACTTCTTCAATGCAATATAAGAATTCGAATGAGGCAATGAAGCATC	841
Medica	TTTAATATATTGTAGATTGTGATA-ATT-----TG--TAATAATTTCAAAAAAC	694
Valencia	CTTAAAAAT-TAAACGCTTTCAAAACTC-AGAAAAAATGAG--TAAGAAAAATCAATCAC	951
Pineapple	CTTAAAAAT-TAAACGCTTTCAAAACTC-AGAAAAAATGAG--TAAGAAAAATCAATCAC	549
Maxima	CTTAAAAATTAACGCTTTCAAAACTCAGAAAAAATGAG--TAAGAAAAATAAATCAC	865
	* * * * *	
Reticulata	CTGCAGTCTCAACCGAAAAAGAAATTATTCATCAAACTTTTACAC--ATAT----	793
Clementina	TACCATTTA--ACTAATA-AATAAT-----TTATTTTTTAAAAACCATGATACA	887
Medica	TTCCATTTAACAGCGGTG-GTGAATGTGTGTGTAATAAATTTTAAATA-----TTTGA	748
Valencia	ATGAGCTTCTCTCTGCCT-ATAATA-----ACCTCGTGTATCA-----	989
Pineapple	ATGAGCTTCTCTCTGCCT-ATATAT-----ATATATATAAACCTtGTACATCA	598
Maxima	ATGAACCTTCTCTCTGCCT-ATATATATGTATATTTATATATATAAACCTCGTGCATCA	924
	* * *	
Reticulata	ATGTTAATTAGAGAATGATTTAAGTGTCCCAGCGG-----	829
Clementina	CAAATATATCGAATATTTTTAATGCAATTAATTT-----AAAA-----	927
Medica	CAACAAGCGAAAGAAATGTTGTTAAAAACTCTTCAATAGATGTTCAATCTCACAACATTCT	808
Valencia	-----	1001
Pineapple	CCACAAACCATAGATTAATTTGAGAACTCTTCCcAA--GTATACCTGTAAGCTAGCTTAC	656
Maxima	CCACAAACCAAGAAATAATTTGAGAACTCTTGGCCAA--GTATAACTGTAAGCTAGCTTAC	982
	* * *	

Figura 24 – Continuação.

Reticulata	---CCTTGTGCGAGTTCGAATTTCTCAGGAGATA-----	859
Clementina	-----ACACACAATGCA	939
Medica	ACAAAAGCG-----CGTTGTGAA-AAAATTTTAATAATTGACAACCTAGTGTA	854
Valencia	-----	1001
Pineapple	ACTGCATCTGTATATCCAATGTCTTCTTGCAATTAATCCCTCAACCTTGGCTACCTCTGTA	716
Maxima	ACTACATCTGTATATCCAA-----	1001
Reticulata	-----	859
Clementina	ATTAAATTAATAATACACAATGTAATCCACAACCA-----	975
Medica	AAATCGTTATAAATTTTAACTCATTCAATCCATGAATTAGTAAA-----	900
Valencia	-----	1001
Pineapple	AATGGTTTCAAAATGTCTT--CCTCTTGCAACAAATAGAGCAGCCATCAGAAATCATGGCAA	774
Maxima	-----	1001
Reticulata	-----GAGAGTTAAAAAATTGATTTGG	881
Clementina	-----TTTTATCCATACACAATT-----CAATTTAA-----	1001
Medica	--A-----TTAATCTAAATTCATAATCTGCAGATTAGAAAGTAGATTTGA	948
Valencia	-----	1001
Pineapple	AAAATAAGCCAGTCCAATGCCTTGTGAGCaCCAATATGATAATTTGACAGTTGATAGGA	834
Maxima	-----	1001
Reticulata	GTTTTGCCACTTTTTTACATT-----TAAAAGGAATGAATAAGA	921
Clementina	-----	1001
Medica	TAT-----	951
Valencia	-----	1001
Pineapple	GATCAGCAAACTACCAACCTTCAATTTGGGACCATGATTTTTtGCAGTCACTGAATAGCA	894
Maxima	-----	1001
Reticulata	TAAACAGAGAGATCGATT-----CAAG-----TATTCCGATCTTGATGTGCA	964
Clementina	-----	1001
Medica	-----AATCCATATTCAATCCACTTTTGCGAATTCA	982
Valencia	-----	1001
Pineapple	ACTATACGGTATTGATTATTATTATTATTACGTATAAATTCCTTTGTTCATTTCAA	954
Maxima	-----	1001
Reticulata	TGACAGAGTAAGCGAACTAATGAAAGGTACCTTGA-----GA-	1001
Clementina	-----	1001
Medica	ATACGGATTAAAAA--AAAT-----	1001
Valencia	-----	1001
Pineapple	ATTAGGACCATGAAT--AACTAAAACTAAaTGCTGTGCATGTACAGGA	1001
Maxima	-----	1001

Figura 24 – Fim.

Clementina	---ATGGCTTGCACTAACAACCTCAATAGTT-----	27
Pineapple	-----	0
Medica	-----	0
Reticulata	ATGTCTTCTTGCAATTAATCCCTCAACCTTGGTTACCTCTGTAATGGTTTCAATGTCTT	60
Valencia	-----	0
Maxima	-----	0
Clementina	-----G	28
Pineapple	-----	0
Medica	-----	0
Reticulata	CCTCTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGC	120
Valencia	-----	0
Maxima	-----	0
Clementina	CTTGTAATG-----GCTCCAATGATCCGTTGCAACGGCGGTGAGCCAATTACCATGCG	81
Pineapple	-----	0
Medica	-----	0
Reticulata	CTTGTGAGCGCCAAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACTACCAACT	180
Valencia	-----	0
Maxima	-----	0
Clementina	AGTATTTGGAACCCCTGAACCTCATAGAGTCTTTACCACTCCTTATACTTACGAGTTGTAT	141
Pineapple	-----	0
Medica	-----ATGTCTTCTTGCAATTAATCCCTCAACCTTGGTTACCTCTGATGAAGCATA	51
Reticulata	TCAATTTGGGACCATGATTTTTTGCACTCGCTGAATAGCAAGTATACGGATGAAGCATA	240
Valencia	-----	0
Maxima	-----	0
Clementina	GCCAACAGATTAGATGAGTTGAAGCAAAAGGCTAAAGATTTGTTTGCATCCGCCAAAGAA	201
Pineapple	-----	0
Medica	AAAAGACGAGCAGAAAGAGCTGAGGGGAAAAGTGAAGATAGCGATTAAGGATG---TAATC	108
Reticulata	AAAAGACGAGCAGAAAGAGCTGAGGGGAAAAGTGAAGATAGCGATTAAGGATG---TAATC	297
Valencia	-----	0
Maxima	-----	0
Clementina	AGCACTAGTGAACCTATTAAGCTAACTGACTCGGTGCAGAAAGTTGGGAGTGGCATACCAT	261
Pineapple	-----	0
Medica	GAGCCTCTGGATCAGTTGGAGCTGATTGATAACTTGCAAAGACTTGGATTGGCTCATCGT	168
Reticulata	GAGCCTCTGGATCAGTTGGAGCTGATTGATAACTTGCAAAGACTTGGATTGGCTCATCGT	357
Valencia	-----	0
Maxima	-----	0
Clementina	TTTGAAGAAGAGATCAAAGAGGCCATGAATATTCTCAA-----GGAGAT	306
Pineapple	-----	0
Medica	TTTGAGACTGAGATTAGGAACATATTGAATAATCTACACAATAATAAAGATTATAAT	228
Reticulata	TTTGAGACTGAGATTAGGAACATATTGAATAATCTACACAATAATAAAGATTATAAT	417
Valencia	-----	0
Maxima	-----	0
Clementina	GCTACCATCAAAGATCTTAATGCAACGCTCACTGCATTTTGCCTTCTACGTGAACACGGC	366
Pineapple	-----	0
Medica	TGGAGAAAAGAAAATCTGTATGCAACCTCCCTTGAGTTGAGACTACTTAGACAACATGGC	288
Reticulata	TGGAGAAAAGAAAATCTGTATGCAACCTCCCTTGAGTTGAGACTACTTAGACAACATGGC	477
Valencia	-----	0
Maxima	-----	0
Clementina	CATCCAGTTAGTACAGGTGTGTTTGATAAATTCAGAAAAAGGGACGGGAGGTTCCATGAC	426
Pineapple	-----	0
Medica	TATCCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGACCAGGGAGGCTTCATTTGT	348
Reticulata	TATCCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGACCAGGGAGGCTTCATTTGT	537
Valencia	-----	0
Maxima	-----	0
Clementina	AATTTACGAGAAGACATAGAAGGGCTTTTGAATTTATTTGAAGCTTCATTCTTGGGAAT	486
Pineapple	-----	0
Medica	-----GATGATTTCAAGGGAACTGAGCTTGCAAGGCTTCGTTTACAGCTTA	399
Reticulata	-----GACGATTTCAAGGGAACTGAGCTTGCAAGGCTTCGTTTACAGCTTA	588
Valencia	-----	0
Maxima	-----	0

Figura 25 - Alinhamento das sequências codificadoras dos genes “Cs3g04390.1” (“Valencia”), “Ciclev10017785m” (*C. clementina*), “orange1.1g045966m” (“Pineapple”), “Cg3g004130.1” (*C. máxima*), “Cm249680.1” (*C. medica*) e “MSYJ216420.1” (*C. reticulata*).

Clementina	GAAGGAGAGGATGTTCTAGAAGAAGCCAATATTTTTGTACTGAGCATCTAAAGGAGTCA	546
Pineapple	-----	0
Medica	GAAGGAGAAAGCATCATGGAGGAGGCTGGCAATTTACTAGTAAACATCTTAAAGAAGTG	459
Reticulata	GAAGGAGAAAGCATCATGGAGGAGGCTGGCAATTTACCAGTAAACATCTTAAAGAAGTG	648
Valencia	-----	0
Maxima	-----ATGGAGGAGGCTGGCAATTTGCCAGTAAACATCTTAAAGAAGTG	45
Clementina	TTAGGGA-CG-----TTGGGGAGCAAAATCATACTGGCTGAGCAGGTACAACAATCTTTA	600
Pineapple	-----	0
Medica	ATGATCAGCAAGAACATGGAAGAGGATGTATTTGTAGCAGAACCAAGCGAAGCGTGCCTG	519
Reticulata	ATGATCAGCAAGAGCAAGGAAGAGCATGTATTTGTAGCAGAACCAAGCGAAGCGGCACTG	708
Valencia	-----	0
Maxima	ATGATCAGCAAGAGCAAGGAAGAGCATGTATTTGTAGCAGAACCAAGCGAAGCGTGCCTG	105
Clementina	GACATCCCCTCATATTGGAGGATGCCAAGAATTGAGGCTCAGAACTTCATCAAATTATAC	660
Pineapple	-----	0
Medica	GAGCTCCCTCTGCATTGGAAGTGCCAAATGTAGAGGCAAGGTGGTTCATACACATTTAT	579
Reticulata	GAGCTCCCTCTGCATTGGAAGTGCCAAATGTAGAGGCAAGGTGGTTCATACACATTTAT	768
Valencia	-----	0
Maxima	GAGCTCCCTCTGCATTGGAAGTGCCAAATGTAGAGGCAAGGTGGTTCATACACATTTAT	165
Clementina	CCCACAGATGATGAAAGCAGTCCAATTTTGTGACTCTAGCCAAGTTGGATTACAATTTA	720
Pineapple	-----	0
Medica	GAGAGAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTGGAGTTTAACT	639
Reticulata	GAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTGGAGTTTAACT	828
Valencia	-----	0
Maxima	GAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGCTAAGTGGAGTTTAACT	225
Clementina	GTACAATCCATACACCAACAAGAACTGAAGGAGTTGGCAAGGTGGTGGAGTAATCTGGT	780
Pineapple	-----	0
Medica	TTGCAGGCAATTTACCAGGAAGAACTAAAAGAAATTTGAGGTTGGGACATCAATATGCT	699
Reticulata	TTGCAGGCAATTTACCAGGAAGAACTTAAAGACATTTGAGGTT-----	871
Valencia	-----ATGACTCCA	9
Maxima	TTGCAGGCAATTTACCAGGAAGAACTTAAAGACATTTGAGTGCAGGCAATTTGCACAGAA	285
Clementina	TTTAAAG-----AGAACTAAGTTTGGCAGAGAC	810
Pineapple	-----	0
Medica	TTGAAGCACCTTCG-----GGCTATATGAAAATGTGTTTCTTG-----CGCTTAC	747
Reticulata	-----GGTGAAGGATACAGGCTTGGAGAGAAATGAGCTTTCGAGGGAC	918
Valencia	AGGAATATCAGGTGGTGAAGGATACAGGCTTCAAGAGAAATGAGCTTCGAGGGAC	69
Maxima	AATGACTCCAAGAAATCTCAGGATACAGGCTTCAAGAGAAATGAGCTTCGAGGGAC	345
Clementina	CGTTTGTGAAAAATTTTGTGGTGTGGGCTTTGTTTCAAAGCACAGTTTCTAAG	870
Pineapple	-----	0
Medica	AACTTTGTTAATGAATTTGCTTATTACGTTCTCAAACAAC-AGGATTTTGATTTGCTTCT	806
Reticulata	AGCTTGGTAGCATCCTTTTATGGAGCATGGGGATAGGGTCTGAGCCTCAATTCGCCTAT	978
Valencia	AGCTTGGTAGCATCCTTTTATGGAGCATGGGGATAGGGTCTGAGGCTCGATTCGCCTAT	129
Maxima	AGCTTGGTAGCATCCTTTTATGGAGCATGGGGATAGGGTCTGAGGCTCGATTCGCCTAT	405
Clementina	TGCAGAATTGGCCTCACAAAATTTGTATGCATATTAAGTGCATTGATGACATTTATGAT	930
Pineapple	-----	0
Medica	GAGCATAAAAA-----TGCACCCATTCCTTGGAGGACAAACA-CATGGC	851
Reticulata	TGCAGGAGAATAGTCACAATTGCAATAGCTCTAATTACAGTGATTGATGACATTTATGAT	1038
Valencia	TGCAGGAGAATAGTTACAATTGCAATAGCTCTAATTACAGTGATTGATGACATTTATGAT	189
Maxima	TGCAGGAGAATAGTTACAATTGCAATAGCTCTAATTACAGTGATTGATGACATTTATGAT	465
Clementina	GTATATGGATCAATAGATGAGCTTGAACCTTTACAGAAGCAGTGAAAAGTTTCCACCA	990
Pineapple	-----	0
Medica	TTTACAGCATCTCTGGCACCAAGGCTGA-----	882
Reticulata	GTTTATGGAACTTGGACGAACCTTGAAGTATTCACTGC-----	1076
Valencia	GTTTATGGAACTTGGACGAACCTTGAAGTATTCACTGC-----	227
Maxima	GTTTATGGAACTTGGACGAACCTTGAAGTATTCACTGC-----	503
Clementina	TCTTATATATTCTTTTGTATGGGATTTCCCTAAAATCCGGTGGGAAATGGG	1050
Pineapple	-----	0
Medica	-----	882
Reticulata	-----TGCTGTTGAGAGGTGGGACATCCAT	1101
Valencia	-----CGCTGTTGAGATGTGGGACATCAAT	252
Maxima	-----CGCTGTTGAGATGTGGGACATCAAT	528

Figura 25 – Continuação.

Clementina	GCAGTACTGGAGGAGCTGCCAGAATATATGCAGATTTGCTACTTGGCCATGTTAACTTT	1110
Pineapple	-----	0
Medica	-----	882
Reticulata	TATGCTTTGAACCACCTTCCGGACTACATGAAATTTGTTTTTTTGGCGTTTACAACCTT	1161
Valencia	TATGCTTTGAACCACCTTCCGGACTACATGAAATTTGTTTTTTTGGCGTTTACAACCTT	312
Maxima	TATGCTTTGAACCACCTTCCGGACTACATGAAATTTGTTTTTTTGGCGTTTACAACCTT	588
Clementina	GGAAATGAGTTGGCATGTGATGTTATGAAAATTCATGGCCTCAACTCTATCCTACATT	1170
Pineapple	-----	0
Medica	-----	882
Reticulata	GTTAATGAATTTGCTTATTACGTAACAAACACAGGATTTTGATATGCTTCGGAGTATT	1221
Valencia	GTTAATGAATTTGCTTATTACGTAACAAACACAGGATTTTGATATGCTTCGGAGTATT	372
Maxima	GTTAATGAATTTGCTTATTACGTAACAAACACAGGATTTTGATATGCTTCGGAGTATT	648
Clementina	AAGAAAGAGTGGGAAAATCTGTGTACATCATACTAGTAGAAGCCAGATGGTTTAGCAA	1230
Pineapple	-----	0
Medica	-----	882
Reticulata	AAAAATTCATGGCTTGGCTTAAACAAAGCCGGCTTAGTGGAGGCGAAATGGTACCATAGT	1281
Valencia	AAAAATTCATGGCTTGGCTTAAACAAAGCCCTACTTAGTGGAGGCGAAATGGTACCATAGT	432
Maxima	AAAAATTCATGGCTTGGCTTAAACAAAGCCCTACTTAGTGGAGGCGAAATGGTACCATAGT	708
Clementina	GGGTACACGCCAAGTCCGAAGGAATACATAGAAAATGCATGGGTTTCAGTGGGAAGCCCT	1290
Pineapple	-----	0
Medica	-----	882
Reticulata	AAGTACACACCAACACTGGGAGAATTCCTGGAAAATGGATTGGTGTCAATAGCAGGCCCT	1341
Valencia	AAGTACACACCAACACTGGGAGAATTCCTGGAAAATGGATTGGTGTCAATAGCAGGCCCT	492
Maxima	AAGTACACACCAACACTGGGAGAATTCCTGGAAAATGGATTGGTGTCAATAGCAGGCCCT	768
Clementina	GCTGCCATTGTCATGCCTATATCTTGCT-ACAACTCCAAGGAAGCAATGCCTTGACCGA	1349
Pineapple	-----AAG-----GA	5
Medica	-----	882
Reticulata	ATAGTAACAATGAGTGCCTACCTTTCTGGTACAAATCCAATCATT-----CA	1388
Valencia	ATAGTAACAATGAGTGCCTACCTTTCTGGTACAAATCCAATCATT-----CA	539
Maxima	ATAGTAACAATGAGTGCCTACCTTTCTGGTACAAATCCAATCATT-----CA	815
Clementina	AAATTCAGTCAAGTCCAAAGTCAAGTCAAGTCAAGTCAAGTCAAGTCAAGTCAAGTCAAG	1409
Pineapple	GC-----TGGAATTTCTAGAAAGTAAACAATATCCAGATATAATCAATGGTCATC	56
Medica	-----	882
Reticulata	GA-----AGGAAGTAAATTTCTAGAAAGCAATCCAGATTTAGTTCACTGGTCGTG	590
Valencia	GA-----AGGAAGTAAATTTCTAGAAAGCAATCCAGATTTAGTTCACTGGTCGTG	590
Maxima	GA-----AGGAAGTAAATTTCTAGAAAGCAATCCAGATTTAGTTCACTGGTCGTG	866
Clementina	TCTCATCAGTCGGCTCAGTAACGATTTGGGAAATCCCGGTTGAGTTGAAGAGAGGGCGA	1469
Pineapple	CAAGATTTTCCGCTTCAAGATGATTTGGGAACTTCAAC-GATGAATTAAGAGAGGGGGA	115
Medica	-----	882
Reticulata	CAAGATTTTTCGTCTTCAAGATGATTTGGGAACTTTCGTGGATGAGATACAGAGAGGGGA	1499
Valencia	CAAGATTTTTCGTCTTCAAGACGATTTGGGAACTTCAACGGATGAGATACAGAGAGGGGA	650
Maxima	CAAGATTTTTCGTCTTCAAGACGATTTGGGAACTTCAACGGATGAGATACAGAGAGGGGA	926
Clementina	CGTGGCGAAATCTATTCAGTGTACATGATTGAAGAAGGCATATCAGAAGAAGAAGCAAG	1529
Pineapple	TGTTTGGAAATCAATCCAGTGTATATGCATGAAACTGGTGTCTCAGAGGAACTTGCTCG	175
Medica	-----	882
Reticulata	TGTTCCGAAATCAATCCAGTGTACATGCATGAAACTGGTGCCTCGGAGGAAAGTTGCTCG	1559
Valencia	TGTTCCGAAATCAATCCAGTGTACATGCATGAAACTGGTGCCTCGGAGGAAAGTTGCTCG	710
Maxima	TGTTCCGAAATCAATCCAGTGTACATGCATGAAACTGGTGCCTCGGAGGAAAGTTGCTCG	986
Clementina	GGACCGTATAAAAAGTTTGATAATTTACTCCTGGAAAAGCTGAATGGCAAGAATCTTTA	1589
Pineapple	TGAACACATAAAGGATTTGATGAGACAGATGTGGAAAGAGGTGAATGCATACAGAGCTAA	235
Medica	-----	882
Reticulata	TGAACACATCAAGGATATGATGAGACAGATGTGGAAAGAGGTGAATGCATACAGAGCTGA	1619
Valencia	TAAACACATCAAGGATATGACGAGACAGATGTGGAAAGAGGTGAATGCATACAGAGCTGA	770
Maxima	TAAACACATCAAGGATATGACGAGACAGATGTGGAAAGAGGTGAATGCATACAGAGCTGA	1046
Clementina	TAAAAGTGAATTTCCAG--AAAGCATGG-CGAAAATGTGTTTAGACATGTCTAGAAGT	1645
Pineapple	TAAAGATTCTCCTTATCTCAAACACAGCTGACTTCATGTTGAATCTGG-TGAGAGCGT	294
Medica	-----	882
Reticulata	TAAAGATTCTCCTTATCTCAAATACAGTTGACTTCATGTTGAATCTTG-TGAGAATGT	1678
Valencia	TAAAGATTCTCCTTATCTCAAATACAGTTGACTTCATGTTGAATCTTG-TGAGAATGT	829
Maxima	TAAAGATTCTCCTTATCTCAAATACAGTTGACTTCATGTTGAATCTTG-TGAGAATGT	1105

Figura 25 – Continuação.

Clementina	CACATTGCA---TTTTCCATGGAGATGGTATAGGAACATCAACCAGGGTTTCTAGAGATC	1702
Pineapple	CCCATTTTATGTATCTACATGGAGATGGGCATGGTGTCAAACCAAGGAGACTATGGACG	354
Medica	-----	882
Reticulata	CCCATTTTATGTATCTACACGGAGATGGGCACGGTGCTCAAACCAAGGAGACTATGGATG	1738
Valencia	CCCATTTTATGTATCTACGTGGAGATGGGCACGGTGCTCAAACCAAGGAGACTATGGATG	889
Maxima	CCCATTTTATGTATCTACGTGGAGATGGGCACGGTGCTCAAACCAAGGAGACTATGGATG	1165
Clementina	GTTTGGTCTCTTAATACTTGAGCCTATACCAGTTGAATTGTAA-----	1746
Pineapple	TAGCGTTTACATTGCTTTTTCGGCCCATCCCTTGGAGGACGAAGACATGGTTTTACAC	414
Medica	-----	882
Reticulata	TAGCTTCTACATGGCTTTTTAGCCCATGCCCTTGGAGGACAAACACATGGCTTTACAG	1798
Valencia	TAGCTTCTACATGGCTTTTTAGCCCATCCCTTGGAGGAGAAACACATGGCTTTACAG	949
Maxima	TAGCTTCTACATGGCTTTTTAGCCCATCCCTTGGAGGAGAAACACATGGCTTTACAG	1225
Clementina	-----	1746
Pineapple	CATCTCTCGGTACCAAAGGCTG-----	436
Medica	-----	882
Reticulata	CACCAAAGGCTGATGAATTCACAGAGTGCAGTTTCAGTTGA	1839
Valencia	CACCAAAGGCTGATGAATTCAGAGTGCAGTCTCAGTTGA	990
Maxima	CACCAAAGGCTGATGAATTCAGAGTGCAGTCTCAGTTGA	1266

Figura 25 – Fim.

Clementina	-----MACSNNSIVACNGSNDPLQRRSANYHA	27
Pineapple	-----	0
Medica	MSSCINPS-----	8
Reticulata	MSSCINPSTLVTSVNGFKCLPLTTNKAAIRIMAKNKPQCLVSAKYDNLTVDRRSANYQP	60
Valencia	-----	0
Maxima	-----	0
Clementina	SIWNPHELIESFTTPYTYELYANRDELKQKAKDLFASAKESTSELLKLTDSVQKLGVAHY	87
Pineapple	-----	0
Medica	-----TLVTSDEAYKRAEELRGKVKIAIKDVIE-PLDQLELIDNLQRLGLAHR	56
Reticulata	SIWHDHFLQSLNSKYTDEAYKRAEELRGKVKIAIKDVIE-PLDQLELIDNLQRLGLAHR	119
Valencia	-----	0
Maxima	-----	0
Clementina	FEEEIKEAMNILKGD-----TIKDLNATSLHFRLREHGHVSTGVFDKFRKRDGRFHD	142
Pineapple	-----	0
Medica	FETEIRNILLNIIYNNKDYNNRKENLYATSLEFRLLRQHGYVPSQEVFNGLKDDQGGFI-	115
Reticulata	FETEIRNILLNIIYNNKDYNNRKENLYATSLEFRLLRQHGYVPSQEVFNGLKDDQGGFI-	178
Valencia	-----	0
Maxima	-----	0
Clementina	NLREDIEGLLNLFEASFLGIEGEDVLEEANIFCTEHLKESLGT--LGSKIIAEVQVQSL	200
Pineapple	-----	0
Medica	--CDDFGILSLHEASYSLLEGESIMEAWQFTSKHLKEVMISKMEEDVFAEQAKRAL	173
Reticulata	--CDDFGILSLHEASYSLLEGESIMEAWQFTSKHLKEVMISKSKEEHVFAEQAKRAL	236
Valencia	-----	0
Maxima	-----MEEAWQFASKHLKEVMISKSKEKHVFVAEHAKRAL	35
Clementina	DIPSYWRMPRIEAQNFIKLYPTDESSPILLTLAKLDYNLVQSIHQEELKELA-----	253
Pineapple	-----	0
Medica	ELPLHWKVPMLERARWFIHYERREDKNHLLLELAKMEFNTLQAIYQEELKEI-----	225
Reticulata	ELPLHWKVPMLERARWFIHYEKREDKNHLLLELAKLEFNTLQAIYQEELKDIS-----	289
Valencia	-----MTP	3
Maxima	ELPLHWKVPMLERARWFIHYEKREDKNHLLLELAKLEYNTLQAIYQEELKDISVQAFAP	95

Figura 26 - Alinhamento das sequências de proteína dos genes “Cs3g04390.1” (“Valencia”), “Ciclev10017785m” (*C. clementina*), “orange1.1g045966m” (“Pineapple”), “Cg3g004130.1” (*C. máxima*), “Cm249680.1” (*C. medica*) e “MSYJ216420.1” (*C. reticulata*).

Clementina	---RWSNLGFKEKLSFARDRLMENYLLVMGLCFKAQFSKCRIGLTKFVCILTAIDDIYD	310
Pineapple	-----	0
Medica	-----	225
Reticulata	--GWWKDTGLGEKLSFARDSLVASFLWSMIGSEEPQFAYCRRIVTIAIALITVIDDIYD	346
Valencia	RNIRWVKDTGLQEKLSFARDSLVASFLWSMIGSEARFAYCRRIVTIAIALITVIDDIYD	63
Maxima	NDSKKSQDTGLQEKLSFARDSLVASFLWSMIGSEARFAYCRRIVTIAIALITVIDDIYD	155
Clementina	VYGSIDELELFTAVKSFPPSYILSFCFMGISPKIRWEIGAVLEELPEYMQICYLAMFNF	370
Pineapple	-----	0
Medica	-----S-----GWDINYALKHLPGYMKCFALALYNF	251
Reticulata	VYGTLDLELELFTAAVE-----RWDIHYALNHLDPYMKLCFFALYNF	387
Valencia	VYGTLDLELELFTAAVE-----MWDINYALNHLDPYMKLCFFELYNF	104
Maxima	VYGTLDLELELFTAAVE-----MWDINYALNHLDPYMKLCFFALYNF	196
Clementina	GNELACDVMKIHGLNLTLSYIKKEWENLCTSYLVEARWFSKGYTPTAKEYIENAWVSVGSP	430
Pineapple	-----	0
Medica	VNEFAYYVLKQQDFDLLSIKNAPILEDKHM-----FTASPGTK---G-----	293
Reticulata	VNEFAYYVLKQQDFDMLRSIKNSWLGLIQAGLVEAKWYHSKYTPTLGEFLENGLVSIAGP	447
Valencia	VNEFAYYVLKQQDFDMLRSIKNSWLGLIQAYLVEAKWYHSKYTPTLGEFLENGLVSIAGP	164
Maxima	VNEFAYYVLKQQDFDMLRSIKNSWLGLIQAYLVEAKWYHSKYTPTLGEFLENGLVSIAGP	256
Clementina	AAIVHAYILLQLQGSNALTENSLSCLKVEHGYDEMIYSSLSRSLNDLGNSAVELKRGD	490
Pineapple	-----KELEFLE--SNNIPDIIQWSSKIFRLQDDLGTSTDELKRGD	39
Medica	-----	293
Reticulata	IVTMSAYL----SGTNPPIQKELEFLE-SN--PDFVRWSCKIFRLQDDLGTSSDEIQRGD	500
Valencia	IVTMSAYL----SGTNPPIQKELEFLE-SN--PDLVHWSCKIFRLQDDLGTSTDEIQRGD	217
Maxima	IVTMSAYL----SGTNPPIQKELEFLE-SN--PDLVHWSCKIFRLQDDLGTSTDEIQRGD	309
Clementina	VAKSIQCYMIEEGISEEEARDRIKSLIISWKKLNGKNLYKS-DFPESMAKMCLDMSRTA	549
Pineapple	VWKSIIQCYMHETGVSEELAREHIKDLMRQMWKKNVAYRANKDSPLSQTADFMLNLVRAS	99
Medica	-----	293
Reticulata	VPKSIQCYMHETGASEEVAREHIKDMRQMWKKNVAYRADKDSPLSQNTVDFMLNLVRMS	560
Valencia	VPKSIQCYMHETGASEEVARKHIKDMTRQMWKKNVAYRADKDSPLSQNTVDFMLNLVRMS	277
Maxima	VPKSIQCYMHETGASEEVARKHIKDMTRQMWKKNVAYRADKDSPLSQNTVDFMLNLVRMS	369
Clementina	HC-IFHGDGIGTSTGVSRRDLVSLILEPIVEL-----	581
Pineapple	HFMYLHGDGHGQVQNETMDVAFLLFRPILEDEDMVFTPSLGTG*-----	145
Medica	-----	293
Reticulata	HFMYLHGDGHGAQNETMDVASTWLFQPMPLLEDKHMFAFTAPKADEFPECSFS-	612
Valencia	HFMYLHGDGHGAQNETMDVASTWLFQPIPLEEKHMFAFTAPKADEFLECSLS*	329
Maxima	HFMYLHGDGHGAQNETMDVASTWLFQPIPLEEKHMFAFTAPKADEFLECSLS-	421

Figura 26 – Fim.

Pineapple	TCTCTATGATTGGATATTG-----TTATTAATCATTCTCTTTACTTTTC	44
Medica	-----TTGGATATACAGATGTAGTGAAGC-----TAGCTTACAGTTATACTTGG	45
Valencia	-GTACAGGATGAATCATACAAAAGACGAGCAGAAGAGCTGAAGGAAAAGTAATGATAAC	59
Clementina	-----TGGGGAG	7
Maxima	-----GTAATAAATAGAACTTTTATTGGTAG	26
Reticulata	-----	0
Pineapple	C-----CTTCAGCTTTTCTGCTTGTCTTTGATATGTTTCCACCTGTC	85
Medica	CAAAGATTCTCAAATATTCTATGGTTTG-----TGGTGTGCACGAGGT	90
Valencia	GATTAAGGATGTAACCGAGCCTCTGGATCAGTTGGAGCTGATTGATAACTTGCAAAAGCT	119
Clementina	AATATAATTAATATGATT--TACAATTTGTAGGGGAATGCTT--AGAA--GAAACGAT	60
Maxima	AATTGAATTTATGAATTTCTGTCAATTTCTGTGTCATTATTGTGTAGTTTATGGAAAG	86
Reticulata	-----	0
Pineapple	GGCGTTTAA-TTTTTGATATGTTCCAAATTTCCAATGTAAAAACTGAACAAATTAATTA	144
Medica	TTTATAT--ATATAAAT-----ATACATATATATAG--GCAGAGGAGAAGTTC	134
Valencia	TGGATTGGC-TCATCGTT-----TT-----GAGAC--TGAGATTAGGAACAT	158
Clementina	ACAAATATA-CAATATAT-----ATACATATACACACACACACACAGAGTTT	108
Maxima	ACTCTTTAAAAAATTTGT-----ATGCAGGAAAAAAA--GAAAAAGAAAAAT--	131
Reticulata	-----	0
Pineapple	GGATACAAAAAAGAAAAAATAATCATTGTACTAATAGTCAATCCGTGTAGCCGCT	204
Medica	ATGT-GATTTATTTTCTTA---CTCATTTTTTCTGAGTTTTGAAAGCGTTAATTTTT	190
Valencia	ATTGAATAATAGCTA--CAA--CAA-----TAATTAAAGTATAAAT--GGAGAAAAGA	206
Clementina	CTTAAAAATAGAAAGAAAGCA---TCAAGTTGTTGAGAATAGTTGCAAGT-TGTGAGAGGG	164
Maxima	-----AAATAAAGATTATA---CAACATTATCCGAATG-----TGCGGATG	170
Reticulata	-----	0
Pineapple	-----A---CCCAACGACTGCAGAAAGTCATGATCCCAATTTGAAGATGGGT	248
Medica	AAGTCTTAATAGTACAAAGATATTTTTATTTCATATGGGGGGGGGGTTTGAAGGAGTAC	250
Valencia	AAATCTGTATGCAACCTCCCTTGAATTCAGAC---TACTTAGACAACATGGCT---ATCC	260
Clementina	ATGCCA---AATTCAATTAACCTGTATCAATTTGAGAGTCAACGATCATGTTTCAC	220
Maxima	ATGTAT---GTGCTTCTGTCACAATATTGACC-TCGTTTCGCACAGTATGATGTACGCC	225
Reticulata	-----ACAATAATGACC-TCGTTTCGCACAGTATGATGACTCC	37
Pineapple	AGCTTGCTGATTTT-----CTAACAATTTGTTGGATTACCAAGTGGGCG	292
Medica	ATCATACTGTGCGAACG--AGGTCAATATTGTGCCACAAGACACATACATCCACACA	308
Valencia	TGTTTTCTCAAGGTACATTTCAATTAATTCGCTTCTTCTTCATGCACA-----TGCA	313
Clementina	GTGAACCTGCCCTTCTTTGACTATTATTGGGTGTGAGGTTGCATTAATACCTTATT	280
Maxima	TTCCACCCCCCTCC---CCCCCTCCCCCCCCCATGTGAATAAAATACCTTTGTA	282
Reticulata	TTTTTTT-----TTCCCCCAATGAATAAAATACCTTTGTA	74
Pineapple	CAGACTGGCCTGTATTCATCTACTCTGATGGTTGCTCTATTTGTGGAAAAGTAGTGGAGGA	352
Medica	TTCCGATGATTTATTTCTTTTTCTTTTTCTTTTTTCTTCGCATACAAATTTTTAAAGA	368
Valencia	ATCTGAATACTTGAATCGA--TCTCTCTGTTTTCTTTCTTTTTTTT---GATAATGTA	367
Clementina	CCCTCAAGATTTTAGAT-----AACCTTTTTATATTACATTTATGATTTTTTCATCAA	334
Maxima	CGATTAAGACTTAAAAATT-----AAACGCTTTCAAACCTCAGAAAAAATGAGTAAGAA	337
Reticulata	CTATTAAGACTTAAAAATT-----AAACGCTTTCAAACCTCAGAAAAAT-GAGCACGAA	128
Pineapple	CACTTGAACCATTTAAACAAGTAGTGAAGGCTGATGGGATGGTGAAGAAGACATTGGA	412
Medica	ATCTTTCCATAAATCACAATAAATGCACGCAGAAATGACAAGAAATTCATAAATTCAA	428
Valencia	AAGAAATGGACGA-AACCC--AAATCAGTTTTATATCTCTCTATGCTCGAGAATTCGAA	424
Clementina	AATAAATACACAAATACACAGATGTCACCATACGTATATTAAAGTGTATATAGTATAATAA	394
Maxima	AAATAAATCACATGAAC---TTCTCTG---CCTATATATATGATATATATATATAT	390
Reticulata	AAATAAATCACATGAAC---TTCTCTCTGCCTATATATATATA-----	169
Pineapple	TGGA--TGTAAGCTCACTGTTTTT-CTAATGCGCTTCAAATAACCTTT-----	457
Medica	TT-----CTACTAACAAAGTTTTATTTATACATTAATAATCTTGTTTTATGCGGAAATA	483
Valencia	CTCGACAAGGGCGCGCTGGGATACCTCAATCGTTCTCAATTAATATATGGATAAAAA	484
Clementina	AAATACTCTAAAAATCACTGTTATTCTCATAC-ATTCTAATAGTATTATA--AACATATC	451
Maxima	ATAACCTCGGGCATCACCACAAACCATAGAAT-AATTTGAGAATCTTTGC--CAAGCATA	447
Reticulata	-----	169
Pineapple	----TTGATAAG----CTGCTAAATTAATCTAT-GGTTTTTtCTTTtCTTTCTtCCG	507
Medica	AGACACAAAGTA-----AGTTTAAAGGAAAAAAA-AAAAGGAACACAAAGTTTGCAAACAA	536
Valencia	ATTTTGACGAAT-----GTAACGTTTTTTGGTTGAGTGTGCGAGAGTTTTCAATGGT	537
Clementina	ATTATCCATTTGATAATGACTACGGTTGTTTCAAAGTATATAAAAAATATGTTACAATAAG	511
Maxima	ACTGTAAGCTAG-----CTTACAGTACATCTTAATATCC-----AATGTC	487
Reticulata	-----	169

Figura 27 - Alinhamento das sequências promotoras dos genes “Cs3g04390.1” (“Valencia”), “Ciclev10017785m” (*C. clementina*), “orange1.1g045966m” (“Pineapple”), “Cg3g004130.1” (*C. máxima*), “Cm249680.1” (*C. medica*) e “MSYJ216420.1” (*C. reticulata*).

Pineapple	TTTTtTtTtAAGGTGC-AAGCTT-----GTGTATATATAGAGAAAGGAGATTGTG	557
Medica	TATCTTAATGTTGAGGACTAACATCGAAATTCATTTGTTACAGTTATAAAGTACTTTTG	596
Valencia	TTTAAAGA-CGACCAGGGAGGCTTCATTTGT--GATGATTTCAAGGGAAAACCTGGGCTTG	594
Clementina	ACGTTCAATTAATCGGACTGACCAAAATATTATGGCAGTATGGTGGATACACCAAACTTG	571
Maxima	TTCTTGCAATTAATCCCCAACCTTGGTTACC-TCTGTAATGGTTTCAAATGTCTTCTCT	546
Reticulata	-----	169
Pineapple	TATCCACGTCTTTtATTTTTCTTATTGATCATATCATATATCATCTAGAGCAGAGGTTTA	617
Medica	CGGAAAAATAAATAAATAAATTTCAAATAATATCAACAAAAAGTAGACTGGGCAGGTAG	656
Valencia	CATGAAGCCTCGTATTACAGCTTA--GAAGGAGAAAGCATCATGGAGGAGCCTTGCAA	651
Clementina	ATTCAATGATT-----AG--TAGGGATGGCAAAACATCGGGTGGGCTCGGGC	617
Maxima	TTGCAACAAATAGAGCAGCGTCA--GAATCATGGCAAAAAAAGCCAGTCCAATGCC	603
Reticulata	-----	169
Pineapple	TTGTGTGTTAAAAGTTAATAATGTCTAA-----TTAATTTTTTtC--TTTTTCAGAC	667
Medica	ATGTCTACTCAAAGTATA-CTGCAATGTATGTACCAGAACTATGAACCCAAAGCAGGA	715
Valencia	TTTGCCAGTAAACATCT-----TAAAGAAAGTATGATCAGCAAGAGCAA	695
Clementina	TTGGCCAAACCCCAACCCGACCTGATCAA----TAGAGAAATTAAGCCCGCCTTAAAAA	672
Maxima	TTGTCGCGCCAAATAT----GACAAT----TTGACAGTTGATAGGAGATCAGCAAAAC	653
Reticulata	-----	169
Pineapple	GTTGGAGTA--TTTTtCTTTt-CTTTTTAATTTTAAATGCGCTTGGGAAAGTATCATTTG	724
Medica	GGCAACAATAGTCATACTT-----TTTCATGAGGGGAATCTAACTTGCTAATGC	765
Valencia	GGAAAAGCA--TGATTTGTAGCAGAA-----CACGCAAGCGTGCACTGGAGCTCCCT	747
Clementina	AACCATACGTATTTATTTAGGGTGGG-T--CGGGCCGACCCGAATCGGGCCAACAT	729
Maxima	TACCAACCT----TCAATTTGGGACCATGATTTTTTGACAGTATTGAATAG--CAACTAT	707
Reticulata	-----	169
Pineapple	TTTTtGTGTTAGTTGAATGGATTT-----AAAAATATTCAAATCTGAATTCATA--	776
Medica	ATGTGTTTATAATAATCAACGATGT-----CGATATTTCTTTATAACTCACAGT	816
Valencia	CTGATTTGAAAGTGCCAATGTTAGA----GGCAAG--GTGGTTTATACACGTTTATGA	800
Clementina	CGGGTGGGCTAGGCTCG----ACCCTACCAGAAACATTTTCAACCCACAATTCATGT	784
Maxima	ACGGTATTTCTTATAAATGTTATTATTACGTATTAATTTCCCTTTGTTCAATTTCAAAT	767
Reticulata	-----	169
Pineapple	TGCATAATTGATATATA---TATA--TATTTTGGGGGTAAGTCGTTtAT--TTTTCT	828
Medica	GAACAGAAACGTGTAGAAGCATGTGTTTAAATAATCAACGAAAC-----TAT--TTCTAT	868
Valencia	GAAAAGAGAGGACAAAGAACCTTTTACTTGAGCTCGCTAAGTTGGAGTATAAACACTTT	860
Clementina	TGAAAAATCAACTCT-----TCATTGCATATATAAG-----AAT--TCGAA	824
Maxima	GGCACCATGAATAGCTAAAACTAAATGCTGTGCGGTACAGGATGAATCAT--ACAAA	824
Reticulata	-----	169
Pineapple	GGATGAAA---AACATCTAAAACCTTAATA-----ATTTTCATTTTTGC	869
Medica	AAGTGTATAGATCACCAAAAAC-AATGTTTAAAAGTTCTTTAATCTCTATATTTTGAG	927
Valencia	GCAGGCAATTTACCAG-----GAAGAACTTAAAGACATTTTCAGGTATCCATTTGATT	912
Clementina	TGAGGCAATGAAGCATCTACCATTTAACTAATAAATAA--T---TTATTTTTTAAAA	877
Maxima	AGACGAGCAGAAAGAGCTGAAGGGAAAAGTAATGATAACGATT--AAGGATGAACCGAGC	882
Reticulata	-----	169
Pineapple	CACTGTAAAAATTATATACTTGTATTATTTTATACGATTTCCCGGGATTCTgcTT	929
Medica	TTTTGTATATTTTTTAA---TTCCTATATTTTTAAAAATAT-----CTTAAAGT	973
Valencia	GCATAAATATTCTTAG---GTGCAGACTCCA-----CCT-----TTTACAGT	952
Clementina	CCATGATACACAAATAT---ATATCGAATATTTTAAATGCA-----ATTAAT	923
Maxima	CTCTGGATCAGTTGGAG---CTGATTGATAACTTGCAAAGA-----CTTGGATT	928
Reticulata	-----	169
Pineapple	GGCAACGACCAGTCAAGATGACAAGATTGTGCAAAAGGATTAAAGTACTAAGTACCCAAA	989
Medica	TCC-----TTGTGCTT-----AAAATTTGATACTTACC-----	1003
Valencia	AAA-----GGCATGA----GTTTGCATATATAGTGCAGGCATTTGCACCAG	997
Clementina	AAA-----AACACACAATGC---AATTAATTAATAATACACAATGTAATTCACAAAC	973
Maxima	GGC-----TCATCGTTTGA--GACTCAGATTAGGAACATATTGAATAATAGCTACAA	979
Reticulata	-----	169
Pineapple	AAAaTATTAT-----T--	1000
Medica	-----	1003
Valencia	AAAA-----	1001
Clementina	CATTTTATCCATACACAATTCAATTTA	1000
Maxima	CAATAATTAAGATTATAATTG-----	1000
Reticulata	-----	169

Figura 27 – Fim.

Pineapple	-----	0
Valencia	ATGTCCTTCTCCATTAATCCCTCAACCTTGGTTACCTCTGTAAATGGTTTCAAATGTCTT	60
Medica	ATGTCCTTCTCCATTAATCCCTCAACCTTGGTTACCTCTGTAAATGGTTTCAAATGTCTT	60
Maxima	ATGTCCTTCTGCATTAATCCCTCAACCTTGGTTACCTCTATAAATGGTTTCAAATGTCTT	60
Reticulata	ATGTCCTTCTGCATTAATCCCTCAACCTTGGTTACCTCTGTAAATGGTTTCAAATGTCTT	60
Pineapple	-----	0
Valencia	CCTCTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGC	120
Medica	CCTCTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCACTCCAATGC	120
Maxima	CCTCTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGC	120
Reticulata	CCTCTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGC	120
Pineapple	-----	0
Valencia	CTTGTCAGCGCCAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACACCAACCT	180
Medica	-----	120
Maxima	CTTGTCAGCGCCAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACACCAACCT	180
Reticulata	CTTGTCAGCGCCAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACACCAACCT	180
Pineapple	-----ATGAAACATAC	11
Valencia	TCAATTTGGGACCATGATTTTTTGCAGTCACTGAATAGCAAGTA-----	224
Medica	-----CTTGATGAAGCATAC	135
Maxima	TCAATTTGGGACCATGATTTTTTGCAGTCATTGAATAGCAACTATACGGATCAAACATAC	240
Reticulata	TCAATTTGGGACCATGATTTTTTGCAGTCGCTGAATAGCAAGTATACGGATGAAGCATAC	240
Pineapple	AAAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGACAGCGATTAAGGATGTAACCGAG	71
Valencia	-----	224
Medica	AAAAGACGAGCAGAAGGGCTGAAGGGAAAAGTGAAGATAGCGATTAAGGATGTAATCGAG	195
Maxima	AGAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGACAGCGATTAAGGATGTAACCGAG	300
Reticulata	AAAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGATAGCGATTAAGGATGTAATCGAG	300

Figura 28 – Alinhamento de sequencias codificadoras dos genes “orange1.1t03904.1” (“Valência”), “orange1.1g043404m” (“Pineapple”), “Cg3g004050.1” (*C. maxima*), “Cm257260.1” (*C. medica*), “MSYJ216420.1” (*C. reticulata*).

Pineapple	G-----	658
Valencia	---AGTTGACTTCATGTTGAATCTTGTGAGAATGTCCCATT--TATGTATCTACGTAGA	828
Medica	TGCTTTGAACCACCTTCCGGACTACATGAAATGTGTTTTTTTGGCCTTTACAACCTTGT	839
Maxima	AGGTCTTGGAGAGAAATTGAGCTTTGCGAGGGACAGCTTGGTAGCATCCTCTTATGGAG	947
Reticulata	AGGTCTTGGAGAGAAATTGAGCTTTGCGAGGGACAGCTTGGTAGCATCCTTTTTATGGAG	944
Pineapple	-----AGCCTCAATTCGCCTACTGCAGGAGAGTGTCAACATCTCGAT	701
Valencia	GATGGGCACGGTGTCAAAA--CCAAGAGACTATGGATGTAGCTTCT--ACATGGCTTT	883
Medica	TA--ATGAATTTGTTTATTACGTACTTGCATTACAGA--AAGACTCTTCAGAATCCAGA	895
Maxima	CATGGGGATAGGGTCTGAGCCTCAATTGGCCTATTGCAGGAGAATAGTACAATTGCAAT	1007
Reticulata	CATGGGGATAGGGTCTGAGCCTCAATTGCCTATTGCAGGAGAATAGTACAATTGCAAT	1004
	* * * * *	
Pineapple	AGCCCTAATACAGTGATTGATGACATTTATGATGTCTATGGAACATTGGATGAACCTGA	761
Valencia	T-----TCAGCCATTCC-----CTTGGAGGACA---A	908
Medica	T-----TGAAA---GCTGA-----	906
Maxima	AGCTCTAGTTACAGTGATTGATGACATTTATGATGTTTATGGAACCTTGGACGAACCTGA	1067
Reticulata	AGCTCTAATACAGTGATTGATGACATTTATGATGTTTATGGAACCTTGGACGAACCTGA	1064
Pineapple	GcTATTCACTGATGCTGT-----TGaGAGTGGGACATCAATTATGC	802
Valencia	CCACATGGCTTCCACAGCACCAACGGCTGATGAATCCAGAGT-----GCAGTTTCA	961
Medica	-----	906
Maxima	GCTATTCACTGCTGCTGTTGAGAGGATTGTTGGCAAACATAATGTTGGACATCCATTATGC	1127
Reticulata	GCTATTCACTGCTGCTGTTGAGAG-----GTGGGACATCCATTATGC	1106
Pineapple	TTTGAAGCACCTTCCGGGcTATATGAAAATGTGTTTTCTTGGCCTTTACAACCTTGTAA	862
Valencia	GTTGA-----	966
Medica	-----	906
Maxima	TTTGAACCACCTTCCGGACTACATGAAATGTGTTTTTTTGGCCTTTACAACCTTGTAA	1187
Reticulata	TTTGAACCACCTTCCGGACTACATGAAATGTGTTTTTTTGGCCTTTACAACCTTGTAA	1166
Pineapple	TGAATTTGCTTATTACGTTCTCAACAACAGGATTTTGATATGCTTCTGAGCATAAAAA-	921
Valencia	-----	966
Medica	-----	906
Maxima	TGAATTTGCTTATTACGTTCTCAACAACAGGATTTTGATATGCTTCTGAGTAATAAAAA	1247
Reticulata	TGAATTTGCTTATTACGTTCTCAACAACAGGATTTTGATATGCTTCTGAGTATTA AAAA	1226
Pineapple	aTGCAGGCTTGGCTTAATACAAGCCTACTTGGTGGAGGCGAAATGGTACCATAGCAAGTA	981
Valencia	-----	966
Medica	-----	906
Maxima	TTTATGGCTTGGCTTACTACAAGCCTGCTTAGTGGAGGCGAAATGGTACCATAGTAAGTA	1307
Reticulata	TTTATGGCTTGGCTTAATACAAGCCTGCTTAGTGGAGGCGAAATGGTACCATAGTAAGTA	1286
Pineapple	CACACCGAACTGGAAGAATACTTGGAAAAATGGATTGGTATCAATAACGGGCCCTTAAAT	1041
Valencia	-----	966
Medica	-----	906
Maxima	CACGCCAACGCTGGGAGAATTCTTGGAAAAATGGATTGGTATCAATAGGAGGCCCTATGGG	1367
Reticulata	CACACCAACTGGGAGAATTCTTGGAAAAATGGATTGGTATCAATAGCAGGCCCTATAGT	1346
Pineapple	TATAaCGATTTCATATCTTCTGGTACAAATCCAATCATTAGAAGGAACGGAAATTTCT	1101
Valencia	-----	966
Medica	-----	906
Maxima	TACAATGACTTCATACCTTTCTGGGACAAATCCAATCATTAGAAGGAACTAGAATTTTT	1427
Reticulata	AACAATGAGTGCGTACCTTTCTGGTACAAATCCAATCATTAGAAGGAACTAGAATTTCT	1406
Pineapple	AGAAAGTAATCCAGATATAGTTCCTGGTCAATCAAGATTTTCCGCTGCAAGATGATTT	1161
Valencia	-----	966
Medica	-----	906
Maxima	AGAAAGTAATCCAGATATAATTCCTGGCCATTCAAGATTTCTGCTTCAAGATGATTT	1487
Reticulata	AGAAAGCAATCCAGATTTCTGGTTCCTGGTCAATCAAGATTTTCTGCTTCAAGATGATTT	1466

Figura 28 – Continuação.

Pineapple	GGGAACTTCATCG-----	1174
Valencia	-----	966
Medica	-----	906
Maxima	GGGAACTTCATCGGATGAGATACAGAGAGGGGATGTTCCGAAATCAATCCAGTGTACAT	1547
Reticulata	GGGAACTTCGTCTGGATGAGATACAGAGAGGGGATGTTCCGAAATCAATCCAGTGTACAT	1526
Pineapple	-----	1174
Valencia	-----	966
Medica	-----	906
Maxima	GCATGAAACTGGTGCCTCGGAGGAAGTTGCTCGTGAACACATCGAGGATATGATGAGACA	1607
Reticulata	GCATGAAACTGGTGCCTCGGAGGAAGTTGCTCGTGAACACATCAAGGATATGATGAGACA	1586
Pineapple	-----	1174
Valencia	-----	966
Medica	-----	906
Maxima	GATGTGGAAGAAGGTGAATGCATACAGAGCTGATAAAGATTCTCCCTTATCTCAAATAC	1667
Reticulata	GATGTGGAAGAAGGTGAATGCATACAGAGCTGATAAAGATTCTCCCTTATCTCAAATAC	1646
Pineapple	-----	1174
Valencia	-----	966
Medica	-----	906
Maxima	AGTTGACTTCATGTTGAATCTTGTGAGAATGTCCCATTTTATGTATCTACGTAGAGATGG	1727
Reticulata	AGTTGACTTCATGTTGAATCTTGTGAGAATGTCCCATTTTATGTATCTACACGGAGATGG	1706
Pineapple	-----	1174
Valencia	-----	966
Medica	-----	906
Maxima	GCACGGTGCTCAAACCAAGAGACTATGGATGTAGCTTCTACATGGCTTTTTCAGCCCAT	1787
Reticulata	GCACGGTGCTCAAACCAAGAGACTATGGATGTAGCTTCTACATGGCTTTTTCAGCCCAT	1766
Pineapple	-----	1174
Valencia	-----	966
Medica	-----	906
Maxima	TCCCTTGGAGGACAACCACATGGCTTCCACAGCACCAACGGCTGATGAATCCCAGAGTG	1847
Reticulata	GCCCTTGGAGGACAACACATGGCTTCCACAGCACCAAGGCTGATGAATCCCAGAGTG	1826
Pineapple	-----	1174
Valencia	-----	966
Medica	-----	906
Maxima	CAGTTTCAGTTGA	1860
Reticulata	CAGTTTCAGTTGA	1839

Figura 28 – Fim.

Pineapple	-----	0
Valencia	MSSSINPSTLVTSVNGFKCLPLTTNKAAIRIMAKNKPQCLVSAKYDNLTVDRRSANYQP	60
Maxima	MSSSINPSTLVTSINGFKCLPLATNKAAIRIMAKNKPQCLVSAKYDNLTVDRRSANYQP	60
Medica	MSSSINPSTLVTSVNGFKCLPLTTNKAAIRIMAKNKLQCL-----	41
Reticulata	MSSSINPSTLVTSVNGFKCLPLTTNKAAIRIMAKNKPQCLVSAKYDNLTVDRRSANYQP	60
Pineapple	-----DETYKRAAEELKGKVKTAIKDVTPELDQLELIDNLQRLGLAYHF	44
Valencia	SIWDHDFLQSLNSKYT-----LELIDNLQRLGLAYRF	92
Maxima	SIWDHDFLQSLNSNYTDQTYRRRAEELKGKVKTAIKDVTPELDQLELIDNLQRLGLAYHF	120
Medica	-----DEAYKRAEELKGKVKIAIKDVEPLDQLELIDNLQRLGLAHRF	85
Reticulata	SIWDHDFLQSLNSKYTDEAYKRAEELKGKVKIAIKDVEPLDQLELIDNLQRLGLAHRF *****;*	120
Pineapple	EPEIRNILRNIIHNNKDYNRKENLYATSLEFRLLRQHGYPVSQEVFSGFKDDKGVGFCID	104
Valencia	ETEIRNILHNIYNSNKDYVWRKENLYATSLELRLLRQHGYPVSQEVFNFGKDDQGGFIYD	152
Maxima	ETEIRNILHNIYNNKDYIWRKANLYATSLEFRLLRQHGYPVSQEVFSGFKDDKGGFCID	180
Medica	ETEIRNILNIIYNNKDYNRKENLYATSLEFRLLRQHGYPVSQEVFNGLKDDQGGFCID	145
Reticulata	ETEIRNILNIIYNNKDYNRKENLYATSLEFRLLRQHGYPVSQEVFNGLKDDQGGFCID * *****;* *	180
Pineapple	DFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEMMITSNSKEEDVFVAEQAKRALELP	164
Valencia	DFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEMVIRKSMY-----	195
Maxima	DFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEMMITSNSKEEYVFVAEQAKRALELP	240
Medica	DFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEMMI-SKSKEEHVFVAEQAKRALELP	204
Reticulata	DFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEMMI-SKSKEEHVFVAEQAKRALELP *****;*	239
Pineapple	LHWKVPMLEARWFIHVYEKREDKNHLLLELAKLEFNTLQAIYQEELKDISG-----	215
Valencia	-----	195
Maxima	LHWKVPMLEARWFIHVYEKREDKNHLLLELAKLEFNTLQAIYQEELKDISGWWKDTGLGE	300
Medica	LHWKVPMLEARWFIHVYEKREDKNHLLLELAKLEFNTLQAIYQEELKDISG-----	255
Reticulata	LHWKVPMLEARWFIHVYEKREDKNHLLLELAKLEFNTLQAIYQEELKDISGWWKDTGLGE	299
Pineapple	-----MGIAFEPQFAYCRRVLTISIALITVIDDIYDVYGTLDLELFTD	259
Valencia	-----	195
Maxima	KLSFARDSLVASFVWSMGIGSEPLAYCRRIVTIAIALVTVIDDIYDVYGTLDLELFTA	360
Medica	-----	255
Reticulata	KLSFARDSLVASFVWSMGIGSEPLAYCRRIVTIAIALITVIDDIYDVYGTLDLELFTA	359
Pineapple	AVER-----WDIYALKHLPGYMKCFALYNFVNEFAYYVLKQQDFDMLRSIKNSWLG	313
Valencia	-----	195
Maxima	AVERIVGKLMWDIHYALNHLPDYMKLCFFALYNFVNEFAYYVLKQQDFDMLRSKNNSWLG	420
Medica	-----WDIHYALNHLPDYMKLCFFALYNFVNEFAYYVLKQQDSSEFQIES----	301
Reticulata	AVER-----WDIHYALNHLPDYMKLCFFALYNFVNEFAYYVLKQQDFDMLRSIKNSWLG	413
Pineapple	LIQAYLVEAKWYHSHKYTPKLEEYLENGLVSIPTGLIITISYLSGTNPIIKELEFLESNP	373
Valencia	-----	195
Maxima	LLQACLVEAKWYHSHKYPTLGEFLENGLVSIPTGLIITISYLSGTNPIIKELEFLESNQ	480
Medica	-----	301
Reticulata	LIQAGLVEAKWYHSHKYPTLGEFLENGLVSIPTGLIITISYLSGTNPIIKELEFLESNP	473
Pineapple	DIVHWSKIFRLQDDLGTSS-----	393
Valencia	-----LSQNKRSDEIQRGDVPKSIQCYMHETGASEEVAREHIEDMMRQMWKK	242
Maxima	DIIHWPFKILRLQDDLGTSSDEIQRGDVPKSIQCYMHETGASEEVAREHIEDMMRQMWKK	540
Medica	-----	301
Reticulata	DFVRWSCKIFRLQDDLGTSSDEIQRGDVPKSIQCYMHETGASEEVAREHIKMMRQMWKK	533
Pineapple	-----	393
Valencia	VNAYRADKDSPLSQNTVDFMLNLVRMESHMYLRRDGHGAQNQETMDVASTWLFQPIPLED	302
Maxima	VNAYRADKDSPLSQNTVDFMLNLVRMESHMYLRRDGHGAQNQETMDVASTWLFQPIPLED	600
Medica	-----	301
Reticulata	VNAYRADKDSPLSQNTVDFMLNLVRMESHMYLHGDGHGAQNQETMDVASTWLFQPIPLED	593
Pineapple	-----	393
Valencia	NHMASTAPTADEFPECSFS*	321
Maxima	NHMASTAPTADEFPECSFS-	619
Medica	-----	301
Reticulata	KHMAFTAPKADEFPECSFS-	612

Figura 29 – Alinhamento das sequencias de proteina dos genes “orange1.1t03904.1” (“Valência”), “orange1.1g043404m” (“Pineapple”), “Cg3g004050.1” (*C. maxima*), “Cm257260.1” (*C. medica*), “MSYJ216420.1” (*C. reticulata*).

Maxima	CTTGACAAACTTATTTGTACAAACTGATGTGGCATGATAAGATTGGTTGAATTAATA	60
Pineapple	-----	0
Reticulata	-----	0
Valencia	-----	0
Medica	-----ATTGGATATATAGATGTAGA---GTAA---GCTAGCTTACAGTT	38
Maxima	TTACTTGGCCACATGATTGTTTTATATTTTATATTTTATTTCAGCCAATGAATTA	120
Pineapple	-----	0
Reticulata	-----	0
Valencia	-----	0
Medica	ATACTTGGCGAAGATTCTCAAATTAATCTA-----	68
Maxima	TAACACATCAGTTGTACAAAATAAATTTGTACAAGAGTTGTGGCTGTATCATCACTCT	180
Pineapple	-----	0
Reticulata	-----	0
Valencia	-----TGGTTTGTGGT-----	11
Medica	-----TGGTTTGTGGT-----	79
Maxima	AAAAAATATCGACATCGTTGATTATTGTAACACATGCATTAGCAAGTTAGAATCCCT	240
Pineapple	-----	0
Reticulata	-----	0
Valencia	-----GATGTACGAGGTTATATATAT	34
Medica	-----GATGTACGAGGTTATATATAT	102
Maxima	CATGAAAAAGTATGACTATTTTTGCCTCCAGATTGGGTCATAGTTTGATACATACA	300
Pineapple	-----TCT	3
Reticulata	-----	0
Valencia	ATAGGCAGAGG---AGAAGTTCATGTGATTATTTTTCGTACTCATTTTTCTGAGTTCG	91
Medica	ATAGGCAGAGG---AGAAGTTCATGTGATTATTTTTCGTACTCATTTTTCTGAGTTTT	159
Maxima	TTTGCAGTATAATTTGAGTAGACATCTACCTGCCAGTCTACTTTTTGTTGATAATTAT	360
Pineapple	GCTCCCACTAACTTTGAGTTGACATCTACCTGCCCAaTCTACTTTTTGTTGATAATCAT	63
Reticulata	-----	0
Valencia	CATGCAATAAAGGAA---AAAGGGTGCATG----CAAGTAATGGTTAAAAACAAG	140
Medica	GAAAGCGTTAATTTT----TAAGTCTTAATA-----GTACAAAAGTATTTTATTCAT	208
Maxima	TTTGAAATTTAT----TAATTTGTTAT--CCGCAAACTACTTTATAACTGTAACAAAT	413
Pineapple	TTTGTAATTTAT----TAATTTGTTTT--CCGCAAAAGTACTTTATAACTGTAACAAAT	116
Reticulata	-----	0
Valencia	ACATTGGAAGCGT--GCAAGTATGGTTGGGGTAAGATGGATTGAAATTTTGAAAATA	198
Medica	TTGGGGGAAAAAAGGAGTACATCATACTGTGCGAACGAGGTCAATATTGTACCAGAA	268
Maxima	ATAATTCGATGTTAGTCTCAACATTAAGATATTGTTTGC--AACT----TTTTGTCC	467
Pineapple	AGAATTCGATGTTAGTCTCAACATTAAGATATTGTTTGC--AACT----TTGTATGCC	170
Reticulata	-----	0
Valencia	GGG---ACGA-----AAATTTAGGAAGTGGATTAAGGTA	232
Medica	GAC---ACGTACATCATCCATACATTCCGATGAATGTTGTATAATCTTTATTTATTC	325
Maxima	TTTTTTT-TTTTTCCTAAACTTACTTTGTGAATCTTATTTCCG--CATAAAACAAGA	524
Pineapple	TTTT-----TTTCTTAAACTTAGTTTGTATATTCTTATTTCTC--CAcAAAACAAGA	221
Reticulata	-----	0
Valencia	GGGTCAGGTATTGCATTGCATACTTGGGGGGAAAGGGGAAATATCAAAATTAATCATGA	292
Medica	TTTTTTT-----TTCCTGCATACAAATTTTTAAAGAGTCTTTCAATAAACTACACAATA	380
Maxima	TTTTAATG---TAATAAATAGAACTTTTATTAGTAGAATTGAATTTATGAAT-TTCTTGT	580
Pineapple	TTTTAATG---TAATAAATAGAACTTTTATTAGTAGAATTGAATTTATGAAT-TTCTTGT	277
Reticulata	-----	0
Valencia	AA-----	294
Medica	AATGCACGCAGAAATGACAAGA-AATTCATAAATCAATCTACTAATAAAAGTTCTATT	439

Figura 30 – Alinhamento das sequencias promotoras dos genes “orange1.1t03904.1” (“Valência”), “orange1.1g043404m” (“Pineapple”), “Cg3g004050.1” (*C. maxima*), “Cm257260.1” (*C. medica*), “MSYJ216420.1” (*C. reticulata*).

Maxima	CATTCTGCGTGCAATTTATTGTGTAGTTTA - TGGAAAGACTCTTTCAAAAAATTTGTATGC	639
Pineapple	TATTTCTGCGTGCAATTTATTGTGTAGTTTA - TAGAAAGACTCTTTAAAAAATTTGTATGC	336
Reticulata	-----	0
Valencia	-----	294
Medica	TATT---ACATTAATAATCTTGTTTTATGTAGAAAATAAGAATATACAAAGTAAATGTAAGG	496
Maxima	AGGAAAAAAGAAAAAGAAAAATAAATAAATCA-----TCCGAATGTGTAT	686
Pineapple	AGGAAAAAAGAAAAAGAAAAATAAATAAATCA-----TCCGAATGTGTAT	396
Reticulata	-----	0
Valencia	-----	294
Medica	AAGAAAAAAGG---CATACAAAGTTGC-AAACAATATCTTAAT--GTTGAGCACTAACAT	550
Maxima	GTATGTGCTTCTGGCACAAAATTGACCTCGT-TCGCACAGTATGATGTACTCCTTCCAA	745
Pineapple	GTATGTGCTTCTGGCaCAATATTGACCTCGT-TCGCACAGTATGATGTAcCCCCCCC	455
Reticulata	-----ACAATAATGACCTCGT-TCGCACAGTATGATGTACTCCTTTTTT	43
Valencia	-----	294
Medica	CGAAATCTATCTGTTACAGTTATAAAGTACTTTTGGGAAAACAAATAAATAAT----	606
Maxima	CCCAACAACCCCCCCCCCCCCCATATGAATAAAAAATATC-TTTGTACTATTAAGA	804
Pineapple	C-c-----aaaaaaaaaGaaTAAATATC-TTTGTACTATTAAGA	494
Reticulata	TTT-----CCCCCAATGAATAAAATACC-TTTGTACTATTAAGA	83
Valencia	-----	294
Medica	TTCAA-----AATGATTATCAACAAAAAGTTGATTGGAGATAATGGAT	649
Maxima	CTTAAAAATTAAACGCTTTCAAAACCTCAGAAAAAATGAGTAAGAAAAATAATCACAT	864
Pineapple	CTTAAAAAT-TAAACGCTTTCAAAACCTC-AGAAAAAATGAGTAAGAAAAATAATCACAT	552
Reticulata	CTTAAAAAT-TAAACGCTTTCAAAACCTC-AGAAAAAATGAGCACGAAAAATAATCACAT	141
Valencia	-----	294
Medica	TTTAATATATTGTAGATTGTGATAA-TT-----TGTAATAATTTCAAAAAACTT	697
Maxima	GAACCTCCTCTGCGCTATATATATGTATATTTATATATATATAACCTCGTGCATCACCA	924
Pineapple	GAGCTTCTCTGCGCTATATAT-----ATATATATATAACCTtGTACATCACCA	602
Reticulata	GAACCTCCTCTGCGCTATATAT-----ATATA-----	169
Valencia	-----	294
Medica	CCATTTAACAGCGTTGGTGAATGTGTTGTAAATAATTTAATAT-----TTGACAA	752
Maxima	CAAACACAGAATAATTTGAGAATCTTTGCCAAGTATAACTGTAAGCTAGCTTACACTAC	984
Pineapple	CAAACCATAGATTAATTTGAGAATCTTCCcAAGTATACCTGTAAGCTAGCTTACACTGC	662
Reticulata	-----	169
Valencia	-----	294
Medica	CAAGCGAAAGAAATGTTGTTAAAAACTCTTCA-----	783
Maxima	ATCTGTATATCCAATGT-----	1001
Pineapple	ATCTGTATATCCAATGTCTTCTTGCAATTAATCCCTCAACCTGGCTACCTCTGTAATGG	722
Reticulata	-----	169
Valencia	-----	294
Medica	-----ATAGA	788
Maxima	-----	1001
Pineapple	TTTCAAATGTCTTCTCTTGCAACAAATAGAGCAGCCATCAGAATCATGGCAAAAAATAA	782
Reticulata	-----	169
Valencia	-----	294
Medica	TGTTCAATCTCACAACATCTACAA-----	813
Maxima	-----	1001
Pineapple	GCCAGTCCAATGCCTTGTGCAAGCaCCAAATATGATAATTTGACAGTTGATAGGAGATCAGC	842
Reticulata	-----	169
Valencia	-----	294
Medica	-----AAGCGGTTGTGAAAAATTTAATAATTGACAACCTAGTGTAAATCGTT	863

Figura 30 – Continuação.

Maxima	-----	1001
Pineapple	AAACTACCAACCTTCAATTTGGGACCATGATTTTTtGCAGTCACTGAATAGCAA-----	896
Reticulata	-----	169
Valencia	-----	294
Medica	ATAAATTT-TTAATCTCATTCAATCCATGAATTAGTAAAATTAATCTAAATTC AATTCAT	922
Maxima	-----	1001
Pineapple	--CTATACGGTATTGATTATTATTATTATTATTACGTATAAATTTCCCTTTGTTTCATTTCA	954
Reticulata	-----	169
Valencia	-----	294
Medica	AATTCTGCAGATTAGAAGTAGATTTGATATAATCCATATTCATTCCACTTTTGCGAATTC	982
Maxima	-----	1001
Pineapple	AATTAGGACCATGAATAACTAAAACTAAaTGCTGTGCATGTACAGG	1001
Reticulata	-----	169
Valencia	-----	294
Medica	AATACGGATTA-----AAAAAAA-----	1001

Figura 30 – Fim.

Medica	-----	0
Maxima	-----	0
Reticulata	ATGCTTCTTGCATTAATCCCTCAACCTTGGTTACCTCTGTAATGGTTTCAAATGTCTT	60
Valencia	-----	0
Pineapple	-----	0
Medica	-----	0
Maxima	-----	0
Reticulata	CCTCTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGC	120
Valencia	-----	0
Pineapple	-----	0
Medica	-----	0
Maxima	-----	0
Reticulata	CTTGT CAGCGCCAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACACCAACCT	180
Valencia	-----	0
Pineapple	-----	0
Medica	-----ATGCTTCTTGCATTAATCCCTCAACCTTGGTTACCTCTGATGAAGCATAC	51
Maxima	-----	0
Reticulata	TCAATTTGGGACCATGATTTTTGACAGTCGCTGAATAGCAAGTATACGGATGAAGCATAC	240
Valencia	-----	0
Pineapple	-----	0
Medica	AAAAGACGAGCAGAAGAGCTGAGGGGAAAAGTGAAGATAGCGATTAAGGATGTAATCGAG	111
Maxima	-----	0
Reticulata	AAAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGATAGCGATTAAGGATGTAATCGAG	300
Valencia	-----	0
Pineapple	-----	0
Medica	CCTCTGGATCAGTTGGAGCTGATTGATAACTTGCAAAGACTTGGATTGGCTCATCGTTTT	171
Maxima	-----	0
Reticulata	CCTCTGGATCAGTTGGAGCTGATTGATAACTTGCAAAGACTTGGATTGGCTCATCGTTTT	360
Valencia	-----	0
Pineapple	-----	0
Medica	GAGACTGAGATTAGGAACATATTGAATAATATCTACAACAATAATAAGATTATAATTGG	231
Maxima	-----	0
Reticulata	GAGACTGAGATTAGGAACATATTGAATAATATCTACAACAATAATAAGATTATAATTGG	420
Valencia	-----	0
Pineapple	-----	0
Medica	AGAAAAGAAAATCTGTATGCAACCTCCCTTGAGTTCAGACTACTTAGACAACATGGCTAT	291
Maxima	-----	0
Reticulata	AGAAAAGAAAATCTGTATGCAACCTCCCTTGAAATTCAGACTACTTAGACAACATGGCTAT	480
Valencia	-----	0
Pineapple	-----	0
Medica	CCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGACCAGGGAGGCTTCATTTGTGAT	351
Maxima	-----	0
Reticulata	CCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGACCAGGGAGGCTTCATTTGTGAC	540
Valencia	-----	0
Pineapple	-----	0
Medica	GATTTCAAGGGAATACTGAGCTTGCATGAAGCTTCGTATTACAGCTTAGAAGGAGAAAGC	411
Maxima	-----	0
Reticulata	GATTTCAAGGGAATACTGAGCTTGCACGAAGCCTCGTATTACAGCTTAGAAGGAGAAAGC	600
Valencia	-----	0
Pineapple	-----	0

Figura 31 - Alinhamento das seqüências codificadoras dos genes “orange1.1t04362.1” (“Valência”), “orange1.1g045966m” (“Pineapple”), “Cg3g004130.1” (*C. maxima*), “Cm249680.1” (*C. medica*) “MSYJ216420.1” (*C. reticulata*).

Medica	ATCATGGAGGAGGCTGGCAATTTACTAGTAAACATCTTAAAGAAGTGATGATCAGCAAG	471
Maxima	---ATGGAGGAGGCTGGCAATTTGCCAGTAAACATCTTAAAGAAGTGATGATCAGCAAG	57
Reticulata	ATCATGGAGGAGGCTGGCAATTTACCAGTAAACATCTTAAAGAAGTGATGATCAGCAAG	660
Valencia	-----	0
Pineapple	-----	0
Medica	AACATGGAAGAGGATGATTTGTAGCAGAACAGCGAAGCGTGCACTGGAGCTCCCTCTG	531
Maxima	AGCAAGGAAAAGCATGATTTGTAGCAGAACACGCAAAGCGTGCACTGGAGCTCCCTCTG	117
Reticulata	AGCAAGGAAAGAGCATGATTTGTAGCAGAACAGCGAAGCGGCACTGGAGCTCCCTCTG	720
Valencia	-----	0
Pineapple	-----	0
Medica	CATTGGAAGTGCCAAATGTTAGAGGCAAGGTGGTTACATACACATTTATGAGAGAAGAGAG	591
Maxima	CATTGGAAGTGCCAAATGTTAGAGGCAAGGTGGTTACATACACATTTATGAGAAAAGAGAG	177
Reticulata	CATTGGAAGTGCCAAATGTTAGAGGCAAGGTGGTTACATACACATTTATGAGAAAAGAGAG	780
Valencia	-----	0
Pineapple	-----	0
Medica	GACAAGAACCACCTTTTACTTGAGCTCGCTAAGATGGAGTTTAAACACTTTGCAGGCAATT	651
Maxima	GACAAGAACCACCTTTTACTTGAGCTCGCTAAGTGGAGTATAACACTTTGCAGGCAATT	237
Reticulata	GACAAGAACCACCTTTTACTTGAGCTCGCTAAGTGGAGTTTAAACACTTTGCAGGCAATT	840
Valencia	-----	0
Pineapple	-----	0
Medica	TACCAGGAAGAACTAAAAGAAATTCAGGGTGGGACATCAATTATGCTTTGAAGCACCTT	711
Maxima	TACCAGGAAGAACTTAAAGACATTTCAAGTGCAGGCATTTGCACCAGAAAATGACTCCAAG	297
Reticulata	TACCAGGAAGAACTTAAAGACATTTCAAGGGTGGT-----	874
Valencia	-----	0
Pineapple	-----	0
Medica	CC----GGGCTATATGAAAATGTGTTTTCTTG-----CGCTTTACAACTTTGTTAAT	759
Maxima	AAATCTCAGGATACAGGCTTCAAGAGAAATTGAGCTTCGCGAGGGACAGCTTGGTAGCA	357
Reticulata	---GGAAGGATACAGGTCTTGAGAGAAATTGAGCTTTGCGAGGGACAGCTTGGTAGCA	930
Valencia	-----	0
Pineapple	-----	0
Medica	GAATTTGCTTATTACGTTCTCAAACAAC-AGGATTTTGATTGCTTCTGAGCATAAAAAA	818
Maxima	TCCTTTTATGGAGCATGGGGATAGGGTCTGAGGCTCGATTGCGCTATTGCAGGAGAATA	417
Reticulata	TCCTTTTATGGAGCATGGGGATAGGGTCTGAGCCTCAATTCGCTATTGCAGGAGAATA	990
Valencia	-----	0
Pineapple	-----	0
Medica	-----TGCACCATTCCTTGGAGGACAAACA-CATGGCTTTCACAGCATC	863
Maxima	GTTACAATTGCAATAGCTCTAATTACAGTGATTGATGACATTTATGATGTTTATGGAAC	477
Reticulata	GTCACAATTGCAATAGCTCTAATTACAGTGATTGATGACATTTATGATGTTTATGGAAC	1050
Valencia	-----	0
Pineapple	-----	0
Medica	TCCTGGCACAAAGGCTGA-----	882
Maxima	TTGGACGAACCTTGAGCATTTCACTGCCGCTGTTGAGATGTTGGACATCAATTATGCTTTG	537
Reticulata	TTGGACGAACCTTGAGCATTTCACTGCCGCTGTTGAGAGGTGGGACATCCATTATGCTTTG	1110
Valencia	-----	0
Pineapple	-----	0
Medica	-----	882
Maxima	AACCACCTTCCGGACTACATGAAATTTGTTTTTTTGCCTTTACAACCTTTGTTAATGAA	597
Reticulata	AACCACCTTCCGGACTACATGAAATTTGTTTTTTTGCCTTTACAACCTTTGTTAATGAA	1170
Valencia	-----	0
Pineapple	-----	0

Figura 31 – Continuação.

Medica	-----	882
Maxima	TTTGCTTATTACGTACTCAAACAACAGGATTTTGATATGCTTCGGAGTATAAAAATTC	657
Reticulata	TTTGCTTATTACGTACTCAAACAACAGGATTTTGATATGCTTCGGAGTATAAAAATTC	1230
Valencia	-----	0
Pineapple	-----	0
Medica	-----	882
Maxima	TGGCTTGGCTTAATTCAAGCCTACTTAGTGGAGGCAAAATGGTACCATAGTAAGTACACA	717
Reticulata	TGGCTTGGCTTAATACAAGCCGGCTTAGTGGAGGCAAAATGGTACCATAGTAAGTACACA	1290
Valencia	-----	0
Pineapple	-----	0
Medica	-----	882
Maxima	CCAACACTGGGAGAATTC TTGAAAATGGATTGGTATCAATAGCAGGCCCTATAGTAACA	777
Reticulata	CCAACACTGGGAGAATTC TTGAAAATGGATTGGTGTCAATAGCAGGCCCTATAGTAACA	1350
Valencia	-----	0
Pineapple	-----	0
Medica	-----	882
Maxima	ATGAGTGCGTACCTTTCTGGTACAAATCCAATCATTAGAAGGAAC TAGAATTTCTAGAA	837
Reticulata	ATGAGTGCGTACCTTTCTGGTACAAATCCAATCATTAGAAGGAAC TAGAATTTCTAGAA	1410
Valencia	-----	0
Pineapple	-----AAGGAGCTGGAATTTCTAGAAAAGTAAC	27
Medica	-----	882
Maxima	AGCAATCCAGATTTAGTTCCTGGTCTGCAAGATTTTTCGTCTTCAAGACGATTTGGGA	897
Reticulata	AGCAATCCAGATTTCTGGTCTGGTCTGCAAGATTTTTCGTCTTCAAGATGATTTGGGA	1470
Valencia	-----	0
Pineapple	AATATCCAGATATAATTC AATGGTCATCCAAGATTTCCGTCTTCAAGATGATTTGGGA	87
Medica	-----	882
Maxima	ACTTCAACGGATGAGATACAGAGAGGGGATGTTCCGAAATCAATCCAGTGTACATGCAT	957
Reticulata	ACTTCTCGGATGAGATACAGAGAGGGGATGTTCCGAAATCAATCCAGTGTACATGCAT	1530
Valencia	-----	0
Pineapple	ACTTCAAC - GATGAATTAAGAGAGGGGATGTTGGAAATCAATCCAGTGTATATGCAT	146
Medica	-----	882
Maxima	GAAACTGGTGCCTCGGAGGAAGTTGCTCGTAAACACATCAAGGATATGACGAGACAGATG	1817
Reticulata	GAAACTGGTGCCTCGGAGGAAGTTGCTCGTAAACACATCAAGGATATGATGAGACAGATG	1590
Valencia	-----ATG	3
Pineapple	GAAACTGGTGTCTCAGAGGAAC TTGCTCGTAAACACATAAAGGATTTGATGAGACAGATG	206
Medica	-----	882
Maxima	TGGAAGAAGGTGAATGCATACAGAGCTGATAAAGATTCTCCCTATCTCAAAATACAGTT	1077
Reticulata	TGGAAGAAGGTGAATGCATACAGAGCTGATAAAGATTCTCCCTATCTCAAAATACAGTT	1650
Valencia	TGGAAGAAGGTGAATGCATACAGAGCTGATAAAGATTCTCCCTATCTCAAACTACAGTT	63
Pineapple	TGGAAGAAGGTGAATGCATACAGAGCTAATAAAGATTCTCCCTTATCTCAAACTACAGCT	266
Medica	-----	882
Maxima	GACTTCATGTTGAATCTTGTGAGAATGTCCATTTTATGTATCTACGTGGAGATGGGCAC	1137
Reticulata	GACTTCATGTTGAATCTTGTGAGAATGTCCATTTTATGTATCTACACGGAGATGGGCAC	1710
Valencia	GACTTCATCTTGAATCTTGTGAGAATGTCCATTTTATGTATCTAGATGGAGATAGGCAT	123
Pineapple	GACTTCATGTTGAATCTGTTGAGAGCGTCCATTTTATGTATCTACATGGAGATGGGCAT	326
Medica	-----	882
Maxima	GGTGCTCAAAACCAAGAGACTATGGATGAGCTTCTACATGGCTTTTTCAGCCCATTTCC	1197
Reticulata	GGTGCTCAAAACCAAGAGACTATGGATGAGCTTCTACATGGCTTTTTCAGCCCATTTCC	1770
Valencia	GGAATTCGAAACCAAGAGAATATGGATGAGCTTTTACATGGCTTTTTCAGCCCGTTCCG	183
Pineapple	GGTGTTCAAAACCAAGAGACTATGGACGTAGCGTTTACATTTGCTTTTTCAGCCCATTTCC	386
Medica	-----	882
Maxima	TTGGAGGAGAAACACATGGCTTTTCACAGCACCAAGGCTGATGAATTCCTAGAGTGCAGT	1257
Reticulata	TTGGAGGACAAACACATGGCTTTTCACAGCACCAAGGCTGATGAATTCCTAGAGTGCAGT	1830
Valencia	TTGGAGGACAAACACATGGCTTTTCACAGCATCTCCTGGCACCAAGGCTGA-----	234
Pineapple	TTGGAGGACGAAAGACATGGTTTTCACACCATCTCTCGGTACCAAAAGGCTG-----	436
Medica	-----	882
Maxima	CTCAGTTGA	1266
Reticulata	TTCAGTTGA	1839
Valencia	-----	234
Pineapple	-----	436

Figura 31 – Fim.

Pineapple	-----	0
Valencia	-----	0
Medica	MSSCINPS-----	8
Maxima	-----	0
Reticulata	MSSCINPSTLVTSVNGFKCLPLTTNKAAIRIMAKNKPQCLVSAKYDNLTVDRRSANYQP	60
Pineapple	-----	0
Valencia	-----	0
Medica	-----TLVTSDEAYKRAEELRGKVKIAIKDVIPLDQLELIDNLQRLGLAHRF	57
Maxima	-----	0
Reticulata	SIWDHDFLQSLNSKYTDEAYKRAEELRGKVKIAIKDVIPLDQLELIDNLQRLGLAHRF	120
Pineapple	-----	0
Valencia	-----	0
Medica	ETEIRNILNNIYNNKDYNNWRKENLYATSLEFRLLRQHGYPVSVQEVFNFGKDDQGGFICD	117
Maxima	-----	0
Reticulata	ETEIRNILNNIYNNKDYNNWRKENLYATSLEFRLLRQHGYPVSVQEVFNGLKDDQGGFICD	180
Pineapple	-----	0
Valencia	-----	0
Medica	DFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEVMISKMEEDVFAEQAKRALELPL	177
Maxima	-----MEEAWQFASKHLKEVMISKSKEKHVFAEHAKRALELPL	39
Reticulata	DFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEVMISKSKEEHVFAEQAKRALELPL	240
Pineapple	-----	0
Valencia	-----	0
Medica	HWKVPMLERWFIHIYERREDKNHLLLELAKMEFNTLQAIYQEELKEIS-----	226
Maxima	HWKVPMLERWFIHVYEKREDKNHLLLELAKLEYNTLQAIYQEELKDISVQAFAPENDSK	99
Reticulata	HWKVPMLERWFIHVYEKREDKNHLLLELAKLEFNTLQAIYQEELKDISG-----	290
Pineapple	-----	0
Valencia	-----	0
Medica	-----	226
Maxima	KSQDTGLQKLSFARDSLVASFWSMGIGSEARFAYCRRIVTIAIALITVIDDYDVYGT	159
Reticulata	WVKDTGLGKLSFARDSLVASFWSMGIGSEPPQFAYCRRIVTIAIALITVIDDYDVYGT	350
Pineapple	-----	0
Valencia	-----	0
Medica	-----GWDINYALKHLPGYMKMCFALYNFVNEFAYYVLKQQDFDLLLLSIKNA	274
Maxima	LDELELFTAAVEMMDINYALNHLDPYMKLCFFALYNFVNEFAYYVLKQQDFDMLRSIKNS	219
Reticulata	LDELELFTAVERWDIHYALNHLDPYMKLCFFALYNFVNEFAYYVLKQQDFDMLRSIKNS	410
Pineapple	-----KELEFLE	7
Valencia	-----	0
Medica	PIPLEDKHMA-----FTASPGTK---G-----	293
Maxima	WLGLIQAYLVEAKWYHSKYTPTLGEFLENGLVSIAGPIVMTSAYLSGTNPIIQKELEFLE	279
Reticulata	WLGLIQAGLVEAKWYHSKYTPTLGEFLENGLVSIAGPIVMTSAYLSGTNPIIQKELEFLE	470
Pineapple	SNNIPDIQWSSKIFRLQDDLGTSTDELKRGDVKSIQCYMHETGVSEELAREHIKDLMR	67
Valencia	-----	0
Medica	-----	293
Maxima	SN--PDLVHWSCKIFRLQDDLGTSTDEIQRGDVPKSIQCYMHETGASEEVARKHIKDMTR	337
Reticulata	SN--PDFVRWSCKIFRLQDDLGTSSDEIQRGDVPKSIQCYMHETGASEEVAREHIKDMMR	528
Pineapple	QMwKKVNAYRANKDSPLSQTTADFMLNLVRASHFMYLHGDGHGVQNETMDVAFLLFRP	127
Valencia	-MwKKVNAYRADKDSPLSQTTVDLILNLVRMSHFMYLGDGRHGIRNQNEMDVGFTWLFQP	59
Medica	-----	293
Maxima	QMwKKVNAYRADKDSPLSQNTVDFMLNLVRMSHFMYLHGDGHGAQNETMDVASTWLFQP	397
Reticulata	QMwKKVNAYRADKDSPLSQNTVDFMLNLVRMSHFMYLHGDGHGAQNETMDVASTWLFQP	588
Pineapple	IPLEDEDMVFTPSLGTGK*-----	145
Valencia	VPLEDKHMFTASPGTK*-----	77
Medica	-----	293
Maxima	IPLLEEKHMFTAPKADEFLECSLS	421
Reticulata	MPLLEDKHMFTAPKADEFPECSFS	612

Figura 32 - Alinhamento das sequências de proteína dos genes “orange1.1t04362.1” (“Valência”), “orange1.1g045966m” (“Pineapple”), “Cg3g004130.1” (*C. maxima*), “Cm249680.1” (*C. medica*) “MSYJ216420.1” (*C. reticulata*).

Valencia	-TCCTCCCAGTGTGGTGTGACTTACCAAGCCACTGATGCACATGACACAGAAAAATAAA	59
Pineapple	-TCTCTATGATTGGATATTGTTAATCATTCTCTTT-AC--TTTTCCCTTC-AGCTTT	55
Medica	TTGGATATACAGATGAGTGAAGCTAGCTTACAGTTATAC-----TTGGC-AAAGAT	52
Maxima	TGTAATAAATAGAACCTTTATTGGTAGAATTGAATTTATGA--ATTTCTTGCTTTCTG	58
Reticulata	-----	0
Valencia	ACTAGTCACAATTTATAATTTTTGAGACAAAAACATCGTAATTTAAAAAGGATAAATCAA	119
Pineapple	TCTGCTTGTCTTTGATATGTTTCACC-CTGCGGCGTTTAAATTTTGATATGTTCC-----	109
Medica	TCTCAAATT--ATTCTATGGTTTGTG-GTGATGCACGAGGTTTTATATATAAATATAC	109
Maxima	TGTGCATTT--ATTGTGAGTTTATG-GAAAGACTCT-----TTAAAAATTTGTATGC	109
Reticulata	-----	0
Valencia	AGGAAAGGAACGGCAGGAGAGGTAAA-ATT-AATATTTTGCCTACTGCT---TTTTAAT	174
Pineapple	---AAATTTCCAATGTAATAAACTGAACAAATTAATTAGGATAACAAA-----	154
Medica	ATATATATAGGCAGAGGAGAAAGTTCATGTATTTATTTTCTTACTATTTTTTCTGAG	169
Maxima	AGGAAAAAAGAAAAAGAAAAATAAATAAA-----	139
Reticulata	-----	0
Valencia	ACTCCGAAGCATATCAAAATCCTGTTGCTTGAGTATGTAACATATGTGAATTTCAAATG	234
Pineapple	-----AATG--AAAAAATAATCATTGTACTAAT-	183
Medica	TTTTGAAAGCGTTAATTTTAAAGT--CTTA--ATAGTACAAAGATATTTTATTCTATA	224
Maxima	-----	139
Reticulata	-----	0
Valencia	AAAAAGAGGC-G--GTTAAGGAGTTTATAAGTAAA--AGAATAAGCTGGAAACAGGGTA-	288
Pineapple	-AGTC-----AATACCGTGTAGCCGCTACCCAACGACTG-----	216
Medica	TGGGGGGGGGGTGGAGGAGTACATCATACTGTGCGAACGAGGCAATATTGTGCCA	284
Maxima	-----GATTATACAACATTCATCCGAATGTGCGGATGATGTATGTGCTTCTGT	188
Reticulata	-----	0
Valencia	--AAAACATGCACGTGTGAGAGAGTGAAGGGAAGCTGCCAAACCGACCCAA-CTACA	344
Pineapple	---CAGAAAGTCATGATCCCAAATTTAAGATGGGTAGCTTGTCTGAT-----	259
Medica	CAAGACACATACATCATCCACACATTCGGATGATTTATTTCTTTTCTTTT-----	335
Maxima	CACAATATTGACCTCGTTCGCACAGTATGATGATGACGCTTCCACCCCTCCCTCCCTCC	248
Reticulata	-ACAATAAGACCTCGTTCGCACAGTATGATGATCTCTTTTTTT-----	44
	* * * * *	
Valencia	GTCCGGAACCCGACCCGGAACCCGGAACCTTGACCCGCCATAACTCCCATTT---C	400
Pineapple	-----TTTCTAACAATTGTTGG	276
Medica	-----TCTTTTTTTTCTGCATACAAATTTTTTAAAGAATCT	372
Maxima	CTCCCCC-CCCCCATGTGAATAAAACTTTGTACGATTAAGACTTAAAAATTAACG	307
Reticulata	-----TTC-CCCCAAATGAATAAAATACCTTTGTACTATTAAAGACTTAAAAATTAACG	98
	* *	
Valencia	CGGCCACAGTTTCGGCCGATCTTGTA-----	427
Pineapple	ATTACCAAGCTGGGCGCAGACTGGCC-----TGTATTCATTAC	315
Medica	TTCCATAAATACACAATAATGCACGAGAAATGACAAGAAATCATAAATTCATTTCT	432
Maxima	CTTTCAAAATCAGAAAAAATGAGTAAGAAAAATA-----ATCACATGAACCTCTCT	361
Reticulata	CTTTCAAAATCAGAAAAAAT-GAGCACAAAAATA-----ATCACATGAACCTCTCT	151
	* *	
Valencia	-----CCAATCTGAAGCTTAGAAGCCGAACGTGTTCCCTGCCATCCTTG	473
Pineapple	TCTGATGTTGCTCTATTTGTGAAAGTAGTGGAGGACA-CTTGAACCATTTAAACAAG	374
Medica	ACTAACAAAAGTTTTATTTATAC-ATTAATCTTGTT-TTATGCCGAAATAA-----	484
Maxima	G---CCTATATATGTATATATATATATAAACC-TCGGGCATCACCAC-----	411
Reticulata	TCTGCCTATATATATA-----	169
Valencia	TCGCCGAAAACCAACC----GGACCGCCGAGATCGAAGCTTGAACCCGCGACTGTTT	528
Pineapple	TAGTGAAGGCTGATGGGATGGTGAAGAAGACATTGGATGGATGTAAGCTCACTGTTTT	434
Medica	-----GACACAAAGTAAGTTAAGGAAA-----AAAAAAGGAACCAAAAGTTG	529
Maxima	-----AAACCATAGAATAATTTGAGAATCTTTGCCAAGCATAACTGTAAGCTAGCTTA	464
Reticulata	-----	169

Figura 33 - Alinhamento das sequências promotoras dos genes “orange1.1t04362.1” (“Valência”), “orange1.1g045966m” (“Pineapple”), “Cg3g004130.1” (*C. maxima*), “Cm249680.1” (*C. medica*) “MSYJ216420.1” (*C. reticulata*).

Valencia	-CACTTTGCTTCGCCGGGATTTTCGCCGGTTTTGGGTGACACGACCGTTGGATCCTGTT	587
Pineapple	CTAATGCGCTTCAAATAACCTTTTTG-ATAAGCTGCATAAATTAATCATGGTTTTTtCCTT	493
Medica	-----CAAACAATATCTTAATGTTG---AGGACTAA-CATCGAAATTCATT	572
Maxima	CAGTACATCTTAATATCCAATGTCTTCTTGCAATTAATCCCCAA-CCTTGGTTACCTCTG	523
Reticulata	-----	169
Valencia	CCCCAC-GACTCCCTCTTCCATTTCCGACCATCCATAGGCACCGAGAGTCACTGTT----	642
Pineapple	TTtCTTTCTTtCCGTTTTtTTtAAG-----G--TGCAAGCTTGTGTATATATA	541
Medica	TGTTAC-AGTTATAAGTACTTTTGCAGAAAATAAATT--AATAAATTTCAAATAATTA	629
Maxima	TAAATG-GTTTCAAATGTCTTCTCTTGCAACAAATAG--AGCAGCCGTCAGAATC---A	577
Reticulata	-----	169
Valencia	-----CT-----TCCGCCGGTCGAT---TGTTGGAATTCACGGCTGCCGAG-CTCG	684
Pineapple	GAGAAAGGAGATTGTGTATCCAGCTCTTtATTTTTCTTATTGATCATATCATAT-ATCA	600
Medica	TCAACAAAAAGTAGACTGGCCAGGTAG----ATGCTACTCAAAGTATACTG--CAAA	682
Maxima	TGGCCAAAAATAAGCCAGTCCAATGCC-----TTGTCCGCGCAAATATGACAATTTGAC	632
Reticulata	-----	169
Valencia	ATTCCGGCGCCGTTGCCGCGGTTGGATCTCACGCCG-GTACCATTGAAC-TCAGCGTG	742
Pineapple	TCTAGAGCAGAGGTTTATTGTGTAAAAAGTTATTAATGTCTAATTAATT-TTTTTCTT	659
Medica	TGT-----ATGTACC GAAACTATGAACC CAAAGCAGGAGGCCAAACAATAGTCATACTT	735
Maxima	AGTTGATAGGAGATCAGCAAACTACCAACCTTCAATTTGGGACCATGATTTTTTGCAGTC	692
Reticulata	-----	169
Valencia	ATTGGAACCTTCAG--ATTTGAGCTTCTAGCCAGCGTTGACC---ATATTCCGGTGAC	796
Pineapple	TTTCAGAGCTTGGAGTATTTTTtCTTTtCTTTTAATTTAAATGCGCTTGGGAAAGTATC	719
Medica	TTTCATGAG--GGA--ATTCTAACTTGCTAATGCATGTGTTTATAATAATCAACGATGTC	791
Maxima	ATTGAATAGCAACT--ATACGGTATCTTATTATAATTGTTATTATTACGTATTAATTTTC	750
Reticulata	-----	169
Valencia	CGTTGAC-----CGGCAAGGGCATTTTGGTAATTTCACACTATGAGGGCAATTTT	846
Pineapple	ATTTGTTTTtGTGTTTAGTTGAATGGATTTAAAAATTATTCAAATCTGAATTCATATGC	779
Medica	GAT-ATT-----TCTTTATAATACT-----CACAGTGAACAGAAACGCT-	828
Maxima	CTTTGTT-----CATTCAAATTTGG-----CACCATGAATAGCTAAAAA	789
Reticulata	-----	169
Valencia	GTAATTTCTGAGCATGTGGATATTTTAGTAATTC TAGAATTGAGGATTGGGTGTA----	902
Pineapple	ATAATTGATATATATATATATTTTTGGGGGTAAGTCGTTtATTTTTCTGGATGAAAAAC	839
Medica	-----GTAGAAGCATGTGTTAATAATCAACGAAACTATTTCTATAAGTGTATAG	879
Maxima	CTAAATGCTGTGCGTGTACAGGATGAATCATACAAAAGACGAGCAGAAGAGCTGAA-GGG	848
Reticulata	-----	169
Valencia	-----ATTACGATTCGAGGGTAATTCG---GTGATGTACGATTTTCAAGTATGT	949
Pineapple	ATCTAAAACCTTAATAATTTTCATTT---TTGCCACTGT---AAAAATTATATACTT	892
Medica	ATCACAAAAACAATGTTTAAAAGTTCTTTAATCTCTATATTTTGAGTTTTGTATATTT	939
Maxima	AAAAGTAAATGATAACGATTAAG-GAT-----GTAACCGAGCCTCTGGATCAGT	895
Reticulata	-----	169
Valencia	GTTAA-----TGATTACGGACTCAAGGGCATTTTAGTAAT---TTTATGGAC----	994
Pineapple	GTTATT----TATTTTATACGATTTCCCGGATTTCTgCTTGGCAACGACAGTCAAGA	947
Medica	TTTAATTCCTATATTTTTAAAAATATCTTAAAGTTCCCTTGTGCTTAAAAATTGAT----	995
Maxima	TGGAGCTGATTGATAACTTGCAAAGACTTGGATTGGCTCATCGTTTTGAGACTCAG----	951
Reticulata	-----	169
Valencia	--ACGGG--AG-----	1001
Pineapple	TGACAAGATTGTCAGAAAGGATTAAGTACTAAGTACCCAAAAAa-----TATTATTA	1001
Medica	-----AC-----TCTA-----	1001
Maxima	-----ATTAGGAACATATTGAATAATAGCTACAACAATAATTAAGATTATAATTG	1001
Reticulata	-----	169

Figura 33 – Fim.

Clementina	-- -ATGGCTTGCAAGTAACTCAATAGTTG-----	28
Pineapple	-----	0
Valencia	-----	0
Medica	-----	0
Maxima	-----	0
Reticulata	ATGTCCTTCTGCATTAATCCCTCAACCTTGTTACCTCTGTAATGGTTTCAAATGTCTT	60
Clementina	-----	28
Pineapple	-----	0
Valencia	-----	0
Medica	-----	0
Maxima	-----	0
Reticulata	CCTCTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGC	120
Clementina	CTTGTAATG-----GCTCCAATGATCCGTTGCAACGGCGGTCAGCCAATTACCATGCG	81
Pineapple	-----	0
Valencia	-----	0
Medica	-----	0
Maxima	-----	0
Reticulata	CTTGTGAGCCCAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACCTACCAACCT	180
Clementina	AGTATTTGGAACCTGAACTCATAGAGTCTTTACCCTTATACTTACGAGTTGTAT	141
Pineapple	-----	0
Valencia	-----	0
Medica	-----ATGTCCTTCTGCATTAATCCCTCAACCTTGTTACCTCTGTGGAAGCATACT	51
Maxima	-----	0
Reticulata	TCAATTTGGGACCATGATTTTTTGCAAGTCGCTGAATAGCAAGTATACGGATGAAGCATACT	240
Clementina	GCCAACAGATTAGATGAGTTGAAGCAAAGGCTAAAGATTTGTTTGCATCCGCCAAAGAA	201
Pineapple	-----	0
Valencia	-----	0
Medica	AAAAGACGAGCAGAAGAGCTGAGGGGAAAAGTGAAGATAGCGATTAAGGATG---TAATC	108
Maxima	-----	0
Reticulata	AAAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGATAGCGATTAAGGATG---TAATC	297

Figura 34 - Alinhamento das seqüências codificadoras dos genes “orange1.1t04363.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g045966m” (“Pineapple”), “CgUng021700.1” (*C. maxima*), “Cm249680.1” (*C. medica*), “MSYJ216420.1” (*C. reticulata*).

Clementina	AGCACTAGTGAACATTAAGCTAACTGACTCGGTGCAGAAGTTGGGAGTGGCATACCAT	261
Pineapple	-----	0
Valencia	-----	0
Medica	GAGCCTCTGGATCAGTTGGAGCTGATTGATAACTTGCAAAGACTTGGATTGGCTCATCGT	168
Maxima	-----	0
Reticulata	GAGCCTCTGGATCAGTTGGAGCTGATTGATAACTTGCAAAGACTTGGATTGGCTCATCGT	357
Clementina	TTTGAAGAAGAGATCAAAGAGGCCATGAATATTCTCAA-----GGAGAT	306
Pineapple	-----	0
Valencia	-----	0
Medica	TTTGAGACTGAGATTAGGAACATATTGAATAATATCTACAACAATAATAAGATTATAAT	228
Maxima	-----	0
Reticulata	TTTGAGACTGAGATTAGGAACATATTGAATAATATCTACAACAATAATAAGATTATAAT	417
Clementina	GCTACCATCAAAGATCTTAATGCAACGCTACTGCATTTTCGCCTTCTACGTGAACACGGC	366
Pineapple	-----	0
Valencia	-----	0
Medica	TGGAGAAAAGAAAATCTGTATGCAACCTCCCTTGAGTTCAGACTACTTAGACAACATGGC	288
Maxima	-----	0
Reticulata	TGGAGAAAAGAAAATCTGTATGCAACCTCCCTTGAATTCAGACTACTTAGACAACATGGC	477
Clementina	CATCCAGTTAGTACAGGTGTGTTTGATAAATTCAGAAAAGGGACGGGAGGTTCCATGAC	426
Pineapple	-----	0
Valencia	-----	0
Medica	TATCCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGACCAGGGAGGCTTCATTTGT	348
Maxima	-----	0
Reticulata	TATCCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGACCAGGGAGGCTTCATTTGT	537
Clementina	AATTTACGAGAAGACATAGAAGGGCTTTTGAATTTATTTGAAGCTTCATTCTTGGAAAT	486
Pineapple	-----	0
Valencia	-----	0
Medica	-----GATGATTTCAAGGGAATACTGAGCTTGCATGAAGCTTCGTATTACAGCTTA	399
Maxima	-----	0
Reticulata	-----GACGATTTCAAGGGAATACTGAGCTTGCACGAAGCCTCGTATTACAGCTTA	588
Clementina	GAAGGAGAGGATGTTCTAGAAGAAGCCAATATTTTTTGTACTGAGCATCTAAAGGAGTCA	546
Pineapple	-----	0
Valencia	-----	0
Medica	GAAGGAGAAAGCATCATGGAGGAGGCTGGCAATTTACTAGTAAACATCTTAAAGAAGTG	459
Maxima	-----	0
Reticulata	GAAGGAGAAAGCATCATGGAGGAGGCTGGCAATTTACCAGTAAACATCTTAAAGAAGTG	648
Clementina	TTAGGGAC-----GTTGGGGAGCAAAATCATACTGGCTGAGCAGGTACAACAATCTTTA	600
Pineapple	-----	0
Valencia	-----	0
Medica	ATGATCAGCAAGAACATGGAAGAGGATGTATTTGTAGCAGAACAAGCGAAGCTGCACTG	519
Maxima	-----	0
Reticulata	ATGATCAGCAAGAAGCAAGGAAGCATGTATTTGTAGCAGAACAAGCGAAGCTGCACTG	708
Clementina	GACATCCCTTCATATTGGAGGATGCCAAGAATTGAGGCTCAGAACTTCATCAAAATTATAC	660
Pineapple	-----	0
Valencia	-----	0
Medica	GAGCTCCCTCTGCATTGGAAAGTGCCAAATGTTAGAGGCAAGGTGTTTCATACACATTTAT	579
Maxima	-----	0
Reticulata	GAGCTCCCTCTGCATTGGAAAGTGCCAAATGTTAGAGGCAAGGTGTTTCATACACATTTAT	768
Clementina	CCCACAGATGATGAAAGCAGTCCAATTTTGTGACTCTAGCCAAGTTGGATTACAATTTA	720
Pineapple	-----	0
Valencia	-----	0
Medica	GAGAGAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGTAAAGTGGAGTTTAACT	639
Maxima	-----	0
Reticulata	GAGAAAAGAGAGGACAAGAACCACCTTTTACTTGAGCTCGTAAAGTGGAGTTTAACT	828
Clementina	GTACAATCCATACACCAACAAGAAGTGAAGGAGTTGGCAAGGTGGTGGAGTAATCTGGGT	780
Pineapple	-----	0
Valencia	-----	0
Medica	TTGCAGGCAATTTACCAGGAAGAACTAAAAGAAATTTAGGGTGGGACATCAATTTATGCT	699
Maxima	-----	0
Reticulata	TTGCAGGCAATTTACCAGGAAGAACTAAAAGCAATTTAGGGTGGTGGAAAGGATACAGGT	888

Figura 34 – Continuação.

Clementina	TTTAAAGAGAAAC TAAGTTT GCCAGAGACCGGTTGATGGAAAAATTATTTGTTGGTGATG	840
Pineapple	-----	0
Valencia	-----ATG	3
Medica	TTGAAGCACCTTCCGGGCTATATGAAAATGTGTTTCTTGCGCTTTACAACCTTGTAAAT	759
Maxima	-----ATG	3
Reticulata	CTTGAGAGAAAATTGAGCTTTCGAGGGACAGCTTGGTAGCATCCTTTTTATGGAGCATG	948
Clementina	GGCCTTTGTTTCAAAGCACAGTTTTCTAAGTGCAGAATTGGC-----CTCACAAAAT	892
Pineapple	-----	0
Valencia	GGGATAGGATCTGAGCCTCGATTGGCCTACTGCAGGAGAATA-----CTCACAACTCT	55
Medica	GAATTTGCTTA-----TTACGTTCTCAAACAACAGGATTTGATTTGCTTTGAGCATAA	814
Maxima	GGGGTAGGGTCTGAGCCTCAATTCGCCTATTGCAGGAGAATA-----GTCACAATTG	55
Reticulata	GGGATAGGGTCTGAGCCTCAATTCGCCTATTGCAGGAGAATA-----GTCACAATTG	1000
Clementina	TTGTATGCATATTAAC TGCATTGATGACATTTATGATGTATATGGATCAATAGATGAGC	952
Pineapple	-----	0
Valencia	TGATTTCTATAATTACAGTGATTGATGACATTTATGATGTTTATGGAACCTGGATGAAC	115
Medica	AAAATGCACCCATTCCCTTGGAGG-----ACAAAC	844
Maxima	CAATAGCTCTAATTACAGTGATTGATGACATATATGATGTTTATGGAACCTTGGACGAAC	115
Reticulata	CAATAGCTCTAATTACAGTGATTGATGACATTTATGATGTTTATGGAACCTTGGACGAAC	1060
Clementina	TTGAACTCTTTACAGAAGCAGTGAAAAGTTTTCCACCATCTTATATATATCCTTTTGTT	1012
Pineapple	-----	0
Valencia	TTGAGCGATTCCCGATGCTGTTGAGAGG-----	144
Medica	ACATGGCTTTCACAGCATCTCTGGCACC-----	873
Maxima	TTGAGCTATTCAC TGTGCTGTTGAGAGG-----	144
Reticulata	TTGAGCTATTCAC TGTGCTGTTGAGAGG-----	1089
Clementina	TTATGGGGATTTCCCTAAAATCCGGTGGGAAATGGGGCAGTACTGGAGAGCTGCCAG	1072
Pineapple	-----	0
Valencia	-----TGGGACATCAATTATGCTTTCAACCACCTTCCGG	178
Medica	-----AAAGGCTGA-----	882
Maxima	-----TGGGACATC-----	153
Reticulata	-----TGGGACATCCATTATGCTTTGAACCACCTTCCGG	1123
Clementina	AATATATGCAGATTTGCTACTTGCCATGTTTAACTTTGAAAATGAGTTGGCATGTGATG	1132
Pineapple	-----	0
Valencia	ACTATATGAAATTGAGTTATTTTGCTCTTACAACCTTGTAAATGAATTTGCTATTACG	238
Medica	-----	882
Maxima	-----	153
Reticulata	ACTACATGAAATTGTTTTTTTTGCGCTTTACAACCTTGTAAATGAATTTGCTATTACG	1183
Clementina	TTATGAAAATTCATGGCCTCAATACTCTATCCTACATTAAGAAAAGAGTGGGAAAATCTGT	1192
Pineapple	-----	0
Valencia	TACTCAAGCAACAGGATTTGAAATGCTTCGGAGTATAAAAAAAGCATGGCTTGGCTTAA	298
Medica	-----	882
Maxima	-----CATTATTGGCTTGGCTTAA	172
Reticulata	TACTCAAAACAACAGGATTTGATAGCTTCGGAGTATTA AAAATTCATGGCTTGGCTTAA	1243
Clementina	GTACATCATACCTAGTAGAAGCCAGATGGTTTAGCAAAGGTTACACGCCAACTGCGAAGG	1252
Pineapple	-----	0
Valencia	TACAAGCCTACTTAGTGAGGCGAAATGGTACCATAGTAAGTACACCCAACACTGGGAG	358
Medica	-----	882
Maxima	TACAAGCCGGCTTAGTGAGGCGAAATGGTACCATAGTAAGTACACCCAACACTGGGAG	232
Reticulata	TACAAGCCGGCTTAGTGAGGCGAAATGGTACCATAGTAAGTACACCCAACACTGGGAG	1303
Clementina	AATACATAGAAAATGCATGGGTTTTCAGTGGGAAGCCCTGCTGCCATTGTCCATGCCTATA	1312
Pineapple	-----	0
Valencia	AATTCTTGAAAAATGGACTGGTATCAATAGCAGGCCAATAGTACAATAAGTGCATACC	418
Medica	-----	882
Maxima	AATTCTTGAAAAATGGATTGGTATCAGTAGCAGGCCCTATAGTAACAATGAGTGCGTACC	292
Reticulata	AATTCTTGAAAAATGGATTGGTATCAGTAGCAGGCCCTATAGTAACAATGAGTGCGTACC	1363
Clementina	TCTTGC-TACAAC TCCAAGGAAGCAATGCCTTGACCGAAAAATCACTCAGCTGCCTCAA	1371
Pineapple	-----AAGGAG-----CTG-----GAATTTCTA	18
Valencia	TTTCTGGTACAAATCCGATCATTGAG-----AAG-----GAGCTAGAA	456
Medica	-----	882
Maxima	TTTCTGGTACAAATCCAATCATTGAG-----AAG-----GAACTAGAA	330
Reticulata	TTTCTGGTACAAATCCAATCATTGAG-----AAG-----GAACTAGAA	1401

Figura 34 – Continuação.

Clementina	GTCGAACATGGCTATGATGAGATGATATATTGGTCATCTCTCATCAGTCGGCTCAGTAAC	1431
Pineapple	GAAAGTAACAATATCCAGATAAATCAATGGTCATCCAAGATTTCCGTCTTCAAGAT	78
Valencia	TTTCTAGAAAAGTAATCCAGATTTAGTTCACTGGTCATGCAAGATTTTCGTCTTCAAGAT	516
Medica	-----	882
Maxima	TTTCTAGAAAAGCAATCCAGATTTTCGTTCACCTGGTCATGCAAGATTTTCGTCTTCAAGAT	390
Reticulata	TTTCTAGAAAAGCAATCCAGATTTTCGTTCGTGGTCATGCAAGATTTTCGTCTTCAAGAT	1461
Clementina	GATTTGGGAAATCCCGGTTGAGTTGAAGAGAGGGCGACGTGGCGAAATCTATTCAGTGC	1491
Pineapple	GATTTGGGAACTTCAACG-ATGAATTAAGAGAGGGGATGTTGGAAATCAATCCAGTGT	137
Valencia	GATTTGGGAACTGCATCGCACGAGATACATAGAGGGGATGTTCCGAAATCAATCCAGTGT	576
Medica	-----	882
Maxima	GATTTGGGAACTTCGTGGATGAGATACAGAGAGGGGATGTTCCATAATCAATCCAGTGT	450
Reticulata	GATTTGGGAACTTCGTGGATGAGATACAGAGAGGGGATGTTCCGAAATCAATCCAGTGT	1521
Clementina	TACATGATTGAAGAAGGCATATCAGAAGAAGAAGCAAGGACCGTATAAAAAGTTTGATA	1551
Pineapple	TATATGCATGAAACTGGTGTCTCAGAGGAACCTGCTCGTGAACACATAAAGGATTTGATG	197
Valencia	TACATGCATGAAACTGGTGTCTCGGAGGAAGTTACTCGTGAACACATCAAGGATGTGATT	636
Medica	-----	882
Maxima	TACATGCATGAAACTGGTGTCTCGGAGGAAGTTGCTCGTGAACACATCAAGGATATGATG	510
Reticulata	TACATGCATGAAACTGGTGTCTCGGAGGAAGTTGCTCGTGAACACATCAAGGATATGATG	1581
Clementina	ATTTACTCTGGAAAAAGCTGAATGGCAAGAATCTTTATAAAAAGTGATTTTCCAG--AA	1608
Pineapple	AGACAGATGTGGAAGAAGGTGAATGCATACAGAGCTAATAAAGATTCTCCTTTATCTCAA	257
Valencia	AGACAGATGTGGAAGAAGGTGAATGCATACAGAGCTGATAAAGATTCTCCCTTATCTCAA	696
Medica	-----	882
Maxima	AGACAGATGTGGAAGAAGGTGAATGCATACAGAGCTGATAAAGATTCTCCCGTATCTCAA	570
Reticulata	AGACAGATGTGGAAGAAGGTGAATGCATACAGAGCTGATAAAGATTCTCCCTTATCTCAA	1641
Clementina	AGCATGGCGAAAAATGTGTTTAGACATGCTAGAACTGCACATTGCA---TTTTCCATGGA	1665
Pineapple	ACTACAGCTGACTTCATGTTGAATCTGGTGAGAGCGTCCCATTTTATGTATCTACATGGA	317
Valencia	ACTACAGTTGACTTTCATGTTGAATCTTGTGAGAATGTCCCATTTTATGTATCTACATGGA	756
Medica	-----	882
Maxima	AATACAGTTGACTTTCATGTTGAATCTTGTGAGAATGTCCCATTTTATGTATCTACACGGA	630
Reticulata	AATACAGTTGACTTTCATGTTGAATCTTGTGAGAATGTCCCATTTTATGTATCTACACGGA	1701
Clementina	GATGGTATAGGAACATCAACCGGGTTTCTAGAGATCGTTGGTCTCTTTAATACTTGAG	1725
Pineapple	GATGGGCATGGTGTCAAACCAAGGAGACTATGGACGTAGCGTTTACATTGCTTTTTCGG	377
Valencia	GATAGGCATGGAATTCGAAACCAAGAGAATATGGATGTAGGTTTACATGGCTTTTTCAG	816
Medica	-----	882
Maxima	GATGGGCACGGTGTCAAACCAAGGAGACTATGGATGTAGCTTCTACATGGCTTTTTCAG	690
Reticulata	GATGGGCACGGTGTCAAACCAAGGAGACTATGGATGTAGCTTCTACATGGCTTTTTCAG	1761
Clementina	CCTATACCAGTTGAATTGTAA-----	1746
Pineapple	CCCATTCCCTGGAGGACGAAGACATGGTTTTACACCATCTCTCGGTACCAAAGGCTG-	436
Valencia	CCCCTTCCGTTGGAGGACAAACACATGGCTTTCACAGCATCTCTGGCACCAAAGGCTGA	876
Medica	-----	882
Maxima	CCCATTCCCTGGAGGACAAACACATGGCTTTCACAGCACCAAAGGCTGATGAATCCCA	750
Reticulata	CCCATGCCCTGGAGGACAAACACATGGCTTTCACAGCACCAAAGGCTGATGAATCCCA	1821
Clementina	-----	1746
Pineapple	-----	436
Valencia	-----	876
Medica	-----	882
Maxima	GAGTGCAGTTTCAGTTGA	768
Reticulata	GAGTGCAGTTTCAGTTGA	1839

Figura 34 – Fim.

Clementina	-----MACSNNSIVACNGSNDPLQRRSANYHA	27
Pineapple	-----	0
Valencia	-----	0
Medica	MSSCINPS-----	8
Maxima	-----	0
Reticulata	MSSCINPSTLVTSVNGFKCLPLTTNKAAIRIMAKNKPVQCLVSAKYDNLTVDRRSANYQP	60
Clementina	SIWNPELIESFTTPYTYELYANRLDELKQKAKDLFASAKESTSELLKLTDSVQKLGVAHY	87
Pineapple	-----	0
Valencia	-----	0
Medica	-----TLVTSDEAYKRAAEELRGKVKIAIKDVIE-PLDQLELIDNLQRLGLAHR	56
Maxima	-----	0
Reticulata	SIWDHDFLQSLNSKYTDEAYKRAAEELKGVKIAIKDVIE-PLDQLELIDNLQRLGLAHR	119
Clementina	FEETKEAMNLIKGA----TIKDLNATSLHFRLREHGHVSTGVDFKFRKRDRGRFHD	142
Pineapple	-----	0
Valencia	-----	0
Medica	FETEIRNILLNIIYNNKDYNRKENLYATSLEFRLRQHGYPVSVQEVNFGKDDQGGFI-	115
Maxima	-----	0
Reticulata	FETEIRNILLNIIYNNKDYNRKENLYATSLEFRLRQHGYPVSVQEVNFGKDDQGGFI-	178
Clementina	NLREDIEGLNLFASFLGIEGEDVLEEFANIFCTEHLKESLGT--LGSKIILAEVQVQSL	200
Pineapple	-----	0
Valencia	-----	0
Medica	--CDDFKGILSLHEASYYSLEGESIMEEAWQFTSKHLKEVMISKNMEEDVFAEQAKRAL	173
Maxima	-----	0
Reticulata	--CDDFKGILSLHEASYYSLEGESIMEEAWQFTSKHLKEVMISKNMEEDVFAEQAKRAL	236
Clementina	DIPSYWRMPRIEAQNFIKLYPTDDESSPILLTLAKLDYNLVQSIHQELKELARWWSNLG	260
Pineapple	-----	0
Valencia	-----	0
Medica	ELPLHMKVPMLEARWFIHIYERREDKNHLLLELAKMEFNTLQAIYQEEELKEISG----	227
Maxima	-----	0
Reticulata	ELPLHMKVPMLEARWFIHVYERREDKNHLLLELAKLEFNTLQAIYQEEELKDISGWNKDTG	296
Clementina	FKEKLSFARDRLMENYLVMGLCFKAQFSKCRIGLTKFVCILTAIDDIYDVYGSIDELEL	320
Pineapple	-----	0
Valencia	-----MGIGSEPRLAYCRRILTIISITVDDIYDVYGTLDLELER	41
Medica	-----	227
Maxima	-----MGVGESEPQFAYCRRIVTIAIALITVDDIYDVYGTLDLELER	41
Reticulata	LGEKLSFARDSLVASFLWSMIGSEPPQFAYCRRIVTIAIALITVDDIYDVYGTLDLELER	356
Clementina	FTEAVKSFPPSYILSFCFMGISPKIRWEIGAVLEELPEYMQICYLAMFNFGNELACDVMK	380
Pineapple	-----	0
Valencia	FTDAVE-----RWDINYAFNHLDPYMKLSYFALYNFVNEFAYYVVK	82
Medica	-----WDINYALKHLPYMKMCFALYNFVNEFAYYVVK	261
Maxima	FTAAVE-----RWDIHY-----	53
Reticulata	FTAAVE-----RWDIHYALNHLDPYMKLCFFALYNFVNEFAYYVVK	397
Clementina	IHGLNTLSYIKKEWENLCTSYLVEARWFSKGYPTAKEYIENAWVSVGSPAIVHAYILL	440
Pineapple	-----	0
Valencia	QQDFEMLRSIKKAWLGLIQAYLVEAKWYHSKYPTLGEFLEGLVSIAGPIVITISAYL--	140
Medica	QQDFDLLLLSIKNAPILEDKHMMA-----FTASPGTK---G-----	293
Maxima	-----WLGLIQAGLVEAKWYHSKYPTLGEFLEGLVSVAGPIVITMSAYL--	98
Reticulata	QQDFDMLRSIKNSWLGLIQAGLVEAKWYHSKYPTLGEFLEGLVSIAGPIVITMSAYL--	455
Clementina	QLQGSNALTENSLCKLVEHGYDEMIYSSLSRSLNDLGNSAVELKRGDVAKSIQCYMI	500
Pineapple	-----KELEFLES--NNIPDIIQWSSKIFRLQDDLGTSTDELKRGDVMKSIQCYMH	49
Valencia	--SGTNPIIEKELEFLES--N--PDLVHWSCKIFRLQDDLGTASHEIHRGDVPKSIQCYMH	195
Medica	-----	293
Maxima	--SGTNPIIQKELEFLES--N--PDFVHWSCKIFRLQDDLGTSSDEIQRGDVPKSIQCYMH	153
Reticulata	--SGTNPIIQKELEFLES--N--PDFVHWSCKIFRLQDDLGTSSDEIQRGDVPKSIQCYMH	510
Clementina	EEGISEEARDRIKSLIIYSWKKLNGKNLYKS--DFPESMAKMLDMSRTAHC--IFHGDGI	558
Pineapple	ETGVSEELAREHIKDLMRQMKKVNAYRANKDSPLSQTTADFMLNLVRASHFMYLHGDGH	109
Valencia	ETGASEEVTREHIKDVIRQMKKVNAYRADKDSPLSQTTVDLILNLVRMSHFMYLHGDGRH	255
Medica	-----	293
Maxima	ETGASEEVAREHIKDMRQMKKVNAYRADKDSPVSNQTVDFMLNLVRMSHFMYLHGDGH	213
Reticulata	ETGASEEVAREHIKDMRQMKKVNAYRADKDSPLSQTTVDLILNLVRMSHFMYLHGDGH	570
Clementina	GTSTGVSRLVLSILEPIVEL-----	581
Pineapple	GVQNQETMDVAFTLLFRPIPLEDEDMVFTPSLGTGK*-----	145
Valencia	GIRNQENMDVGFQVLPVPLEDKHMAFTASPGTK*-----	291
Medica	-----	293
Maxima	GAQNQETMDVASTWLFQPIPLEDKHMAFTAPKADEFPECSFS	255
Reticulata	GAQNQETMDVASTWLFQPMPLLEDKHMAFTAPKADEFPECSFS	612

Figura 35 - Alinhamento das sequências de proteína dos genes “orange1.1t04363.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g045966m” (“Pineapple”), “CgUng021700.1” (*C. maxima*), “Cm249680.1” (*C. medica*), “MSYJ216420.1” (*C. reticulata*).

Valencia	TGCTCCAT-----AAGAAGGATGCTACGAACCAGTTCTCTCGCAGAGCTCAA	46
Maxima	TGCTCCAT-----AAGAAGGATGCTACCAAGCTGCCCTCGCAAAGCTCAA	46
Pineapple	-TCTCTATGATTGGATATTGTTAATCATTCTCTTTACTTTCCCTTCAGCTTTCTG	59
Medica	TTGGATATACAGATGTAGTGAAGCTAGCTTACAGTTATA-CTTGGC-AAAGATTCTCAA	58
Clementina	-----GGGAGAATATAATTA-----TATGATTACAA	29
Reticulata	-----	0
Valencia	TTTTTCTCCAATACCCGTATCCTTCCACCACCTTCATGGGAAAAATAAACGAATATTAC	106
Maxima	TTTCTCTCCAAGACCTGTATCCTTCCACTACCTTGATAAGGAAATGAAACGAATATTAC	106
Pineapple	CTTGGC--TTTGATATGTTTACCCTGCGCGTTAATTTTTGATATGTCCAAATTTCC	117
Medica	ATTATT-CTATGGTTTGTGGTGTGCACGAGTTTTATATAT--ATAAATACATATAT	115
Clementina	TTTGTA---GGGGAATGCTTAGAAGAACAGATACAATATAACAATATATATACATATAC	86
Reticulata	-----	0
Valencia	GATTTACGACACAGCTTACATATATCTATATAT-----AGAGAGTTAGCTTTCA	155
Maxima	GA-----TACATGTTGATATATCTATATAT-----ATAGAGTCAGCTTTTC	148
Pineapple	AATGTAAAAAAGCTGAACAAATTAATAGGATAACAAAAATGAAAAAATAATCATTGT	177
Medica	ATAGGCAG--AG--GAGAAGTTCATGTGATTTA-----TTTTCTTACTCATTTTT	161
Clementina	ACACACAC--ACACACAGAGTTCTTAAATAG-----AAAGAAAGCATCAAGTT	134
Reticulata	-----	0
Valencia	ATCTGGAATTCTGAAGACT-CTTCTCTGATG-----C-----A	188
Maxima	ATCTGGAATTCTGAAGAGT-CTTCTGTAATG-----C-----A	181
Pineapple	ACTA--ATAGTCAATACC-GTGTAGCCGCTACCCAACGA-----CT-----G	216
Medica	TTTC-----TGAGTTTTGAAAGCGTTAATTTTTA-----AGTCTTAATAG	202
Clementina	GTTGAGAATAGTTGCAAGTTGTGAGAGGGATGCCAAATTCATCAATTAACCTGATACAAT	194
Reticulata	-----	0
Valencia	AACATTCACATTTTATAAAGCGCATGACTCGTGGCTTTCCAATAATTTATATATTAGAAT	248
Maxima	GACAATAGCACTTTATAAAGTGTATAAGGGCTTTACAATAGNNNNNTAATTAATTAANN	241
Pineapple	CAGAAAGCATGATCCCAAAATGAAGATGGGTAGCTTGTGATTTTCAACAAATTTGTT--	274
Medica	TACAAAGATATTTTTATTCATATGGGGGGGGGGGGTGGGA--AGGAGTACATCACT--	258
Clementina	TGCAGAGTCAACG--ATCATGTTTACGTGAACCTTGCT--TTCCTTGACTATTATT--	247
Reticulata	-----ACA--AT-----AATGACC--TCGTTG--	19
Valencia	T---GAGGATTGGGTGTAATTACGATTCGAGGGTAA-----TTCGGTGA	290
Maxima	NNNTAAAAATTAGGTTAAATTTGAAGGAGTAGATTC-----GGTTGTAA	287
Pineapple	---GGATTACCAAGC-----TGGGCGCAGACTGGCCTGTATTCA-TTCACCTCGATG	322
Medica	---GTGCAACGAGGTCAATATTGTGCCACAAGACAC--ATACATCATCCACACATTCC	312
Clementina	---GGGTGTGTGAGGT-----TGCATTAATTACCTTATTCCTCAAAGATTTTA	294
Reticulata	---CACAGTATGATGT-----ACTCCTTT--TTTTTCCCCCAAAATGAATA	61
Valencia	TGTACGATTTACAGATATGTGTTAATAATTACGA---ACTCAAGGGCAT-----T	338
Maxima	AGTAGTTTTTTTAGCAATTTAACAATTTATCCG---ATAAATGGGATG-----A	335
Pineapple	GTTGCTC-----TATTTGTGG-----AAA---GTAGTGGAGGACACT	356
Medica	GATGATTTATTTCTTTTTCTTTTTCTTTTTCTGCTACAAAATTTTTAAAGAACT	372
Clementina	GATAACCTTTTTATATACATTTATGATTTTTCATCAAAAATAATACAC---AA---	346
Reticulata	AAATACCTTTGACTATTAAGACT-TAAAAATTAACGCTTTCAAAACTC---AG---	112
Valencia	TTAGTAATT-TTATGGACAGC-----GGAGTTGTCAATTATGGATAGATGTT-----	384
Maxima	CATGTCATTTTATCAATATATATCATATGATATGTCATGTTTACTAGGTAATGG---	392
Pineapple	TGAAACCATTTAAACAAGTAGTG--AAGGCTGATGGGATGGTGAAG-AAGACATTTGAT	413
Medica	TTCCATAAATACACAATAAATG--CACGCAGAAATGACAAGAAAT--CATAAATCAAT	429
Clementina	ATACACAGATGCACCATACGTA-----TATTAAGTGTATATAGTATAATAAAAA	396
Reticulata	AAAAAATGAG--CACGAAAAATA-----AATCA-----	138
	* *	
Valencia	-----CGTTTCGAGTTTATTG--CATAAAATTTAGTCATAATTCGATTTACTGAA---	433
Maxima	---GATGACATGCTTTTTTTA--ATCAAAGTTTCATCAAT-----CTTAAA---	434
Pineapple	GGATGTAAGCTCACTGTTTTCTAATGCGCTTCAAATAACCTTTTTGATAAGCTGCTAAA	473
Medica	TCTACTAACAAAAGTTTTATTT--ATTACATTA---TACTCTAAATCACTGTTATTCCTCATACATTCTA-----	462
Clementina	TACTCTAAATCACTGTTATTCCTCATACATTCTA-----	431
Reticulata	-----C-----	139
Valencia	----AA-TCATTATGTCGTTTCTTGATTTAGGAGGATCCA-----CGAGCGAGAACC	481
Maxima	----AA-ACTAGATTACCTTAGAATGTCAGCGTTTGCAA-----CGGAAGTTAACA	482
Pineapple	TTAATCTATGGTTTTCTTTTTCTTTCTTCCGTTTTTtTtAAGGTGCAAGCTTGTG	533
Medica	----ATCTGTTTTATGCG-----GAAATAAGACACAAAGTAAAGTTTAA	502
Clementina	----ATAGTATTATAACATATCAT--TATCCATTTGATAATGACTACGGTTGTTTCAA	484
Reticulata	-----	139

Figura 36 - Alinhamento das sequências promotoras dos genes “orange1.1t04363.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g045966m” (“Pineapple”), “CgUng021700.1” (*C. maxima*), “Cm249680.1” (*C. medica*), “MSYJ216420.1” (*C. reticulata*).

Valencia	GGTCCGCGGACGTGGACGATAACCGACCGTGAACACCGTCACTGTGAGTGAAT---ATA	538
Maxima	GATTAGTGGACGGCAGA---AGTGTTTTGTCAACTTAGGATATATAAGTGATAC---ACT	536
Pineapple	TATATATAGAGAAAGGAGATTGTATCCA---CGTCTTTEATTTTTCTTATTGATCATA	590
Medica	GGAAAAAAGGAAACACAAAGTTGCAACCAATATCTTAATGTTGAGGACT-----A	556
Clementina	AGTATATAAAA-----ATATGTTACAATAAGACGTTCAATTAATCGGACT-----G	530
Reticulata	-----	139
Valencia	CAAAACCTATTTTCATAGTTAATTATGATAGTAAATCATGTTTGCAGAAATAAGTATTTTA	598
Maxima	TGAAAAGTGTT-----CACACACGTTTGATACGGG---TGTC	571
Pineapple	TCATATATCATCTAGAGCAG-----AGGTTTATTGTGTGTTAA-----AA	630
Medica	ACATCGAAATCTATTGTTA---CAGTTATAAAGTACTTTTGCAGAAAA---TAAA	607
Clementina	ACCAAAATATTATGGCAGTA-----TGGTGGATACAC---C---AAAC	567
Reticulata	-----	139
Valencia	AATATTCTGATTTAATGACTTCTCGAA-----CT-----AGATGTTATTCACGCAT	645
Maxima	TTGTTACTGTTACATGACGACTTTCACAGTGACGGTACGTATGACGTTCTGACGCAAT	631
Pineapple	GTTATTAATGTCTAATTAATTTTT-----	654
Medica	TAAATAAATTTCAAATAATTATCAACAAAA-----GTAGACTGGGACGGTAG	656
Clementina	TTGATTCAATGATTAGTAGGGATGCAAAAACA-----TCGGGTCTGGGCTCGGGC	616
Reticulata	-----	139
Valencia	TGGTATATTATTA-----AAGTATTGATTAATGATTTTGCCT-----ATCGACTTTGA	694
Maxima	TCATAGACGATCGATGACAGTGGCATTGACCGATGATGGCATTGACTGATGAGGTGAC	691
Pineapple	--TcTTTTTCAGACGTTGGAGTATTTTCTTTCTTTTTAA-----TTTTAA	700
Medica	ATGTCTACTCAAAAGTATACTGCAAAATGATGTAC-CGAAAC-----TATGAA	703
Clementina	TTGGCCAAACCCAAC---CCGACCTGATCAATAG-AGAA-----TT-AAA	656
Reticulata	-----	139
Valencia	ATGAGCATGATAGTATTTAAAAAATAGAAAAGTGGATTCAAATGTGGTATGATTTAAAA	754
Maxima	ACGATCCTGTTGGGCTAAAATCTTATGTACTGTTGATGGTGACGTGGCAGCATATCAGT	751
Pineapple	ATGCGCTTGGGAAAGTATCATTGTTTTt-GTGTFTA-----	736
Medica	CCCAAAGCAGGAGGCAAAACAATAGTCATA-CTTTTTCATGAGGG-----	746
Clementina	GCCCACCTTAAAAAACCATACGTATTT-ATATTTAGGGTCTGGGTCGGGCCGACCCGA	715
Reticulata	-----	139
Valencia	ATATGGTTAA-----GAGGTATGTGAATATGAGTATAATGATTGTTTTGAAATCA	805
Maxima	GGATAAAAAATCTC---GCGTACGGTACATGCATCACATAGGATTATTT-TCAACCAA	805
Pineapple	-----GTTTGAATGGATTAAA---AATTATTCAAATCT	767
Medica	-----AATTCTAACTTGCTAAT---GCATGT-----	769
Clementina	ATCGGGCAACATCGGGTCTGGGCTAGGCTCGACCTACCGAAA---CCATTTTCAACCCA	772
Reticulata	-----	139
Valencia	TTATACAGTACCCTTCCC-----TCTAGATACA-----ATGATACAGGTGATATG	850
Maxima	ACCGGCTCTAGTGTTCACCGGTCAAACCGGTACT-----GTTTCATCCGGAGTCA	857
Pineapple	GAATT-----CATATGCATAATTGATATATATATATTTTTGG---GGGGTAA	812
Medica	-----GTTTATAATAATCAACGATGTCGATATTCTTTATAATACTCACAGTGAACAG	822
Clementina	CAATTCAATGTTGAAAAATCAACTTCTTATTGCA--TATATAAGAATTGCAATGAGGCA	830
Reticulata	-----ATGAACCTTCTCTCTGCC--TATA-----	161
	*	
Valencia	AGATGAGAGGCCCTTGGGGCCGCTGAACACACATAGAGGCTTTTGG-----CCG	901
Maxima	AACCGTGTACTGTTCA--TCCGCGTGGTCAAACCGTACTGTTGAC-----TGA	906
Pineapple	AGTCGTTtATT--TTT---CTGGATGAAAAACATCTAAACCTTAATAATTTTCATTTT	866
Medica	AAACGTGTAGAAGCAT---GTGTTAATAATCAACGAAACTATTTCT--ATAAGTCA	876
Clementina	----ATGAAGCATCTA---CCATTTAACTAATAAATAATTTATTTTT--TAAAA-CCA	879
Reticulata	-----	161
Valencia	TGT-----GTTTGGGCGCTTTTGC--CTTTGGGGGCATATG	936
Maxima	TGA-----CGTGGCGCAATCCTGAGCTGTCCAAACTGTTTTT	943
Pineapple	TGCCACTGTAAAAATATATATACTTGTATTTTATTTTACGATTTCCGGGATTTCTg	926
Medica	TAGATCACCAAAACAATGTTT---AAAAGTCTTTTAACTCTATATTTTGGATTTTg	932
Clementina	TGA---TACACAAATATATAT---CGAATTTTTAATGCAATTAATAA---	924
Reticulata	-----	161
Valencia	CATCCGG-----TATGATGATTACAGAGATA--CATATATGAGATATAGACAGATATTG	988
Maxima	AATCCGA-----TGCCATGATTTACTCCATG--TATCTATAAAAAGGGGCTCCCCC	995
Pineapple	cTTGGCAACG---ACCAAGTCAAGATGACAAGATTGTGAGAAAGGATTAAGTACTAAGTAC	983
Medica	TATATTTTAAATTCCTATATTTTAAAAATA---TCTTAAAGTCTCT-----TG	979
Clementina	---AAACACAAATGCAATTAATAAATAAATA--CACAAATGTAATCCACAACCATTTTA	979
Reticulata	-----TA	163
Valencia	AGATACAAATGAT----- 1001	
Maxima	CTCTAA----- 1001	
Pineapple	CCCAAAAAaTATTATTA----- 1001	
Medica	T-CGTAAAAATATTGACTCTA 1001	
Clementina	T-CCATACACAATTCATTTAAC 1001	
Reticulata	T-ATATA----- 169	

Figura 36 - Fim.

Clementina	-----	0
Valencia	-----	0
Medica	-----ATG	3
Maxima	-----	0
Pineapple	ATGAGAATCTTTGCCAAGTATAACTGTAAGCTAGCTTACACTACATCTGTATATCCAATG	60
Reticulata	-----	0
Clementina	ATGGCTTGCAAGTAACTCAATAGTTGCTTGTAAAT-----GGC-----	39
Valencia	-----	0
Medica	TCTTCTCCATTAATCCCTCAACCTTGGTTACCTCTGTAAATGGTTTCAAATGCTTCCCT	63
Maxima	-----	0
Pineapple	TCTTCTGCATTAATCCCTCAACCTTGGCTACCTCTGTAAATGGTTTCAAATGCTTCCCT	120
Reticulata	-----	0
Clementina	-----	39
Valencia	-----	0
Medica	CTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCACTCCAATGC---	120
Maxima	-----	0
Pineapple	CTTCCAACAAATAGAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGCCTT	180
Reticulata	-----	0
Clementina	-----TCCAATGATCCGTTGCAACGGCGGTCAGCCAATTACCATGCGAGT	84
Valencia	-----	0
Medica	-----	120
Maxima	-----	0
Pineapple	GTCAGCGCAAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACCTCAACCTTCA	240
Reticulata	-----	0
Clementina	ATTTGGAACCTGAACTCATAGAGTCCTTTACCACTCCTTATACTACGAGTTGTATGCC	144
Valencia	-----	0
Medica	-----CTTGATGAAG-CATACAAA	138
Maxima	-----	0
Pineapple	ATTTGGGACCATGATTTTTGCAGTCACTGAATAGCAACTATACGATGAAA-CATACAAA	299
Reticulata	-----	0

Figura 37 - Alinhamento das sequências codificadoras dos genes “orange1.1t04367.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g021595m” (“Pineapple”), “Cg3g004140.1” (*C. maxima*), “Cm257260.1” (*C. medica*) e “MSYJ054830.1” (*C. reticulata*).

Clementina	AACAGATTAGATGAGTTGAAGCAAAGGCTAAAGATTTGTTTGCATCCGCCAAAGAAAGC	204
Valencia	-----	0
Medica	AGACGAGCAGAAGGGCTGAAGGAAAAGTGAAGATAGCGAT --- TAAGGATGTAATCGAG	195
Maxima	-----ATGACAACGATTAA---TAAGGATGTAACCGAG	30
Pineapple	AGACGAGCAGAAGAGCTGAAGGAAAAGTAAATGACAACAAT --- TAAGGATGTAACCGAG	356
Reticulata	-----ATGACAACAAT --- TAAGGATGTAACCGAG	27
Clementina	ACTAGTGAAC TATTAAGCTAACTGACTCGGTGCAGAAGTTGGGATGGCATAACCATTTT	264
Valencia	-----	0
Medica	CCTCTGGATCAGTTGGAGCTGATTGATAACTTGCAAGACTTGGATTGGCTCATCGTTTT	255
Maxima	CCTCTGGATCAGTTGGAGCTGATTGACAACCTTGCAAGACTTGGATTGGCTTATCATTTT	90
Pineapple	CCTCTGGATCAGTTGGAGCTGATTGACAACCTTGCAAGACTTGGATTGGCTTATCATTTT	416
Reticulata	CCTCTGGATCAGTTGGAGCTGATTGACAACCTTGCAAGACTTGGATTGGCTTATCATTTT	87
Clementina	GAAGAAGAGATCAAAGAGGCCATGAATTTCTC-----AAAGGAGATGCT	309
Valencia	-----	0
Medica	GAGACTGAGATTAGGAACATATTGAATAATCTACAACAATAAAGATTATAAATTGG	315
Maxima	GAGACTGAGATTCGGAATAATTGCATAATATCTACAACAGTAATAAAGATTATAAATTGG	150
Pineapple	GAGACTGAGATTCGGAACATATTGCACAATAACTACAACAATAAAGATTATAAATTGG	476
Reticulata	GAGACTGAGATTCGGAACATATTGCACAATAATCTACAACAATAAAGATTATAAATTGG	147
Clementina	ACCATCAAAGATCTTAATGCAACGTCACCTGCAATTTTCGCTTCTACGTGAACACGGCCAT	369
Valencia	-----	0
Medica	AGAAAAGAAAATCTGTATGCAACCTCCCTTGAGTTGAGACTACTTAGACAACATGGCTAT	375
Maxima	AGAAAAGAAAATCTGTATGCAACCTCTCTCGAGTTTAGACTACTTAGACAACATGGCTAT	210
Pineapple	AGAAAAGAAAATCTGTATGCAACCTCCCTCGAGTTTAGACTACTTAGACAACATGGCTAT	536
Reticulata	AGAAAAGAAAATCTGTATGCAACCTCCCTCGAGTTTAGACTACTTAGACAACATGGCTAT	207
Clementina	CCAGTTAGTACAGGTGTTTTGATAAATTCAGAAAAGGGACGGGAGGTTCCATGACAAT	429
Valencia	-----	0
Medica	CCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGGCCAGGGAGGCTTCATTTGTGAT	435
Maxima	CCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGACAAGGGAGGCTTCATTTGTAAT	270
Pineapple	CCTGTTTCTCAAA-CGTTTTCAATGGTTTTAAAGACGACAAGGGGGGCTTCATTTGTAAT	595
Reticulata	CCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGACAAGGGGGGCTTCATTTGTAAT	267
Clementina	TTACGAGAAGACATAGAAGGGCTTTTGAATTTATTTGAAGCTTCATTCTTGAATTGAA	489
Valencia	-----ATGAGCTTGATGAAGCCTCGTATTACAGCTTAGAA	36
Medica	GATTT-----CAAGGAACTACTGAGCTTGACGAAAGCCTCGTATTACAGCTTAGAA	486
Maxima	GATTT-----CAAGGAAATAATGAGCTTGATGAAGCCTCGTATTACAGCTTAGAA	321
Pineapple	GATTT-----CAAGGAAATAAAGCTTGATGAAGCCTCGTATTACAGCTTAGAA	646
Reticulata	GATTT-----CAAGGAAATAAAGCTTGATGAAGCCTCGTATTACAGCTTAGAA * * * * * ***** * * * * *	318
Clementina	GGAGAGGATGTTCTAGAAGAAGCCAATTTTTTGTACTGAGCATCTAAAGGAGTCATTA	549
Valencia	GGAGAAAGCATCATGGAGGAGGCCTGGCAATTCACCAGTAAACATCTAAAAGAGTGATG	96
Medica	GGAGAAAGCATCATGGAGGAGGCCTGGCAATTCACCAGTAAACATCTAAAAGAGTGATG	546
Maxima	GGAGAAAGCATCATGGAGGAGGCCTGGCAATTCACCAGTAAACATCTAAAAGAGTGATG	381
Pineapple	GGAGAAAGCATCATGGAGGAGGCCTGGCAATTCACCAGTAAACATCTAAAAGAGTGATG	706
Reticulata	GGAGAAAGCATCATGGAGGAGGCCTGGCAATTCACCAGTAAACATCTAAAAGAGTGATG ***** *	378
Clementina	GGGAC-GT-----TGGGGAGCAAAAATCATACTGGCTGAGCAGGTACAACAATCTTAGAC	603
Valencia	ATCAGCAAGAGCAAGCAAGGGGATGTCTTTGTGGCAGAACAAGCAAAGCGTGCACCTGGAG	156
Medica	ATCAGCAAGAGCAAGGAAAGCATGTATTTGTAGCAGAACAAGCGAAGCGTGCACCTAGAG	606
Maxima	ATCAGCAAGAGCAAGCAAGGGGATGTCTTTGTAGCAGAACAAGCAAAGCGTGCACCTGGAG	441
Pineapple	ATCAGCAAGAGCAAGCAAGGGGATGTCTTTGTAGCAGAACAACAAGCGTGCACCTGGAG	766
Reticulata	ATCAGCAAGAGCAAGCAAGGGGATGTCTTTGTAGCAGAACAACAAGCGTGCACCTGGAG *	438
Clementina	ATCCCTTCATATTGGAGGATGCCAAGAAATGAGGCTCAGAACTTCATCAAATATACCCC	663
Valencia	CTCCCTCTGCATTGGAAGTTCCAATGTTAGAGGCAAGGTGGTGGAAAGGATATAGGCTCT	216
Medica	CTCCCTCTGCATTGGAAGTTGCCAATGTTAGAGGCAAGGTGGTTCATACACGTTTATGAG	666
Maxima	CTCCCTCTGCATTGGAAGTTCCAATGTTAGAGGCAAGGTGGTTCATAGACGTTTATGAG	501
Pineapple	CTTCCTCTGCTTTGGAAGTTCCAATGTTAGAGGCAAGGTGGTTCATAGACGTTTATGAG	826
Reticulata	CTTCCTCTGCTTTGGAAGTTCCAATGTTAGAGGCAAGGTGGTTCATAGACGTTTATGAG * * * * * ***** *	498
Clementina	ACAGATGATGAAAGCAGTCCAATTTTGTGACTCTAGCCAAGTTGGATTACAATTTAGTA	723
Valencia	-----	216
Medica	AAAAGAGAGGACAAAGAACCCCTTTTACTTGAGCTCGCTAAGTTGGAGTTTAAACACTTTG	726
Maxima	AAAAGAGAGGACAAAGAACCCCTTTTACTTGAGCTCGCTAAGTTGGAAATCAAAATTTTG	561
Pineapple	AAAAGAGAGGACAAAGAACCCCTTTTACTTGAGCTCGCTAAGTTGGAAATCAACGTTTTG	886
Reticulata	AAAAGAGAGGACAAAGAACCCCTTTTACTTGAGCTCGCTAAGTTGGAAATCAACGTTTTG	558

Figura 37 – Continuação.

Clementina	CAATCCATACACCAACAAGAACTGAAGGAGTTGGCAAGGTGGTGGAGTAATCTGGGTTTT	783
Valencia	-----	216
Medica	CAGGCAATTTACCAGGAAGAAGCTTAAAGACATTTTCAGGGTGGGACATCCATTATGCTTTG	786
Maxima	CAGGCAATTTACCAGGAAGAAGCTTAAAGATGTTTCAAGGTGGTGGAGGATATAGGTCTT	621
Pineapple	CAGGCAATTTACCAGGAAGAAGCTTAAAGATGTTTCAAGTGGTG-----	929
Reticulata	CAGGCAATTTACCAGGAAGAAGCTTAAAGATGTTTCAAGGTATCCATGCTTGGTGCATAA	618
Clementina	AAAGAGAACTAAGTTTTGCCAGAGACCGGTTGATGGAAAATATTTGTTGGTATGGGC	843
Valencia	GGAGAGAACTGAGCTTTGCGAGGGACAGCTTGGTAGCATCCTTCGTATGGAGCATGGGG	276
Medica	AACCACCTTCCGGACTACATGAAATTGTTTTTTGCGCTTACAACCTTGTAAATG--	844
Maxima	GGAGAGAACTGAGCTTTGCGAGGGACAGCTTGGTAGCATCCTTCGTATGGAGCACGGGG	681
Pineapple	-----	929
Reticulata	-----	618
Clementina	CTTTGTTTCAAAGCACAGTTTTCTAAGTGCAGAATTGGCCTCACAAAATTTGTATGCATA	903
Valencia	ATAGTGTGAGCCTCAATTCGCCAAGTGGAGAACTACTACAATCACATTTGCTCTA	336
Medica	AATTTGTTTATACGTACTTGCATTACAGAAAGACTC--TTCAGAATCCAGATT----	897
Maxima	ATAGTGTGAGCCTCAATTCGCCAAGTGGAGAACTACTACAATCACATTTGCTCTA	741
Pineapple	-----	929
Reticulata	-----	618
Clementina	TTAACTGCGATTGATGACATTTATGATGTATATGGATCAATAGATGAGCTTGAACCTTT	963
Valencia	ATTTTCAGTATTGATGATATTTATGATGTTTATGGAACCTTGGATGAACCTGAGCTATTT	396
Medica	-----GAAAGCTGA-----	906
Maxima	ATTTTCAGTATTGATGACATTTATGATGTTTATGGAACCTTGGAGAACTTGAAGCTATTT	801
Pineapple	-----	929
Reticulata	-----	618
Clementina	ACAGAAGCAGTGAAGTTTTCCACCATCTATATATTATCCTTTTGTGTTTGGGGATT	1023
Valencia	GCTGCTGCTGTTGAGAGGACTTTGATATACT-----	427
Medica	-----	906
Maxima	GTTGATGCTGTTGAGAGGTGGGACATCAATT-----	832
Pineapple	-----	929
Reticulata	-----	618
Clementina	TCCCCTAAAATCCGGTGGGAAATGGGGCAGTACTGGAGGAGCTGCCAGAATATATGCAG	1083
Valencia	-----	427
Medica	-----	906
Maxima	-----ATGCTTTGAACCACCTTCCGGACTATATGAAA	864
Pineapple	-----	929
Reticulata	-----	618
Clementina	ATTTGCTACTTGCCATGTTTAACTTTGGAATGAGTTGGCATGTGATGTTATGAAAATT	1143
Valencia	-----	427
Medica	-----	906
Maxima	ATCTGTTTCTTGCGCTTACAACCTTGGTAAATGAATTTACTTATTACGTACTCAAACAA	924
Pineapple	-----	929
Reticulata	-----	618
Clementina	CATGGCCTCAATACTCTATCCTACATTAAGAAAGAGTGGGAAAATCTGTGATACATCAC	1203
Valencia	-----TCGAATGGCTTGGCAATATACAAGCCTAC	456
Medica	-----	906
Maxima	CAGGATTTGATATACTCGAAGTATAAAAAATGCGTGGCTTCGCAATATACAAGCCTAC	984
Pineapple	-----	929
Reticulata	-----	618
Clementina	CTAGTAGAAGCCAGATGGTTTAGCAAAGGTACACGCCAAGTGGGAAATACATAGAA	1263
Valencia	TTTGTGGAGGCGAAAT-----	472
Medica	-----	906
Maxima	TTAGTGGAGGCGAAATGGTACCATGGTGGTACACGCCAAGCAGGGAGAATTTCTGGAA	1044
Pineapple	-----	929
Reticulata	-----	618
Clementina	AATGCATGGGTTTCAGTGGGAAAGCCCTGCTGCCATTGTCCATGCCTATATCTTGTCTACAA	1323
Valencia	-----GGTACCATGGAGGCCCTATGGTTACAATGACTGCATACCTTTCTGGGAC-	521
Medica	-----	906
Maxima	AATGGATTGGTATCAATAGGAGGCCCTATGGTTACAATGACTGCATACCTTTCTGGGAC-	1103
Pineapple	-----	929
Reticulata	-----	618

Figura 37 – Continuação.

Clementina	CTCCAAGGAAGCAATGCCTTGACCGAAAATCACTCAGCTGCCTCAAAGTCGAACATGGC	1383
Valencia	-----AAATCCAATCATTGAGAAG-----GAACTAGAATTTTAGAAAGT	561
Medica	-----	906
Maxima	-----AAATCCAATCATTGAGAAG-----GAACTAGAATTTTAGAAAGT	1143
Pineapple	-----	929
Reticulata	-----	618
Clementina	TATGATGAGATGATATATTGGTCATCTCTCATCAGTCGGCTCAGTAACGATTTGGGAAAT	1443
Valencia	AATCGAGATATAATTCACCTGGTCATTCAAGATTCCTCGTCTTCAAGATGATTTGGGAACG	621
Medica	-----	906
Maxima	AATCAAGATATAATTCACCTGGTCATTCAAGATTCCTCGTCTTCAAGATGATTTGGGAACG	1203
Pineapple	-----	929
Reticulata	-----	618
Clementina	TCCGCGGTTGAGTTGAAGAGAGGCGACGTGGCGAAATCTATTCAAGTGTACATGATTGAA	1503
Valencia	TCATCGGATGAGATACAGAGAGGGGATGTTCCGAAATCAATCCAGTGTACATGCACGAA	681
Medica	-----	906
Maxima	TCATCGGATGAGATACAGAGAGGGGATGTTCCGAAATCAATCCAGTGTACATGCATGAA	1263
Pineapple	-----	929
Reticulata	-----	618
Clementina	GAAGGCATATCAGAAGAAGCAAGGGACCGTATAAAAAGTTTGATAATTTACTCCTGG	1563
Valencia	ACTGGTGCCTCCGAGGAAGTTGCTCATGAACACATCAAGGATATGATGAGACAGATGTGG	741
Medica	-----	906
Maxima	ACTGGTGCCTCCGAGGAAGTTGCTCGTGAACACATCAAGGATATGATGAGACAGATGTGG	1323
Pineapple	-----	929
Reticulata	-----	618
Clementina	AAAAAGCTGAATGGCAAGAATCTTTATAAAAGTGATTTCCAG---AAAGCATGGCGAAA	1620
Valencia	AAGAAGGTGAATGCATACAGAGCTGATAAAGATTCCTCCCTATAG-----	786
Medica	-----	906
Maxima	AAGAAGGTGAATGCATACAGAGCTGATAAAAAGTCTCCCTTATCGCAAATACAGTGGAG	1383
Pineapple	-----	929
Reticulata	-----	618
Clementina	ATGTGTTTAGACATGTCTAGAAGTGCACATTG---CATTTTCCATGGAGATGGTATAGGA	1677
Valencia	-----	786
Medica	-----	906
Maxima	TTCATATTGAATGTTGTGAGAGTGTCCATTTTATGTATCTAAATGGAGATGGGCATGGG	1443
Pineapple	-----	929
Reticulata	-----	618
Clementina	ACATCAACCGGGGTTTCTAGAGATCGTTTGGTCTCTTAATACTTGAGCCTATACAGTT	1737
Valencia	-----	786
Medica	-----	906
Maxima	GCTCAAACCAAGAGACTATGGATGTAGTTTTACATTGCTTTTTAGCCAAATTCCTTG	1503
Pineapple	-----	929
Reticulata	-----	618
Clementina	GAATTGTAA-----	1746
Valencia	-----	786
Medica	-----	906
Maxima	GACGACAAACACATGGTTGCTACATCATCACCAGGCACCAAAGGATGA	1551
Pineapple	-----	929
Reticulata	-----	618

Figura 37 – Fim.

Clementina	-----GGGGAGAATAATAATAAT-----	20
Valencia	-----ACTCAATCAAGAATTTGAAAT-----	21
Reticulata	-----CTTCC-----	5
Maxima	----ATTAAGATATTCTTTGTAACCTTGCATATTTCTATTTTTATGTAAGT-----	47
Pineapple	-----	0
Medica	TTGGATATATAGATGTAGAGTAAGCTAGCTTACAGTTACTTGGCGAAGATTTCTCAAAT	60
Clementina	-GATTTACAATTTGT-----AGGGGAATGCTTA-----GAAGAAACAGATA	60
Valencia	GAAAGATCTAGGTGAAGTTAAG--AAGATT-----CTTGGCATGAAGATATG	66
Reticulata	-AAGCTGTAATACGAGGCTTTCATGCAAGCTTATTATTC--CTTGAAATCATTACAAA	60
Maxima	-AAAAAA-----GTTTTTAATGTAATAAATAGGACTTTTGTAAAGCAAAG-TTA	94
Pineapple	TAATCTATGGTTTGTGGTGTACGAGGTTATATATACATGACACGTAACGACGACTTC	60
Medica	TAATCTATGGTTTGTGGTGTACGAGGTTATATATATATAGGCAGAGGAGAAGTTC	120
	* * *	
Clementina	CAATATAAC-----AAT-----ATATATACATATACACA	89
Valencia	CAGAGATAGAGCTCATGGCAAAGTAAGCTTGT--CTCAGAGCAATATTTGAATA-----	118
Reticulata	TGAAGCCCCCTTG-T-----CGTCTTAAAACCTTGAACCGCTGCGAGT-----G	107
Maxima	AATTTATGAATTTTTTGTTCATTAATATGTATTTATTATAATTATATGGCTT-----	148
Pineapple	TGAAAAACCATttG-TTTTTaaggATG-----CCATTCAAAGTTTCAACTT-TAGCC	112
Medica	ATGTGATTTATTTT-TCGTACTCATTTTTTCTGAGTTTTGAAAGCGTTTTAATTTTTAAGT	179
	*	
Clementina	CA---CACACACAGAGTTTCTTAAAAAGAAAGAAAGC-ATCAAGTTGTTGAGA---	141
Valencia	----AGGTACTACAACAGTTTGACATGATTGAGCAGACAAAACCTGTGAGTACCCCAT	173
Reticulata	CTCAACAAAAAGAACTACATTCATCAAAATTTTCGCATACATATGCTAATTAGAGA---	164
Maxima	-----ATAGAAACAGTCTTAAAAAAATTTGTAGCGAAAAAAATGACAAATAAATAACA	202
Pineapple	CACCAAAAGAAAAAATC-----	130
Medica	CTTAATAGTACAAAAGTATTTTATTC-ATTTGGGGGAAAAAAAG--GAGTACATCATA	236
Clementina	-----ATAGTTGCAAGTTGTGAGAGGGATGCCAAATTCATCAATTAACCTGATACA	192
Valencia	GGCTT--ATCATTCAAGCTTTCTGCACAACTATCTCCTT-----TAACAGA----	218
Reticulata	-----ATGACTTAAGTGCTCAGCGGCTTGTGCGAGTT-----	197
Maxima	ATTATACAACAAGCCAGCCCCCTCAAGGGCGTGGTGGGGTT-----	243
Pineapple	-----	130
Medica	CTGT-----GCGAACGAGGTCAATAT-----	257
Clementina	ATTGCAGAGTCAACGATCATGTTTACGTTGAACCTTGCCTTTCTTACTATTATTGGGTG	252
Valencia	--TGCAGAACGAGAATACATGTTACAAGTTCTGTATTCAAAATGCAAGTGGGTAGCTTATG	276
Reticulata	-----CGAA-----TTCTCCG-----	208
Maxima	-----GGTTGCATTGCAGCTGTAAC-----CTCTACC-AAAATCCGGGTTCACTCTG	290
Pineapple	-----	130
Medica	----TGTACCAGAAGACAGTACA-----TCATCCA-TACATTCCGAT-GAATGTTG	303
Clementina	T--GTGAGGTTGCATTAATTACCTCTATTCCTCAAAGATTTTAGATAACCTTTTTTATA	310
Valencia	TATGCAATGGTGTGTACAAGGCCTG-----ACATT	306
Reticulata	---GAGATAGAGAATTAATAAATTTG-----ATTTGGGCGTTGTCCAC	247
Maxima	TGGATGATAAGGGGGTTAAAAACTG-----TATTTGGGTTTGGCCAC	332
Pineapple	-----	130
Medica	TATAATCT-----TTATTTATTT-----ATCTTTTTTTTCTCTGC	338
Clementina	TTACATTATTGATTTTTTCATCAAAAATAATACACAAATACACAG---ATGTCACCATAC	366
Valencia	TCACATGCAGTTGGTATAGTGAGCAAGTATATGC-ATAATCCTGGTAAAGGACATTGGCA	365
Reticulata	TCTTTTAAATTTTTTTTAAAAAGGAAAAAACA-GAGAGATCG-----ATTCAA	297
Maxima	CCCCCTTA---CCTTAAAGGAAAAAACAAC-ATGACAGCG-----AATGTAC	378
Pineapple	-----	130
Medica	ATACAAAT---TTTTAAAGAGTCTTCAATAA-ACTACACAA-----TAAATGC	384
Clementina	GTATATTAAGTGTATATAGTATAATA---AAAACTCT-AAAATCACTGTTATTCCT--	420
Valencia	AGCTGTGAAATGGATTCTACGGTAAATTTAGAAGACCGTGGATGTTGGTTACTGTTTGA	425
Reticulata	TATTCAGACCTTGCATGCGCATGACAAAAAAGCGAGT-TAATGATATGTACCTTGA--	354
Maxima	ATATTTGAACCTGCTGGCAGCTTAGA-ATTCCTCACAAAGGGGAAGATGTACTTTTT--	435
Pineapple	-----	130
Medica	ACGCA-GAAATGACAAGAAATTCATAAATTCATTTACTAATAAA--AGTTCTATTT--	439
Clementina	CATACATTCTAATAGTATTATAAACAT---ATCATTATC--CATT-----T-----	461
Valencia	GAGAGACGATACACTTGGTCAAGGTGT-----	452
Reticulata	GAAACAGGATAGCCATGTTGTCTAAGT----A--GTCTA--AACT----CGAGGGAGG	400
Maxima	TATTAATGAATATAATAT-CTTTGTCCTACTAAG-ACTTACAAATATATGCTTTGAAAA	493
Pineapple	-----	130
Medica	ATTACATTAAAACTTGTTTTATGTAGAAATAAGAAATACAAAGTAAATGTAAGGAAGA	499

Figura 39 - Alinhamento das seqüências promotoras dos genes “orange1.1t04367.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g021595m” (“Pineapple”), “Cg3g004140.1” (*C. maxima*), “Cm257260.1” (*C. medica*) e “MSYJ054830.1” (*C. reticulata*).

Clementina	GATA-----ATGACTACGGTTG-----TTTCAAAGTATATA	492
Valencia	GATCAGGTATGTTGATTC----TGATTATGCTGGTAATTT--GGACAAAACGATGGTCA	504
Reticulata	TTGCATACAGATTTCTTTTCTCCAATTATAATCTTTATTA--TTGTTGTAGATATTGT	457
Maxima	TCTCAGGGAAAATGAATA-AGAAAAATAAATCGCTTGCACTTCTCTGCTGCCTATATATA	552
Pineapple	-----	130
Medica	AAAAAGGCATACAAAGTT-GCA---ACAATATCTTAATGTTGAGCACTAACATCGAAAT	555
Clementina	AAAATATGTTACAATAAGACGTTCAATTAATCGGACTGACC-----AAA	536
Valencia	ACCACCGGA-----TATGTATTTACTTTTGCTGGAGGGCCAATCAGTTGGAAGTCTACAC	559
Reticulata	GCAATATGTTCCG----AATCTCAGTCTCAAAATGATAAGCCAA-----TCC	500
Maxima	TATATATATA----TATATATAACCTTGTGCATAACCACAAAACCA-----TAG	596
Pineapple	-----	130
Medica	TCTATCTGTTACAGTTATAAAGTACTTTTGCGGAA---AACAAA-----TTA	599
Clementina	ATATTATGGCAGTATGGTGGATACACCAAACCTTGATTCAATGATTAGTAGGGATGGCAAA	596
Valencia	TACAGTTTACAGTTGCACCGTCAACCACAAAGGCCGA-GT----ACATGGCAATTACAG	613
Reticulata	AAGTCTTTGCAAGTTGTAATCAGCTCAACTGATCC-AGAGGCTCGGTACATCCTTAA	559
Maxima	ATTAATTT-GAGAATTTTTGCCAAGTATAACTGTAAG-CTAGCTTACACTACATCTGTAT	654
Pineapple	-----	130
Medica	ATAAATTT-CAAAATGATTATCAACAAAAGTTGATT-GGAG---ATAATGGATTTAAT	654
Clementina	ACATCGGGTCGGGCTCGGGCTTGGCCAAACCCAACCCGACCTGATCAATAGAGAATTA	656
Valencia	---AGGCTGT---TGAAGAGGCTATTTGGTTA----CAAGGCTTGCTTAA-----A	655
Reticulata	---TTGTTGT-----CATTACTTTTCCCTTCAGCTCTTCTGCTCATCTTTT-----G	603
Maxima	---GTCCATAT-----GTCTTCTTG-----	671
Pineapple	-----	130
Medica	---ATATTGT-----AGATTGTGATAATTTG-----TAATAATTTCAA-----A	690
Clementina	GCCCGACCTTAAAAAACCATACGTATTT--ATATTTAGGGTCGGGTCGGGCCGACC--	712
Valencia	ACTTGGGATTTGCACAGGAGCACATTAATGTGATTGCGACAGTCAGAGTGCTATTCATT	715
Reticulata	TATGTTTACCTGTACACGCACAGCATTTAGTTTTAGCTATTCATGGTCCAATTTGGA	663
Maxima	ATTGTTCCATCAACCTCGTTTACCTCTGTAATGGTT----TCAAATGCCTCCTCTTGC	727
Pineapple	-----	130
Medica	AAACTTCCATTTAACAGCGGTTGGTGAATGTGTGTTG---TAAATAATTTAATATTT	746
Clementina	---CGAATCGGGCCAACATCGGGTCGGGCTAGGCTCGACCCTACCGAAACCA-----	761
Valencia	TAACAAAACTCAAGTTTAACATG---CGCGTACAAAGTACATCGATGTACGATTTCACT	772
Reticulata	AAT-GAACAAAGGAAATTAATATG---TAATAATAATA-----ATAATCAATATCGTA	712
Maxima	AA--CAAATCGAGCAGCCA-----CTAGAATCATTACCATAAATAAGCCAGTCCAAT	777
Pineapple	-----	130
Medica	GA--CAACAGCGAAAGAATGTTG---TAAAAACTTCAATAGATGTTCAATCTCACA	801
Clementina	-----TTTTCAACCACAATTCAATGTTGAAAA	789
Valencia	TTGTACGGGAAATGTTGATGAGGGGAA-GATTCTTCTTCAGAAAATTAACGCAAAAG	831
Reticulata	TAGTTGCTATT----CAGTGACTGCAAAAAATCATGGTC-CCAAATGAAAGGTTGGTAG	766
Maxima	GCCTTG---T-----CAGCGCC-----AAATATGA-TA-ATTTGACAGTTGACAG	817
Pineapple	-----	130
Medica	ACATTCTACAA-----AAGCGG-----TTGTGAAA-AAATTTAATAATTGACAA	846
Clementina	ATCAACTTCTTATTGCATATATAAGAATTCGAAT-GAGGCAATGAAGCATCTACCATT	848
Valencia	AATCTGTAGATATGTTGACT-----AAGGTGGTGACGACGATCAAAATTT	876
Reticulata	TTTGCTGATCTCTATCAACTGTCAAATTA-----TCATATTTGGCGCTGACAAGGCAT	820
Maxima	GAGATCAGCAAACCTCAACCCCTGAATTTGGGACCATGATTTTTTGCACTCAGTGAATAG	877
Pineapple	-----	130
Medica	CTAGTGTA-----AAATCGTTATAAATTTTAAATCTCAATCAATCC	887
Clementina	AACTAATAAATAATTTATTTTTTAAACCATGATACACAAT-----ATATATC	898
Valencia	GAGCATTGTCTAAGTATTGTGTCATATTTCTT-TTGCAATTT-----GTTTATC	924
Reticulata	T-GGACTGGCTTATTTT--TTGCCATGATTCTG-ATGGCTGCTCATTTGTTGGAAGAGG	876
Maxima	CGGCTATACGGTATT----TATTATTATTCAT-TTCAAATTTGG-----GACCATG	922
Pineapple	-----	130
Medica	ATGAATTAGTAAAT----TAATCTAAATCAA-TTCATAATCTGCAGATTAGAAGTAG	942
Clementina	GAATATTTTAAATGCAATTAATTAACACACAATGCAAT-TAAATTA-A-----	948
Valencia	ACCACATTTATAT--TTCTTCAG--AAGTCGCAGTATTAGTAATTACTTA-ACCCGCGTT	979
Reticulata	AAGACATTTGAAACCATTTACAGAGGTAGCCAAAGTTGAGGGATTAATGCAAGGAGACAT	936
Maxima	AATAACTAAA-AACTAAATGCCGTTTCATGTACAGGATGAAACATACAAAA-----	971
Pineapple	-----	130
Medica	ATTTGATATA-ATCCATATTCATCCACTT-----TTGC-GAATTCATA-----	985

Figura 39 – Continuação.

Clementina	--AAATACACAATGTAATTCACAACCATTTT-----ATCCATACACAATTCAATTTAA	1000
Valencia	TTCGCAACAGACTGT-----AGTTTGC-----	1001
Reticulata	TGGATATACAGATGTAGTGTAAAGCTAGCTTACAGTTATACTTGGCAAAGATTCTCATAAT	996
Maxima	--GACGAGCAGAAGAGCTGAAGGGAAAAGTAA-----	1001
Pineapple	-----	130
Medica	--CGGA-----TTAAAAAAAAT-----	1001
Clementina	C----	1001
Valencia	-----	1001
Reticulata	CTATG	1001
Maxima	-----	1001
Pineapple	-----	130
Medica	-----	1001

Figura 39 – Fim.

Clementina	-----ATGGCTT	7
Valencia	-----	0
Pineapple	-----	0
Maxima	ATGTCTTCTTGCAATTAATGCCTCAACCTTGGTTACCTCTGTAATGGTTTCAAATGTCTT	60
Medica	ATGTCTTCTTGCAATTAATCCCTCAACCTTGGTTACCTCTGTAATGGTTTCAAATGTCTT	60
Reticulata	ATGTCTTCTTGCAATTAATCCCTCAACCTTGGTTACCTCTGTAATGGTTTCAAATGTCTT	60
Clementina	GCAAGTAACTCAAT-----AGTTGCTTGTAAATGGC-----	39
Valencia	-----ATGGCCAAAAATAAGCCAGTCCAATGC	27
Pineapple	-----	0
Maxima	CCTCTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAAT--	118
Medica	CCTCTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCACTCCAAT--	118
Reticulata	CCTCTTACAACAAATAAAGCAGCCATCAGAATCATGGCCAAAAATAAGCCAGTCCAATGC	120
Clementina	-----TCCAATGATCCGTTGCAACGGCGGTCAAGCAATTACCATGCG	81
Valencia	CTTGTGAGCGCCAAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACACCAACCT	87
Pineapple	-----	0
Maxima	-----	118
Medica	-----	118
Reticulata	CTTGTGAGCGCCAAATATGATAATTTGACAGTTGATAGGAGATCAGCAAACACCAACCT	180
Clementina	AGTATTTGGAACCTGAACTCATAGAGTCCTTTACCACTCCTTATACTTACGAGTTGTAT	141
Valencia	TCAATTTGGGACCATGATTTTTGTCAGTCACTGAATAGCAAGTATACGGATGAAGCATAAC	147
Pineapple	-----	0
Maxima	-----GCCTTGATGAAGCATAAC	135
Medica	-----GCCTTGATGAAGCATAAC	135
Reticulata	TCAATTTGGGACCATGATTTTTGTCAGTCACTGAATAGCAAGTATACGGATGAAGCATAAC	240
Clementina	GCCAACAGATTAGATGAGTTGAAGCAAAAGGCTAAAGATTTGTTTGCATCCGCCAAAGAA	201
Valencia	AAAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGATAGCGATTAAGGATG---TAATC	204
Pineapple	-----	0
Maxima	AAAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGATAGCGATTAAGGATG---TAATC	192
Medica	AAAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGATAGCGATTAAGGATG---TAATC	192
Reticulata	AAAAGACGAGCAGAAGAGCTGAAGGGAAAAGTGAAGATAGCGATTAAGGATG---TAATC	297

Figura 40 - Alinhamento das sequências codificadoras dos genes “orange1.1t04775.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g046807m” (“Pineapple”), “Cg3g004080.1” (*C. maxima*), “Cm257260.1” (*C. medica*) e “MSYJ216420.2” (*C. reticulata*).

Clementina	AGCACTAGTGAACCTTTAAAGCTAACTGACTCGGTGCAGAAGTTGGGAGTGGCATACCAT	261
Valencia	GAGCCTCTGGATCAGTTGGAGCTGATTGATAACTTGCAAAGACTTGGATTGGCTCATCGT	264
Pineapple	-----CTTGGATTGGCTTATCAT	18
Maxima	GAGCCTCTGGATCAGTTGGAGCTGATTGATAACTTGCAAAGACTTGGATTGGCTCATCGT	252
Medica	GAGCCTCTGGATCAGTTGGAGCTGATTGATAACTTGCAAAGACTTGGATTGGCTCATCGT	252
Reticulata	GAGCCTCTGGATCAGTTGGAGCTGATTGATAACTTGCAAAGACTTGGATTGGCTCATCGT	357
	* * * * *	
Clementina	TTTGAAGAAGAGATCAAAGAGGCCATGAATATTCTCAA-----GGAGAT	306
Valencia	TTTGAGACTGAGATTAGGAACATATTGAATAATATCTACAACAATAAAAGATTATAAT	324
Pineapple	TTTGAGACTGAGATTGGAAAAATATGCATAATATCTACAACAGTAATAAAGATTATAAT	78
Maxima	TTTGAGACTGAGATTAGGAACATATTGAATAATATCTACAACAATAAAAGATTATAAT	312
Medica	TTTGAGACTGAGATTAGGAACATATTGAATAATATCTACAACAATAAAAGATTATAAT	312
Reticulata	TTTGAGACTGAGATTAGGAACATATTGAATAATATCTACAACAATAAAAGATTATAAT	417
	***** * * * * *	
Clementina	GCTACCATCAAAGATCTTAATGCAACGCTCACTGCATTTTCGCCTTCTACGTGAACACGGC	366
Valencia	TGGAGAAAAGAAAATCTGTATGCAACCTCCCTTGAATTCAGACTACTTAGACAACATGGC	384
Pineapple	TGGAGAAAAGAAAATCTGTATGCAACCTCTCTCGAGTTAGACTACTTAGACAACATGGC	138
Maxima	TGGAGAAAAGAAAATCTGTATGCAACCTCCCTTGAATTCAGACTACTTAGACAACATGGC	372
Medica	TGGAGAAAAGAAAATCTGTATGCAACCTCCCTTGAATTCAGACTACTTAGACAACATGGC	372
Reticulata	TGGAGAAAAGAAAATCTGTATGCAACCTCCCTTGAATTCAGACTACTTAGACAACATGGC	477
	* * * * *	
Clementina	CATCCAGTTAGTACAGGTGTGTTTGATAAAATCAGAAAAAGGGACGGGAGGTTCCATGAC	426
Valencia	TATCCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGGCCAGGGAGGCTTCATTTGT	444
Pineapple	TATCCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGCAAGGGAGGCTTCATTTGT	197
Maxima	TATCCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGGCCAGGGAGGCTTCATTTGT	432
Medica	TATCCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGGCCAGGGAGGCTTCATTTGT	432
Reticulata	TATCCTGTTTCTCAAGAGGTTTTCAATGGTTTTAAAGACGCAAGGGAGGCTTCATTTGT	537
	**** * * * * *	
Clementina	AATTTACGAGAAGACATAGAAGGGCTTTGAATTTATTTGAAGCTTCATTCTTGGAAAT	486
Valencia	GA-----TGATTTCAAGGGAATACTGAGCTTGCACGAAGCCTCGATTACAGCTTA	495
Pineapple	AA-----TGATTTCAAGGGAATACTGAGCTTGCACGAAGCCTCGATTACAGCTTT	248
Maxima	GA-----TGATTTCAAGGGAATACTGAGCTTGCACGAAGCCTCGATTACAGCTTA	483
Medica	GA-----TGATTTCAAGGGAATACTGAGCTTGCACGAAGCCTCGATTACAGCTTA	483
Reticulata	GA-----TGATTTCAAGGGAATACTGAGCTTGCACGAAGCCTCGATTACAGCTTA	588
	* * * * *	
Clementina	GAAGGAGAGGATGTTCTAGAAGAAGCCAATTTTTTGTACTGAGCATCTAAAGGAGTCA	546
Valencia	GAAGGAGAAAAGCATCATGGAGGAGGCTGGCAATTTACCAAGTAAACATCTTAAAGAAAGCG	555
Pineapple	GAAGGAGAAAAGCATCATGGAGGAGGCTGGCAATTTACCAAGTAAACATCTTAAAGAAAGTG	308
Maxima	GAAGGAGAAAAGCATCATGGAGGAGGCTGGCAATTTACCAAGTAAACATCTTAAAGAAAGTG	543
Medica	GAAGGAGAAAAGCATCATGGAGGAGGCTGGCAATTTACCAAGTAAACATCTTAAAGAAAGTG	543
Reticulata	GAAGGAGAAAAGCATCATGGAGGAGGCTGGCAATTTACCAAGTAAACATCTTAAAGAAAGTG	648
	***** * * * * *	
Clementina	TTAGG-GACGTTGGGG----AGCAAAATCATACTGGCTGAGCAGGTACAACAATCTTTA	600
Valencia	ATGATCAGCAAGAGCAAGGAAGGAGCATGTATTGTAGCAGAACCAAGCGAAGCGTACACTG	615
Pineapple	ATGATCAGCAAGAGCAAGGAAGGAGCATGTATTGTAGCAGAACCAAGCGAAGCGTACACTG	368
Maxima	GTGATCAGCAAGAGCAAGGAAGGAGCATGTATTGTAGCAGAACCAAGCGAAGCGTACACTG	603
Medica	ATGATCAGCAAGAGCAAGGAAGGAGCATGTATTGTAGCAGAACCAAGCGAAGCGTACACTG	603
Reticulata	ATGATCAGCAAGAGCAAGGAAGGAGCATGTATTGTAGCAGAACCAAGCGAAGCGTACACTG	708
	* * * * *	
Clementina	GACATCCCTTCATATTGGAGGATGCCAAGAATTGAGGCTCAGAACTTCATCAAATTATAC	660
Valencia	GAGCTCCCTCTGCATTGGAATGTGCCAATGTAGAGGCAAGGTGGTTTCATACACGTTTAT	675
Pineapple	GAGCTCCCTCTGCATTGGAAGTCCAATGTAGAGGCAAGGTGGTTTCATAGACGTTTAT	428
Maxima	GAGCTCCCTCTGCATTGGAAGTGTGCCAATGTAGAGGCAAGGTGGTTTCATACACGTTTAT	663
Medica	GAGCTCCCTCTGCATTGGAAGTGTGCCAATGTAGAGGCAAGGTGGTTTCATACACGTTTAT	663
Reticulata	GAGCTCCCTCTGCATTGGAAGTGTGCCAATGTAGAGGCAAGGTGGTTTCATACACGTTTAT	768
	** * * * *	
Clementina	CCCACAGATGATGAAAGCAGTCCAATTTTGCTGACTTAGCCAAGTTGGATTACAATTTA	720
Valencia	GAGAAAAGAGAGGACAAGAACCCCTTTTACTTGAGCTCGCTAAGTTGGAGTTAAACACT	735
Pineapple	GAGAAAAGAGAGGACAAGAACCCCTTTTACTTGAGCTCGCTAAGTGAATGGAATCAATGTT	488
Maxima	GAGAAAAGAGAGGACAAGAACCCCTTTTACTTGAGCTCGCTAAGTTGGAGTTAAACACT	723
Medica	GAGAAAAGAGAGGACAAGAACCCCTTTTACTTGAGCTCGCTAAGTTGGAGTTAAACACT	723
Reticulata	GAGAAAAGAGAGGACAAGAACCCCTTTTACTTGAGCTCGCTAAGTTGGAGTTAAACACT	828
	* * * * *	
Clementina	GTACAATCCATACCAACAAGAAGTGAAGGAGTTGGCAAGGTGGTGGAGTAATCTGGT	780
Valencia	TTGCAGGCAATTTACCAAGGAAGAACTTAAAGACATTTTCAGAGTGGTGGAGGATATAGGT	795
Pineapple	TTGCAGGCAATTTACCAAGGAAGAACTTAAAGATTTTGT-----	526
Maxima	TTGCAGGCAATTTACCAAGGAAGAACTTAAAGACATTTTCAGGTTGGTGGAGGATACAGGT	783
Medica	TTGCAGGCAATTTACCAAGGAAGAACTTAAAGACATTTTCAGGTTGGGACATCCATATGCT	783
Reticulata	TTGCAGGCAATTTACCAAGGAAGAACTTAAAGACATTTTCAGGTTGGTGGAGGATACAGGT	888
	* * * * *	

Figura 40 – Continuação.

Clementina	TTTAAAGAGAACTAAGTTTGGCAGAGACCGTTGATGGAAAATTATTTGTTGGTGATG	840
Valencia	CTTGACAGAGAACTGAGCTTTGCGAGGGACAGCTTGGTAGCATCCTTCGTACGGAGCATG	855
Pineapple	-----	526
Maxima	CTTGGAGAGAAATGAGCTTTGCGAGGGACAGCTTGGTAGCATCCTTCTATGGAGCATG	843
Medica	TTGAACCACCTTCCGGACTACATGAAATTTGTTTTTTTTCGCGCT--TTACAACCTTTGTTA	841
Reticulata	CTTGGAGAGAAATGAGCTTTGCGAGGGACAGCTTGGTAGCATCCTTTTTATGGAGCATG	948
Clementina	GGC-----CTTTGTTTCAAAGCACAGTTT-TCTAAGTGCAGAATTGGCCTCACAAA	890
Valencia	GGGAGCATGGGGATAGTGTTTAAGCCTCAATTAGCCTACTGTAGGA-GAATACGCACAAT	914
Pineapple	-----	526
Maxima	GGG-----ATAGGGTCTGAGCCTCAATTCGCCTATTGCAGGA-GAATAGTCACAAT	893
Medica	ATG-----AATTTGTTTATTACGTACT---TGCAATTACAGAAAAGACTCTTCAGAAAT	889
Reticulata	GGG-----ATAGGGTCTGAGCCTCAATTCGCCTATTGCAGGA-GAATAGTCACAAT	998
Clementina	ATTTGTATGCATATTAAGTGCAGTGTGACATTTATGATGTATATGGATCAATAGATGA	950
Valencia	CACGTTTGCTCTAATTTCAAGTATTGATGATATTTATGATGTTTATGGAACTTTGGATGA	974
Pineapple	-----	526
Maxima	TGCAATAGCTCTAATTACAGTATTGATGACATTTATGATGTTTATGGAACTTTGGACGA	953
Medica	TCCAGATTGAA-----AGCTGA-----	906
Reticulata	TGCAATAGCTCTAATTACAGTATTGATGACATTTATGATGTTTATGGAACTTTGGACGA	1058
Clementina	GCTTGAACCTTTTACAGAAGCAGTAAAAGTTTTCCACCCTTTATATATTATCCTTTTG	1010
Valencia	ACTTGAGCTATTTGCTGATGCTGTTGAGAGGTGGGACATCAATTATG-----	1021
Pineapple	-----	526
Maxima	ACTTGAGCTATTTACTGCTGCTGTTGAGAGGTGGGACATCAATTATG-----	1000
Medica	-----	906
Reticulata	ACTTGAGCTATTTACTGCTGCTGTTGAGAGGTGGGACATCCATTATG-----	1105
Clementina	TTTTATGGGGATTTCCCTAAAAATCCGGTGGGAAATTTGGGCAGTACTGGAGGAGCTGCC	1070
Valencia	-----CTTTGAACCACCTTCC	1037
Pineapple	-----	526
Maxima	-----CTTTGAACCACCTTCC	1016
Medica	-----	906
Reticulata	-----CTTTGAACCACCTTCC	1121
Clementina	AGAATATATGCAGATTTGCTACTTGGCCATGTTTAACTTTGGAAATGAGTTGGCATGTGA	1130
Valencia	GGACTATATGAAATCTGTTTTCTTGGCCTTTACAACCTTGGTAAATGAATTTACTTATTA	1097
Pineapple	-----	526
Maxima	GGACTATATGAAATCTGTTTTCTTGGCCTTTACAACCTTGGTAAATGAATTTACTTATTA	1076
Medica	-----	906
Reticulata	GGACTACATGAAATTTGTTTTTTTGGCCTTTACAACCTTGGTAAATGAATTTGCTTATTA	1181
Clementina	TGTTATGAAAATTCATGGCCTCAATACTCTATCCTACATTAAGAAAAGAGTGGGAAAATCT	1190
Valencia	CGTACTCAAACAACAGGGTTTTGATATACTTCGAAGTATAAAAAATGCCTTACGTAATAA	1157
Pineapple	-----	526
Maxima	CGTACTCAAACAACAGGATTTTATATACTTCGAAGTATAAAAAATGCCTTACGTAATAA	1136
Medica	-----	906
Reticulata	CGTACTCAAACAACAGGATTTTATATACTTCGAAGTATAAAAAATTCAGTATGTAATAA	1241
Clementina	GTGTAC-----ATCATACTAGTAGAAGCCAGATGGTTTAGCAAAGGGTA	1235
Valencia	ATTATGGCTTCGCAATATACAAGCCTACTTAGTGGAGGCGAAATGGTACCATAGTAAGTA	1217
Pineapple	-----	526
Maxima	TATACAAGCCT-----ACTTTGTGGAGGCGAAATGGTACCATGGTAAGTA	1181
Medica	-----	906
Reticulata	GTATAATTTGC-----CTCTCCC---GCCGTTCCGTTCTTTGATTTATC	1283
Clementina	CACGCCAACTGC6AAGGAA--TACATAGAAAATGCATGGGTTTCAAGTGGGAAAGCCCTGCT	1293
Valencia	CACACCAACTGGGAGAAATTC--TTGGAAAATGGACTGGTATCAATAGCAGGCCCAATA	1275
Pineapple	-----	526
Maxima	CACGCCAACTCTGGGAGAAATTTGGGAAA--ATGGATTGGTATCAATAGGAGGCCCTATG	1239
Medica	-----	906
Reticulata	CTTTTTAAATTACGATGTTTTTGTCTCAAAAATAAATAATGTAACCTAG-----	1332
Clementina	GCCATTGTCCATGCCTATATCTTGCTACAACCTCAAAGGAAGCAATGCCTTGACCGAAAAT	1353
Valencia	GTCACAATAAGTGATACCTTT-----CTGGTACAAAATCCGATCATTGAGAAG	1323
Pineapple	-----	526
Maxima	GTTACAATGACTGCATACCTTT-----CTGGGACAAAATCCAATCATTGAGAAG	1287
Medica	-----	906
Reticulata	-----	1332

Figura 40 – Continuação.

Clementina	TCACTCAGCTGCCTCAAAGTCGAACATGGCTATGATGAGATGATATATTGGTCATCTCTC	1413
Valencia	GAG-----CTAGAATTTCTAGAAAAGTAATCCAGATTTAGTTCACTGGTCATGCAAG	1374
Pineapple	-----	526
Maxima	GAA-----CTAGAATTTTAGAAAAGTAATCGAGATATAATCACTGGTCATTCAAG	1338
Medica	-----	906
Reticulata	-----	1332
Clementina	ATCAGTCGGCTCAGTAACGATTTGGGAAATCCGCGGTTGAGTTGAAGAGAGGCGACGTG	1473
Valencia	ATTTTCGTCTTCAAGATGATTTGGGAACTTCGTCAGATGAGATACAGAGAGGGGATGTT	1434
Pineapple	-----	526
Maxima	ATTCTTCGTCTTCAAGATGATTTGGGAACTTCGTCAGATGAGATACAGAGAGGGGATGTT	1398
Medica	-----	906
Reticulata	-----	1332
Clementina	GCGAAATCTATTCAGTGCTACATGATTGAAGAAGGCATATCAGAAGAAGAAGCAAGGGAC	1533
Valencia	CCGAAATCAATCGAGTGTACATGCATGAAACTGGTGCCTCGGAGGAAGTTGCTCGTGAA	1494
Pineapple	-----	526
Maxima	CCGAAATCAATCCAGTGTACATGCACGAAACTGGTGCCTCGGAGGAAGTTGCTCATGAA	1458
Medica	-----	906
Reticulata	-----	1332
Clementina	CGTATAAAAAGTTTGATAATTTACTCCTGGAAAAAGCTGAATGGCAAGAATCTTTATAAA	1593
Valencia	CACATCAAGGATATGATGAGACAGATGTGGAAGAAGGTGAATGCATACAGAGCTGATAAA	1554
Pineapple	-----	526
Maxima	CACATCAAGGATATGATGAGACAGATGTGGAAGAAGGTGAATGCATACAGAGCTGATAAA	1518
Medica	-----	906
Reticulata	-----	1332
Clementina	AGTGATTTT---CCAGAAAGCATGGCGAAAATGTGTTAGACATGTCTAGAAGTGCACA	1649
Valencia	GATTCCTCCCTATCTCAAATACAGTTGACTTCATGTTGAATCTTGTGAGAATG-TCCCA	1613
Pineapple	-----	526
Maxima	GATTCCTCCCTATAG-----	1533
Medica	-----	906
Reticulata	-----	1332
Clementina	TTGCA---TTTTCCATGGAGATGGTATAGGAACATCAACCGGGTTTCTAGAGATCGTTT	1706
Valencia	TTTTATGTATCTACGTGGAGATGGGCACGGTCTCAAACCAAGAGACTATGGATGTAGC	1673
Pineapple	-----	526
Maxima	-----	1533
Medica	-----	906
Reticulata	-----	1332
Clementina	GGTCTCTTAATACTTGAGCCTATACCAGTTGAATTGTAA-----	1746
Valencia	TTCTACATGGCTTTTTAGGCCATTCCTTGGAGGACAAACACATGGCTTTCACAGCACC	1733
Pineapple	-----	526
Maxima	-----	1533
Medica	-----	906
Reticulata	-----	1332
Clementina	-----	1746
Valencia	AAAGGCTGATGAATCCCAGAGTACAGTTTCAGTTGA	1770
Pineapple	-----	526
Maxima	-----	1533
Medica	-----	906
Reticulata	-----	1332

Figura 40 – Fim.

Clementina	-----MA--CSNNSIVACNGSNDPLQRRSANYHA	27
Valencia	-----MAKNKPQCLVSAKYDNLTVDRRSANYQP	29
Pineapple	-----	0
Maxima	MSSCINASTLVTSVNGFKCLPLTTNKAAIRIMAKNKPQCL-----	41
Medica	MSSSINPSTLVTSVNGFKCLPLTTNKAAIRIMAKNKLQCL-----	41
Reticulata	MSSCINPSTLVTSVNGFKCLPLTTNKAAIRIMAKNKPQCLVSAKYDNLTVDRRSANYQP	60
Clementina	SIWNPHELIESFTTPYTYELYANRLDELKQKADLFASAKESTSELLKLTDSVQKLGVAHY	87
Valencia	SIWDHDFLQSLNSKYTDEAYKRAAEELKGVKIAIKDVIE-PLDQLELIDNLQRLGLAHR	88
Pineapple	-----LGLAYH	6
Maxima	-----DEAYKRAAEELKGVKIAIKDVIE-PLDQLELIDNLQRLGLAHR	84
Medica	-----DEAYKRAAEGLKGVKIAIKDVIE-PLDQLELIDNLQRLGLAHR	84
Reticulata	SIWDHDFLQSLNSKYTDEAYKRAAEELKGVKIAIKDVIE-PLDQLELIDNLQRLGLAHR	119
	****:	
Clementina	FEEIEKAMNLIKGDA----TIKDLNATSLHFRLREHGHVSTGVDFKFRKRDRGRFHD	142
Valencia	FETEIRNILNNIYNNKDYNNRKENLYATSLEFRLLRQHGYPVSEQEVNGLKDGQGGFI-	147
Pineapple	FETEIRKILHNIYNSNKDYNNRKENLYATSLEFRLLRQHGYPVSEQEVNGLKDGQGGFI-	65
Maxima	FETEIRNILNNIYNNKDYNNRKENLYATSLEFRLLRQHGYPVSEQEVNGLKDGQGGFI-	143
Medica	FETEIRNILNNIYNNKDYNNRKENLYATSLEFRLLRQHGYPVSEQEVNGLKDGQGGFI-	143
Reticulata	FETEIRNILNNIYNNKDYNNRKENLYATSLEFRLLRQHGYPVSEQEVNGLKDGQGGFI-	178
	** **:: : : : * ****.*****:** ** : : . . * *	
Clementina	NLREDIEGLLNLFEASFLEGGEDVLEEANIFCTEHLKESLGTL--GSKIIAEQVQOQL	200
Valencia	--CDDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEAMISKSKEEHVFAEQAKRTL	205
Pineapple	--CNDFKIIMSLHEASYSLLEGESIMEEAWQFTSKHLKEVMISKSKEEHVFAEQAKRAL	123
Maxima	--CDDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEVMISKSKEEHVFAEQAKRAL	201
Medica	--CDDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEVMISKSKEEHVFAEQAKRAL	201
Reticulata	--CDDFKGILSLHEASYSLLEGESIMEEAWQFTSKHLKEVMISKSKEEHVFAEQAKRAL	236
	:* : : . . * . * : : . * . * : : * : * : * : * : * : * : * : * : * : * : *	
Clementina	DIPSYWRMPRIEAQNFILKYPTDDESSPILLTAKLDYNLVQSIHQELKELARWWSNLG	260
Valencia	ELPLHWVPMLEARWFIHVYKREDKNHLLLELAKLEFNTLQAIYQEEELKDISGWMKDIG	265
Pineapple	ELPLHWVPMLEARWFIHVYKREDKNHLLLELAKLEFNTLQAIYQEEELKDISGWMKDIG	175
Maxima	ELPLHWVPMLEARWFIHVYKREDKNHLLLELAKLEFNTLQAIYQEEELKDISGWMKDIG	261
Medica	ELPLHWVPMLEARWFIHVYKREDKNHLLLELAKLEFNTLQAIYQEEELKDISGWMKDIG	255
Reticulata	ELPLHWVPMLEARWFIHVYKREDKNHLLLELAKLEFNTLQAIYQEEELKDISGWMKDIG	296
	:* : : . . * . * : : . * . * : : * : * : * : * : * : * : * : * : * : * : *	
Clementina	FKEKLSFARDRLMENYLLVM---GLCFKAQFSKCRIGLTKFVCILTAIDDIYDVYGSIDE	317
Valencia	LAEKLSFARDSLVASFVRSMGSMGVFKPQLAYCRRIRITIFALISVDDIYDVYGTLDDE	325
Pineapple	-----	175
Maxima	LGEKLSFARDSLVASFVRSMGSMGVFKPQLAYCRRIRITIAIALITVDDIYDVYGTLDDE	318
Medica	-----	255
Reticulata	LGEKLSFARDSLVASFVRSMGSMGVFKPQLAYCRRIRITIAIALITVDDIYDVYGTLDDE	353
Clementina	LELFTEAVKSFPPSYILSFCFMGISPKIRWEIGAVLEELPEYMQICYLAMFNFGNELACD	377
Valencia	LELFADAVE-----RWDINYALNHLDPYMKFCFFALYNLVNEFTYY	366
Pineapple	-----	175
Maxima	LELFTEAVKSFPPSYILSFCFMGISPKIRWEIGAVLEELPEYMQICYLAMFNFGNELACD	359
Medica	-----RWDIHYALNHLDPYMKLCFFALYNLVNEFTYY	286
Reticulata	LELFTEAVKSFPPSYILSFCFMGISPKIRWEIGAVLEELPEYMQICYLAMFNFGNELACD	394
	-----RWDIHYALNHLDPYMKLCFFALYNLVNEFTYY	
Clementina	VMKIHGLNTLSYIKKE----WENLCTSYLVEARWFSK---GYTPTAKEYIENAWSVVGS	429
Valencia	VLKQQGFDILRSIKNALRKLWLRNIQAYLVEAKWYHS---KYPTLGEFLENGLVSIAG	423
Pineapple	-----	175
Maxima	VLKQQGFDILRSIKNA----WLGNIQAYFVEAKWYHG---KYPTLGEFLENGLVSIAG	411
Medica	VLALQKDSSEFQIES-----	301
Reticulata	VLKQQGFDMLRSIKNS----VCKMLILPLPPFRSFDLSFLNVDVFSKIINCN-----	443
Clementina	PAAIVHAYILLLQQGSNALTENSLSCLKVEHGYDEMIYWSSLISRLSNDLGNSAVELKRG	489
Valencia	PIVTISAYL----SGTNPIIEKELEFL---ESNPDLVHMSCKIFRLQDDLGTSSDEIQRG	476
Pineapple	-----	175
Maxima	PMVTMTAYL----SGTNPIIEKELEFL---ESNRDIHWSFKILRLQDDLGTSSDEIQRG	464
Medica	-----	301
Reticulata	-----	443
Clementina	DVAKSIQCYMIEEGISEEAEARDRIKSLIIYSWKKLNGKNLYKS-DFPESMAKMLDMSRT	548
Valencia	DVPKSIQCYMHETGASEEVAHEHIKDMRQMWKVNAYRADKDSPLSQNTVDFMLNLVVM	536
Pineapple	-----	175
Maxima	DVPKSIQCYMHETGASEEVAHEHIKDMRQMWKVNAYRADKDSPL-----	510
Medica	-----	301
Reticulata	-----	443
Clementina	AHC-IFHGDGIGTSTGVSRRDLVSLILEPIPELV-----	581
Valencia	SHFMYLRGDGHGAQNQETMDVASTWLFQIPLLEDKHMFAFAPKADEFPEYSFS*	589
Pineapple	-----	175
Maxima	-----	510
Medica	-----	301
Reticulata	-----	443

Figura 41 - Alinhamento das sequências de proteína dos genes “orange1.1t04775.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g046807m” (“Pineapple”), “Cg3g004080.1” (*C. maxima*), “Cm257260.1” (*C. medica*) e “MSYJ216420.2” (*C. reticulata*).

Maxima	-----AGAAA-----TTTTTTTTAATCCGTATTGAATTCG	30
Reticulata	-----	0
Medica	---ATTGGATATA-----TAGATGTAGAGTAAGCTAGCTTACAGTTA	39
Valencia	CCTCCTGTAGATTTTGATCTGTCTCCTCCATGTGAATTTTATTATATCAATAAT	60
Clementina	---GGGGAGAATATAATT-----AATATGATTTA-----CAAT	30
Pineapple	-----	0
Maxima	CAAAAGTGGAAATGAATATGGATTATATCAAATCCACTTCTAATCTGAAGAATTATGAATT	90
Reticulata	-----	0
Medica	TACTTGCGAAGATTCTCAAATTAATCTATGGTTTGTGGTGATGTACGAGGTATATATA	99
Valencia	TTACAGGTAAGGGGT-CCTGCCTAACCC-CACCAACTTTGGGTATTTTAAATAAAAAA-	117
Clementina	TTGTAGGGGAATGCT-TAGAAGAAACAGATACAATATAACAATATATATACATATACACA	89
Pineapple	-----	0
Maxima	GAATTTAGATTAATTTTACTAATTCATG-GATTGAATGGGATAAAAATTATAACGATT	149
Reticulata	-----	0
Medica	TATATAGGCAGAG---GAGAAGTTCATGTGATTTATTTTCGTAATCATTTTCTGAGT	156
Valencia	-----AGCATAA-----AAATGGTCA---TTGAAGAATCGATCAAAAATGTTGTGAAC	162
Clementina	CACACACACAG---AGTTCTTAAAAAGAAAAGCATCAAGTTGTTGAGAAT	143
Pineapple	-----GT	2
Maxima	TTACTAGTTGTCAATTATTAGAATTTTT-TCACAACGCGCTTTTGTAGAA-TGTTGTG	207
Reticulata	-----	0
Medica	TTTGAAAGCGTTTAAATTTTAAAGCTTAATAGTACAAAAGTATTTTATTCATTTGGGGGG	216
Valencia	AGAGAGTACTTCTGAGTGTCTCT-CTCACT-TTACCAAGAT---G-AAAAATTCAGGG	215
Clementina	AGTTGCAAGTTGTGAGAGGGATG-CCAAAT-TCATCAATTAACCTGATACAATTCAGAG	201
Pineapple	CTTTGCAAGT-----	12
Maxima	-----AGATTGAACATCTATTGAAGAGTTTTTAAACAACATTCTTTCGCTTGT-----	254
Reticulata	-----	0
Medica	-AAAAAAAAGGAGTACATCA-----TACTGTG-----	242
Valencia	-----GAGCAGAGTTCCTGCAAAAACAGCGTAGCTGTGATAAGTCTTTCGCGTTGCAATCC	270
Clementina	TCAACGATCATGTTTCACGTGAACTTGCCCTTCTTTGACTATATTGGGTGTGTA----	257
Pineapple	-----	12
Maxima	---TGTCAAATATAAAATTTTACAACACACATTCCAACCGCTGTTAAATGGAAG	311
Reticulata	-----	0
Medica	---CGAACGAGGTCAATATTGTACCAGAAGACAGTACATCATCCATACATCCGATGAA	299
Valencia	CGAAGTAAAAGTTTCAATTTGTCTATGACCACTTTTCATACCTC-----CTCGGCTGGTGGC	325
Clementina	---GGTTGCATT-----AATTACCTC-----TATTCCCTCAAGA	289
Pineapple	-----	12
Maxima	TTTTTTGAAATTATTACAAATATCACAATCTACAATATATAAAATCCATTATCTCCAA	371
Reticulata	-----	0
Medica	TGTTGTATAATCTTT-----ATTTA-----TTTATC	325
Valencia	CTTTAATTATTCTTA-----GTTAGA	346
Clementina	TTTTAGATAACCTTT-----TTTATA	310
Pineapple	-----	12
Maxima	TCAACTTTTGTGATAATCATTTTAAATTTATTAATTTGTTTTCCGCAAAAGTACTTT	431
Reticulata	-----	0
Medica	TTTTTTTTCTCGCATACA-----AATTTTTTAAAGAGTCTTCAATAAACTACACA	377
Valencia	ATAGTTTTGAGTCGGTGCT-----ACATGTGGCTTTTGTACTGGGTTAACT-----	393
Clementina	TT-----A-----CATTATTGATTTTTTCATCAAAATAAAATACACA	345
Pineapple	-----	12
Maxima	ATAACTG-----TAACAGATAGAAT-TTCGAT-----GTTAGTGTCT	466
Reticulata	-----	0
Medica	ATAAATGCAGCAGAAATGACAAGAAATTC-ATAAATCAATTCTACTAATAAAAGTTCT	436
Valencia	-----GGCAGCAGTCACAATCAACTTCATCGCTTTGTAATTT-----TCCAGTACC	439
Clementina	A-----ATACACAGATGTACCATACGTATATTAAGTGTATATAGTATAATAAAATACT	400
Pineapple	-----	12
Maxima	CAACATTAAG-ATATTGTTGCAACTTTGTATGCCTTTTTTTTTT-----CCTTAAAT	518
Reticulata	-----	0
Medica	-----ATTTATTACATTAATACTTGTTTTATGTAG-----AAA	470
Valencia	ACAGAGTCAACAGTCAGGCTCATGAAAGGAAA-----TTATTTGTATTTTTCTTATTG	492
Clementina	CTAAAACTACTGTTATTCCTCATACATTTCTAATAGTATTATAAACATATCATTATCCATT	460
Pineapple	-----	12

Figura 42 - Alinhamento das sequências promotoras dos genes “orange1.1t04775.1” (“Valência”), “Ciclev10017785m” (*C. clementina*), “orange1.1g046807m” (“Pineapple”), “Cg3g004080.1” (*C. maxima*), “Cm257260.1” (*C. medica*) e “MSYJ216420.2” (*C. reticulata*).

Maxima	TTACTTTGTATATCTTATTTCTACATA--AAACAAGATTTAATGTAATAAATAGAAGT	576
Reticulata	-----	0
Medica	TAAGAATATACAAAGTAAATGTAAGGAAGAAAAAGGCATACAAAGTTGCAAAACAATATC	530
Valencia	GCATAAAATAAATAATGAAATAAAAATAAAAATACAG-----AATTTAATATTTGAATT	546
Clementina	TGATAATGACTACGGTTGTTCAAAGTATATAAAAAAT-----ATGTTACAATAAGACGT	514
Pineapple	-----	12
Maxima	TTTATTAGTAGAA-----TTGAATTTATGAATTTCTTGTCATTCTCGCGTGCAATTTAT	630
Reticulata	-----	0
Medica	TTAATGTTGAGCACTAACATCGAAATCTATCTGTT--ACAGTTATAAAGTACTTTTGGG	588
Valencia	TT-----GATTTAAGTCTAACTTATGT-----GTAGCTAGAGGCGAAGTTTGA	591
Clementina	TCAATTAATCGGACTGACCAAAATATTATGGCAGTATGGTGGATACACCAAACTTGATTC	574
Pineapple	-----	12
Maxima	GT-----GTAGTTATTGAAAGACTCTTTAAAAAATTTGTATGCAGGAAAAAAA	679
Reticulata	-----	0
Medica	GAAAACAAATTAATAAATTTCAAATGATTATCAACAAAAAGTTGATTGGAGATA--ATG	646
Valencia	GAAGACTAGAAAGATTGAACCCA--AGTCTCTACGCTCATATTTTATAAACACA--AAC	646
Clementina	AATGATTAGTAGGGATGGCAAAACATCGGGTCGGGCTCGGGCTTGGCCAAACCCA--ACC	632
Pineapple	-----	12
Maxima	AAGATAAATAAATAAAG-ATTATACAAC-----ATTCATCGGA-----A	717
Reticulata	-----	0
Medica	GATTTAATATATTGTAGATTGTGATAAATTTGTAA--TAATTTCAAAAAAATTCATTTA	704
Valencia	GACATTGTTGGATATTTGTTCTAGGAATGACTAT---GATAATAGAA---GATAATTA	699
Clementina	CGACCTGATCAATAGAGAATTAAGCCCGACCTTAAAAAACCATACGTATTTATATTTA	692
Pineapple	-----	12
Maxima	TGTATGGATGATGTATGTCTTCTGGTACAATATTGACCTCGTTCGCACAGTATGATGT	777
Reticulata	-----ACAATAATGACCTCGTTCGCACAGTATGATGT	32
Medica	ACAGCGGTTGGTGAA-----TGTTG--TTGTAATAA	734
Valencia	AAATGG-----ACTAATCCAATAATTA--GGCGCTCCTT--CTTTAAGCT	740
Clementina	GGGTCGGGTCGGGCCGACCGAATCGGGCCAACATCGGGTCGGGCTAGG--CTCGACCTT	751
Pineapple	-----	12
Maxima	ACTCCTTTTTTTTCCCCCAAATGAATAAAATAATTTGTACTATTAAGACTTAAAAAT	837
Reticulata	ACTCCTTTTTTTTCCCCCAAATGAATAAAATAACCTTTGTACTATTAAGACTTAAAAAT	92
Medica	AATTTAATATTTGACAACAAGCGAAGAATGTTGTTAAAAACT---CTTCAATAGATGT	791
Valencia	AAACC-AAATAATAGGAAGTCA--TTTTTTGTTATATTTACTTTTTGATCCTGTAACT	797
Clementina	ACCGA-AAACATTTTCAACCCACAATTCATGTTGAAAAATCAACTTCTTCATGTCATAT	810
Pineapple	-----	12
Maxima	TAAACG-----CTTTCAAACCTCAAAT----GAGTACGAAAA-GTAAATC	877
Reticulata	TAAACG-----CTTTCAAACCTCAGAAAAAATGAGCACGAAAA-ATAAATC	137
Medica	TCAATC-----TCACAACATTTCAAAAAGC---GCGTTGT---GAAAAATTTTAAATAA	840
Valencia	TTTTTC-----TTTAAATGCCACAGCTCTAATTTCTATCCTCATTAAATTAATAG	848
Clementina	ATAAGAATTCGAATGAGGCAATGAAGCATCTACCATTAACTAATAAATAAT-TTATTTT	869
Pineapple	-----	12
Maxima	ACATGAACCTCTCCTCTGCCTATATATATATAAACCTCGTACATCACCACAAAC-----	932
Reticulata	ACATGAACCTCTCCTCTGCCTATATATATATAT-----	170
Medica	TTGACAACCTAGTGAATAATCGTTATAAATTTTAACTCATTCAATCCATGAATAGT-A	899
Valencia	GGTACGAT-----TTGTCAAATGC--GATTTAAATGGGTGATGATGATGATACTGAAA	898
Clementina	TTTAAAC--ATGATACACAAATATATCGAATATTTTAAATGCAATTAATTAATAA	926
Pineapple	-----	12
Maxima	-----CATAGATTAATTTGAGAATCTT-----TGC-C---AAGTATAACTGTAAGC	974
Reticulata	-----	170
Medica	AAATTAATCTAAATTCATTCATAATCTGCAGATTAG-AAGT-AGATTTGATATAATCC	957
Valencia	GTAGCCCTTGTGCTTAACATGCTATGAACCATGCTTGAATAATCGAGTATAACTGCATCC	958
Clementina	ACACACAATGCAATTAATTAATAAATAACA-----CAATGT-----AATTC	967
Pineapple	-----	12
Maxima	TAGCTTACTCTACATCTATATATCCAA-----	1001
Reticulata	-----	170
Medica	ATATTCATCCACTTTTGGCAATTCATACGGATTAATAAAAAA-----	1001
Valencia	AT---CCTCATCTGTAGGAATTTGAATGAGCCTCACTTAAGTATA--	1001
Clementina	AC---AACCATTTTAT-----CCATACCAATTCATTTAAC	1001
Pineapple	-----	12

Figura 42 – Fim.