

Six Papaya Cultivars Grown

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Six papaya (*Carica papaya* L.) cultivars, grown in a Mediterranean climate under greenhouse conditions, were screened for physicochemical properties, antioxidant capacity, nutritional and sensory characteristics. The fruits, harvested with more than 50% of yellow surface (between 60% and 77%) were tested for carotenoids content, phenolic content, reducing activity (ABTS), and cellular antioxidant activity (CAA₅₀). The physicochemical traits were measured in terms of the titratable acidity and soluble content whereas proximal composition along with moisture, fats, total sugar, ash, vitamin A, C, and E content. Moreover, the sensory profile was analyzed by a semi-trained panel. Although the six analyzed cultivars reached qualitative characteristics to satisfy market needs, significant differences among them were found in a genotype-dependent manner. In particular, Cartagena and Maradol cultivars evidenced the highest values of minerals and vitamins, carotenoids, polyphenols, ABTS and CAA₅₀ and reached the best commercial requisites (size, total soluble solids content/titratable acidity ratio). As for sensory analysis, we observed significant differences only for sweetness, juiciness, odor, and flavor of peach and exotic fruits whereas descriptors related to unpleasant defects or sensations always have very low scores in all the observed cultivars. These results highlight the possibility of obtaining quality papaya fruits in a Mediterranean climate using greenhouse growing.

Keywords: fruit quality ; antioxidant activity ; antiproliferative activity ; carotenoids ; physicochemical

1. Introduction

Papaya (*Carica papaya* L.) is a perennial herbaceous plant native to tropical America, with a range that extends from Asia, to America and Africa. Its diffusion is due to the abundance and longevity of its seeds. Papaya is a climacteric fruit whose maturation is accompanied by tissue softening, an exocarp color change, and the development of a strong and characteristic aroma. The color varies according to the degree of ripeness. In Europe, its cultivation is limited to a few Mediterranean countries, such as Spain and Italy where it is only cultivated in Sicily under greenhouses [1][2]. In Sicily, varietal selection is performed to obtain plants with hermaphrodite flowers to promote self-pollination, and with small fruits [3]. However, the propagation of seeds that originated in tropical areas has caused the spread of numerous genetic entities that produce very heterogeneous products. This presence of very different selections leads to fruits being brought to market with widely different pomological features, aromas, and flavors. This goes against market demand and makes it more difficult for consumers to appreciate the product. The ripeness papaya scale of reference is that described by Basulto *et al.* [4]. According to this scale, the stages of harvesting are stage 3 (one or more orange-colored stripes in skin; pulp almost completely orange in color, except near skin, still hard but contains less latex) and 4 (skin clearly range in color with some light green areas; pulp completely orange, except near peduncle, softer than in stage 3, but still too hard for consumption, low latex content). It has been reported that the loss of chlorophyll produces yellow and red tones; carotenoids, lycopene, and other pigments are responsible for these colors that will increase during ripening [5]. In Sicily, given the relative proximity of the European markets, the fruits could be harvested for consumption later and therefore allowed to ripen to late stages. This would improve the organoleptic characteristics of the fruits since on-tree ripening is considered less drastic and usually associated with better quality parameters of fruit that ripens in storage. Papayas that remain attached to the tree will also delay ripening compared to papayas that ripen in storage [5][6]. Furthermore, ripening in storage at high temperatures and low relative humidity effects nutritional and organoleptic qualities [7]. Furthermore, although some fruits accumulate starch that breaks down into sugars through catabolic degradation during the ripening process, this is not the case for papayas [8]. The aim of this study is to determine the physicochemical and nutraceutical characteristics of six papaya cultivars, obtained from seed, cultivated in Mediterranean climate in Sicily in greenhouse conditions, and harvested at late stages. The cultivars analyzed are Guinea Gold (Australia), Sinta (Philippines), Honeydew (India), Cartagena (Dominican Republic), Maradol (Cuba), and Solo (Barbados). The analysis carried out was: Physicochemical, Total Carotenoids Content, Total Phenolic Content, Total Antioxidant Activity, Radical Scavenging Activity (CAA), Proximate Composition, and Sensory Profile.

2. Conclusion

All cultivars analyzed reach chemical-physical traits that satisfy the market needs. However, our results showed a wide range of variability in terms of physicochemical traits, proximal composition, antioxidant capacity, and sensory characteristics. In fact, significant differences were found in the characteristics in a genotype-dependent manner. As for sensory analysis, the descriptors related to unpleasant defects or sensations always have very low scores. Moreover, the fruits of the six cultivars are rich in molecules with antioxidant activity, especially polyphenolic phytochemicals. These data suggest a potential protective effect on the quantities commonly consumed with food. In conclusion, we can say that our data are comparable to the tropical and subtropical fruits; and highlight the possibility of obtaining quality papaya fruits in a Mediterranean climate harvesting fruit with more than 50% of yellow surface and using greenhouse growing. Further studies, which are not the subject of this research, should analyze the vegetative-productive characteristics of these genotypes in order to assess their overall potential.

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