

SENSORY EVALUATION AND CUSTOMERS' PERCEPTION OF SOME PAWPAP (*Asimina triloba* Dunal) PRODUCTS

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Abstract

Pawpaw (Asimina triloba Dunal) is a native North American fruit species that belongs to the Annonaceae family. In Romania, it was introduced for the first time in 1926, by Suci family from Alba County, but for many decades remained unknown. Extended studies on the plant and new varieties are made at the Experimental Field, within the Faculty of Horticulture in Bucharest, starting with 2000. The purpose of this paper is to present the sensory evaluation of some pawpaw processed products: pawpaw ice cream; pawpaw yoghurt; pawpaw with sweet cottage cheese; pawpaw chocolate bar. Customers' perception consisted on the evaluation of general appearance, colour, texture, taste and flavour, noticed with grades from 1 to 7. The results showed that most of analysed products have been positively appreciated by consumers and their preferences varied with gender, age and origin.

Key words: customers' preferences, food products, northern banana, raw materials.

INTRODUCTION

Asimina triloba (L.) Dunal, or pawpaw, is the only temperate plant species that belongs to the *Annonaceae* family (Padmanabhan & Paliyath, 2016). Is a native North American fruit species including nine species of *Asimina*. Grows on the eastern part of the continent, from Florida to South Canada.

In the south-eastern part of Florida and Georgia State, there are eight other members of *Asimina* genus: *Asimina incarnata* (flag paw-paw), *Asimina longifolia*, *Asimina obovata*, *Asimina parviflora* (dwarf paw-paw), *Asimina pygmaea*, *Asimina reticulata*, *Asimina tetramera* (oposum paw-paw), *Asimina* × *nashii* (Callaway, 1993; Stănică et al., 2008).

In Romania, the first *Asimina* plants arrived in Transylvania from North America at the beginning of the 20th Century. They were locally cultivated and remained unknown in the rest of country (Dănăilă et al., 2004).

Only after 2000, at the Faculty of Horticulture in Bucharest, was a scientific evaluation of this interesting species started with the goal of studying the propagation techniques, orchard management and its behaviour under Romanian

conditions (Stănică, 2002; Stănică et al., 2004; Stănică et al., 2008).

The color of the fruit changes from creamy white through bright yellow to shades of orange. (Levine et al., 2015).

The flavor of ripe pawpaw fruit resembles a combination of banana (*Musa* × *paradisica*), mango (*Mangifera indica*), and pineapple (*Ananas comosus*); however, flavor varies among varieties, with some fruit displaying more complex flavor profiles (Padmanabhan & Paliyath, 2016).

Although pawpaw is sometimes confused with papaya (*Carica papaya*), but it is an entirely different species (Levine et al., 2015). Papaya is a tropical plant grown in tropical regions, but pawpaw can grow well in tropical regions as well as in humid microthermal climates. (Padmanabhan & Paliyath, 2016).

Regarding nutritional value, pawpaw is a nutritionally rich fruit with high levels of antioxidant compounds. Brannan et al. (2015), reported that pawpaw fruit contains a large amount of procyanidins, which have antioxidant effects, and Kobayashi et al. (2008), demonstrated that pawpaw fruit exhibits antioxidant activity. The pawpaw antioxidant

content is similar to values for strawberry and orange, and is almost ten times higher than values for banana and apple (Nam & Jang, 2018; Pellegrini et al., 2003).

Minerals and vitamins are comparable to banana, apple and orange. Pawpaw fruit are high in vitamins such as vitamin C, niacin, protein and minerals, amino acids and they can be considered an excellent source of potassium, calcium, phosphorus, iron and magnesium, all very important micronutrients that are often lacking in the diets of children and seniors, along with unique taste, make it an interesting alternative to the most commonly consumed fruits (Galli et al., 2007; Templeton et al., 2003).

MATERIALS AND METHODS

The objective of this study is to present sensory evaluation and customers' perception of some pawpaw (*Asimina triloba* Dunal) products.

All the products were prepared at the Research Center for Studies of Food Quality and Agricultural Products, in the Integrated Fruit Growing Laboratory.

The tested sensory characteristics included overall aspect, color, texture, taste and flavor.

For sensory evaluation, consumers were asked to rate the products on a 7-point Hedonic scale: 1=very unpleasant/dislike it very much; 2=unpleasant/dislike it; 3=a little unpleasant; 4=indifferent; 5=a little pleasant; 6=pleasant; 7=very pleasant.

Colour is important sensor character on which the consumer preferences dependent.

Color affects our perception of food and drink in different ways. The most obvious of these refers to the color of the product itself, which will change even the taste and the perceived aroma (Spence et al., 2010; Spence, 2016; Spence, 2018).

The products were evaluated by consumers represented by 70% women and 30% men with ages between 10 and 72 years old (Figure 1).

Pawpaw fruit can be consummated as fresh fruits or as processed products. The products prepared and tested were:



Figure 1. Products testing

Pawpaw ice cream

All the ingredients were mixed: yoghurt, pulp of pawpaw, honey, and sea buckthorn, for the second option, and put it in the special ice cream machine (Figure 2).



Figure 2. Pawpaw ice cream with honey/
Pawpaw ice cream with sea buckthorn

DAIRY PRODUCTS WITH PAWPAP

Yoghurt with chokeberry or sea buckthorn

Mixed yoghurt with pulp of pawpaw, juice of chokeberry or sea buckthorn and little honey (Figure 3).

Yoghurt with biscuits

Yoghurt with pulp of pawpaw and crushed biscuits (Figure 3).



Figure 3. Dairy products with pawpaw: Yoghurt with pawpaw and chokeberry/sea buckthorn; Sweet cottage cheese and pawpaw; Yoghurt with pawpaw and biscuits

Cakes with pawpaw

Mixed all the ingredients: pulp of pawpaw, powder of jujube, juice of sea buckthorn or chokeberry and put them in equal quantities in wafer sheets and a chocolate glaze over (Figure 4).



Figure 4. Pawpaw cake with jujube powder and sea buckthorn/chokeberry

Chocolate bar with alcoholized pawpaw

Mixed all the ingredients: dark chocolate and pulp of alcoholized pawpaw and put them in special form for bars (Figure 5).

Chocolate bar with pawpaw

Mixed all the ingredients: dark chocolate and pulp of fresh pawpaw and put them in special form for bars (Figure 5).

Sweet cottage cheese and pawpaw

Mixed sweet cottage (0.2 fat) with pulp of pawpaw and putted on the crackers (Figure 3).



Figure 5. Chocolate bar with alcoholized pawpaw / Chocolate bar with pawpaw

RESULTS AND DISCUSSIONS

The data collected from the questionnaires completed were processed into graphs.

The pawpaw ice cream with honey was the most appreciate (Figure 6). The flavor, being the most intense, made the difference between the two. The graph of ice cream pawpaw sensory characteristics can be found in Figure 7.

The mixture of sweet cottage cheese and pawpaw such was a success, maybe the used salty crackers too. The combination of sweet and salty was very appreciate. The graph dairy products can be found in Figure 8.

Among the three yoghurts presented, the most appreciated was the yoghurt with pulp of pawpaw and chokeberry. The most appreciated parameter was the texture, for the sweet cottage cheese with pawpaw, and the lower the texture of yogurt with pawpaw and biscuits (Figure 9).

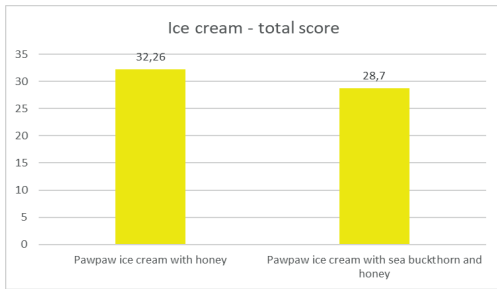


Figure 6. Pawpaw ice cream - total score

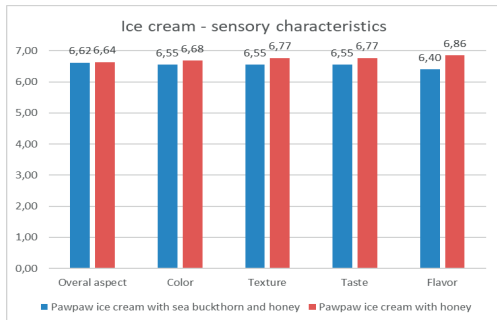


Figure 7. Pawpaw ice cream sensory characteristics

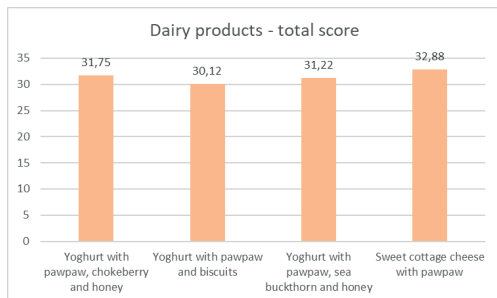


Figure 8. Dairy products - total score

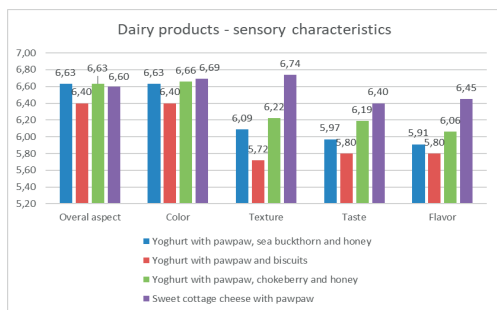


Figure 9. Dairy products sensory characteristics

Both of cake was very appreciate (Figure 10). The consumers appreciate much more the combination of pawpaw with chokeberry than with sea buckthorn (Figure 10).

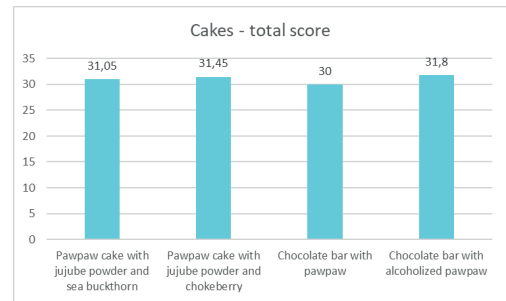


Figure 10. Pawpaw cakes and bars

The taste and flavor of chocolate bar with simple pawpaw was much more appreciated than chocolate bar with alcoholized pawpaw, maybe because of the alcohol, but the texture and overall aspect was very interesting for consumers for this bar (Figure 11).

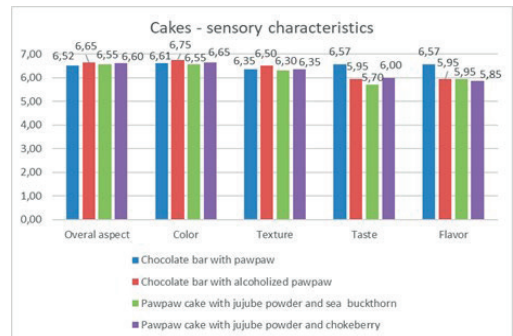


Figure 11. Pawpaw cakes and bars sensory characteristics

CONCLUSIONS

In conclusion, the results showed that most of the products in combination with the pawpaw offered to consumers for testing have been positively appreciated and their preferences varied with gender, age and origin.

The most appreciated products are the sweet cottage cheese and pawpaw and the pawpaw ice cream with honey.

All suggestions and recommendations for future products are taken into account.

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