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Food and economic importance of tapioca roots

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Abstract: Tapioca has become a multipurpose crop that responds to the priorities of developing countries, to trends in the global economy and to the challenge of climate change. Tapioca (cassava) is the most important tropical root crop, originally from Amazonia. Its starchy root is a major source of dietary energy and provides the staple food of an estimated 800 million people worldwide. It is known to be the highest producer of carbohydrates among staple crops. According to United Nations Food and Agriculture Organization (FAO), tapioca ranks fourth of food crops in developing countries after rice, maize and wheat. Grown almost exclusively by low-income, smallholder farmers, it is one of the few staple crops that can be produced efficiently on a small scale, without the need for mechanization or purchased inputs, and in marginal areas with poor soils and unpredictable rainfall. The edible leaves are relatively rich in protein. Tapioca can be stored in the ground for several seasons, and thereby serve as a reserve food when other crops fail. Tapioca is also increasingly used for animal feed and in different industrial processes and products.



• Introduction

Cassava is the most widespread root crop in the tropics and the sixth most important crop (after wheat, rice, corn, potatoes and barley) in the world. It constantly contributes to food security, as its mature edible roots can be stored in the ground for up to three years. Tapioca, cassava, madioca, yuca, kappa or - the best known name - "manioc" is a tropical shrub with thickened roots in the form of tubers, from which this floury substance is obtained, called "tapioca" - a kind of cassava paste (Sunita and Mustt, 2008. Tapioca is a delicious starch extracted from a plant called Cassava (cassava), native to South America. It has roots in the form of tubers that contain about twice the caloric amount of the potato, a 100 g root with 160 calories using as the principal source of food and nutrition for many of the world's undernourished / poorest households. TRCs, being a rich source of carbohydrates (starchy roots) (Blagbrough *et al* 2010), have multiple uses, most notably as regular food crops, cash crops, and are increasingly used as livestock feed, raw material for industrial purposes, and also processed for human consumption. Recently, commercial starches, obtained from cassava dominate in the world markets of food and pharmaceutical industries (Odeku, 2013). However, it is richer in protein than potatoes and other tubers similar to it, such as yam (a kind of sweet potato), taro, etc. (<https://www.nutrition-and-you.com/cassava.html>); (Ray *et al*, 2009); (Scott *et al*. 2004).

Cassava is consumed in different forms, from the root as such French fries, flour for bread or pastries and ending with beverage specialties. From cassava is can obtain thick syrup, flavored with different spices and used as a base for various sauces but also as a spice. Gives a delicate aroma in soups and purees. In some countries the leaves are also consumed. Cassava is also used as an ingredient in animal feed. Tapioca beans or pearls are best for making delicious puddings. Tapioca, which can be cooked in the form of puddings and desserts. Flour is used for sauces, puddings, jelly replacing starch. Cassava roots can be processed into fermented beverages such as wine or beer (Saranraj, 2019).

An important aspect of this plant is the lack of gluten, so tapioca is very often used in gluten-free foods (<https://www.nutrition-and-you.com/cassava.html>)

Among the benefits brought by tapioca in the body we can give as an example the improvement of digestion, blood circulation, reduction of cholesterol, maintenance of heart health, prevention of Alzheimer's disease, diabetes, congenital malformations, also protects bone mineral density, helps to increase the number of red blood cells. Saponins, sapogenins, glycoalkaloids and antioxidant defense enzymes (superoxide dismutase, catalase and glutathione peroxidase) from tapioca have shown many benefits: Antibacterial, antifungal, antiobesity, antioxidant, antiviral, antitumor, anticancer, antiestrogenic, antiproliferative and cytotoxic activity (Poornima and Ravishankar (2009), Huang *et al*. (2012) Ginzberg *et al*. (2009), Liu *et al*. (2004)).

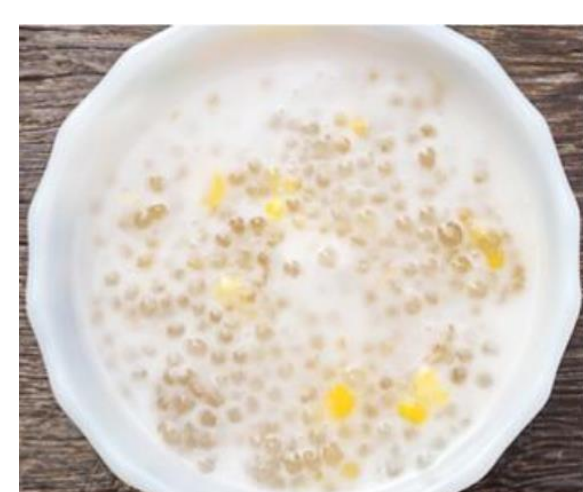
By chemical point of view, tapioca has a unique composition of carbohydrates, vitamins, minerals and organic compounds, including a very low level of saturated fats, cholesterol and sodium but also B-complex vitamins, iron, magnesium and calcium (<https://www.nutrition-and-you.com/cassava.html>).

Despite all these benefits, it must be borne in mind that this plant has toxic potential if not properly processed. (www.organicfacts.net).

Recent researchers were evaluating the use of cassava as a biofuel to replace gasoline. Cassava is also used in the pharmaceutical, textile, paper and adhesive industries. (<https://www.nutrition-and-you.com/cassava.html>)

• Material and method

Three types of jelly and tapioca bun were prepared with fruit puree: quince, blackberry and mango. The recipe was optimized for each dessert, adjusting the water and sugar content. The sensory evaluation of these deserts was done using the 9-point hedonic scale. The following characteristics were evaluated: appearance, color, taste, odor, consistency.



• Results and discussions

The sensory characteristics are shown in graphical form in fig. 1 and 2.

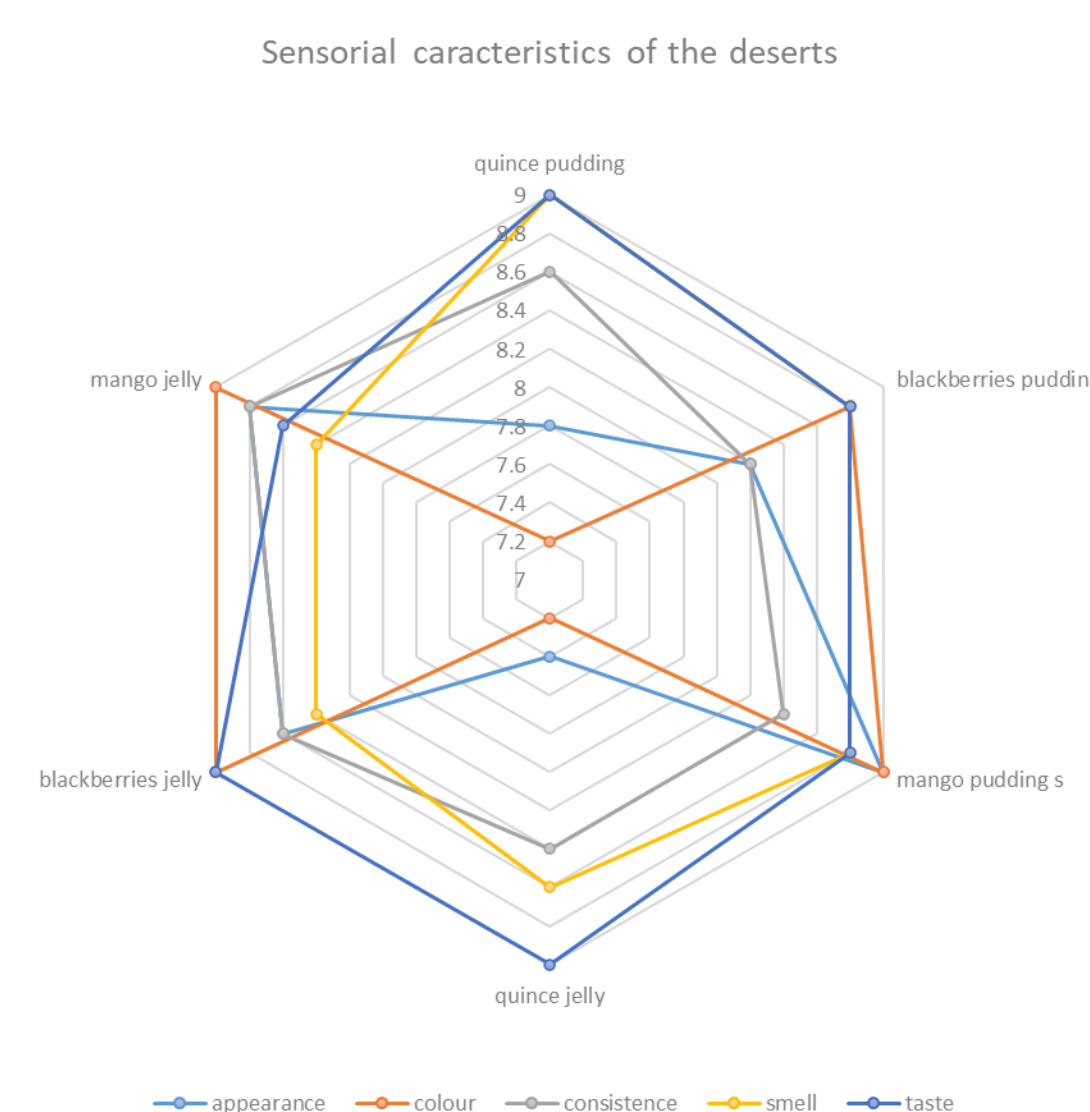


Fig. 1

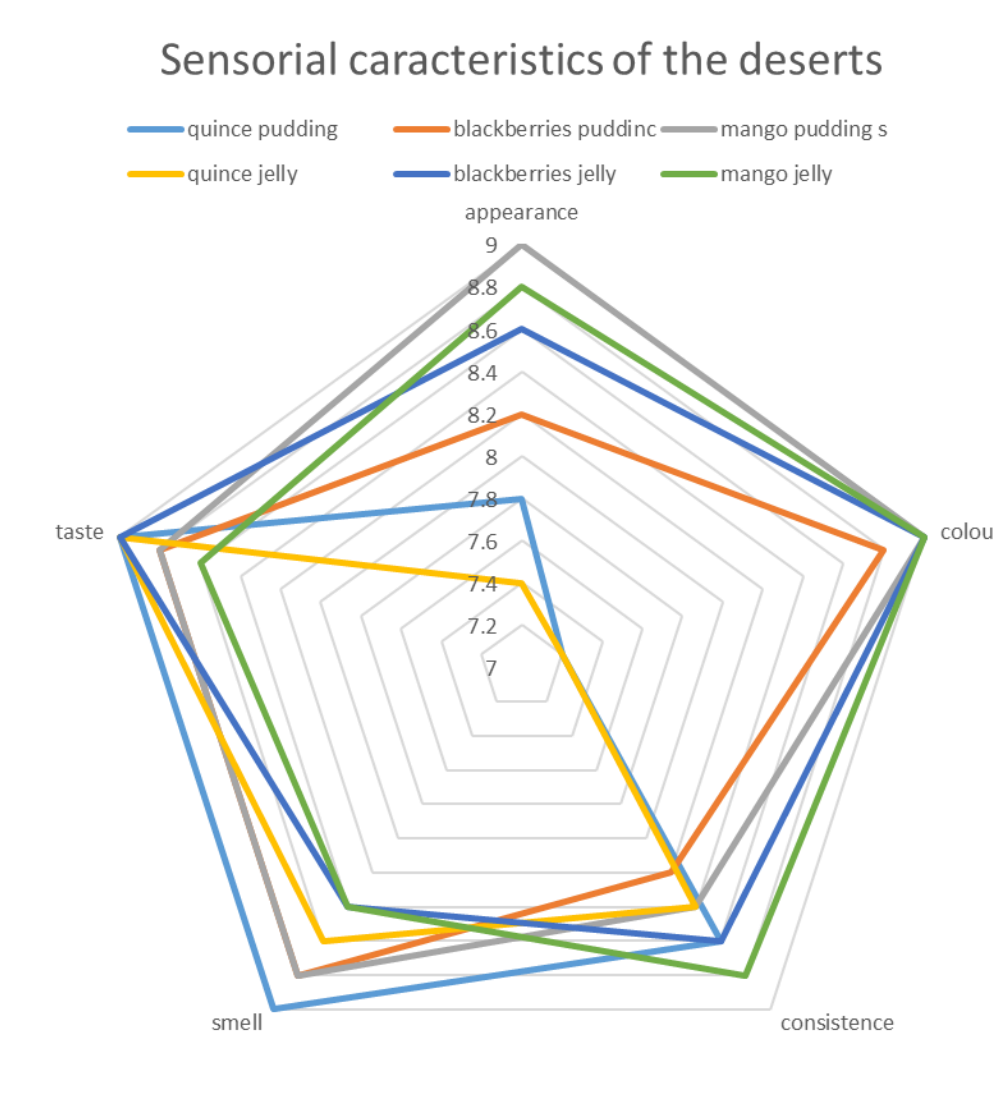


Fig. 2

The appearance of the desserts was appreciated with values between 7.4 and 9, the most appreciated being the tapioca pudding with mango puree, and the most outstanding was that of the tapioca jelly with quince puree.

The mango and blackberry fruits led to very good assessments in terms of appearance, both in the case of puddings and jellies, while quince puree gave desserts a less appreciated color.

The consistency of tapioca desserts and fruit purees did not vary significantly, being appreciated in the range of 8.2-8.8.

In assessing the smell, quince puree contributed substantially to the pudding, obtaining a maximum score. The smell was not perceived as intensely in jellies as that perceived in the case of puddings.

Quince and blackberry purees have greatly contributed to the finalization of the taste, both in the case of puddings and jellies. The mango puree was not much below the maximum threshold either, but the other two fruits were more appreciated.

• Conclusions

All types of desserts were very well appreciated by the evaluators, having a good acceptability for consumers.

The sensory characteristics evaluated were different from product to product, being in direct correlation with the addition of fruit used.

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