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VALORIZATION OF SWEET POTATO (*IPOMOEA BATATAS* (L.) LAM) AND CUSTOMERS' PERCEPTION ON SOME INNOVATIVE PRODUCTS

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Abstract

Sweet potato (Ipomoea batatas) is a perennial tuber, belongs to the botanical family Convolvulaceae and it is native to Central America. Sweet potatoes are an exceptionally essential crop in several parts of the world, growing well in tropical, subtropical and temperate areas, being produced in more than 100 countries. In different parts of Africa, Asia, and the Pacific. The aim of this study is to present some innovative products with sweet potato and some fruits (jujube, pawpaw, kiwi, apricots, peaches, apple, pears) and customers' perception of this. The sweet potato tubers were provided from SCDCPN Dăbuleni and the other fruits from the experimental field within the Faculty of Horticulture, Bucharest. The products were prepared at the pastry ''Moesis by Angelo'', in Tulcea, Romania and in the Integrated Fruit Growing Laboratory, and the tasting was made at the Research Center for Studies of Food Quality and Agricultural Products. Customers' perception consisted on the evaluation of general appearance, color, texture, taste and flavor, noticed with grades from 1 to 7, using a Hedonic scale, and it was made by specialized persons.

Key words*: cookies, pie, purple sweet potato, Ziziphus jujuba Mill., white sweet potato.*

INTRODUCTION

Ipomoea batatas (L.) Lam, commonly known as sweet potato is a perennial tuber belonging to the family *Convolvulaceae*. (Mohanraj R. and Subha S., 2013; Purseglove, 1972; Woolfe, 1992; Mohammad, 2021).

Flowers can be white or purple, and leaves can be green or purple. Flesh can be white, cream, yellow, orange, or purple (Woolfe, 1992; Bovell-Benjamin, 2007; Burri B. J., 2010). The intensity of the color is attributed to carotenoid content (Ameny et Wilson, 1997; Nungo et al., 2007).

Sweet potatoes grow well in tropical, subtropical, and temperate areas. Originated in the New World, were introduced into Spain, India, and the Philippines by Spanish explorers in the 15th and 16th centuries. Their distribution is now worldwide. (Woolfe, 1992; Bovell-Benjamin, 2007; Burri B. J. 2010).

It is amongst the world's most important, versatile and under-exploited food crops, because it is high yielding and drought tolerant, with wide adaptability to various climates and farming systems with more than 90 million tonnes in annual production, contributed mostly by Asian and African countries, especially China, the leading producer of sweet potatoes at the global level (Diop, 1998; Jiang et al., 2004; FAOSTAT, 2020; Mohammad, 2021).

In **Romania**, the sweet potato is recently cultivated, especially in the South-West region. (Dinu et al., 2021).

Also, sweet potato is a typical food security crop because it can be harvested little by little over several months (Bovell-Benjamin, 2007).

Nutritional composition and health benefits of sweet potato

According to the Food and Drug Administration, a nutrient can be classified as "low source" or "good source" or "rich source" when a food contains 20% of the Daily Value (%DV) of the particular nutrient, respectively (Mohammad, 2021).

The sweet potato has immense potential and has a major role to play in **human nutrition**, food

security, and poverty alleviation in developing countries. (Bovell-Benjamin, 2007).

From a dietary and nutritional perspective, sweet potato (*Ipomoea batatas* L. Lam) is a good source of the basic nutrients and different vitamins, minerals, antioxidants and bioactive compounds or polyphenols (present in Table 1) (Burri, 2011; Satheesh and Solomon, 2019; Alam et al., 2016, 2020; Islam, 2006, 2014; Sun et al., 2019). β-Carotenes are important pigments in sweet potato roots as provitamin A precursor, which is essential for human health (Low et al., 2017; Mayne, 1996; Teow et al., 2007; Huang et al., 2007; Mark et al., 2009; Rosero et al., 2022.

Sweet potatoes contain oxalic acid, a naturally-occurring substance found in some vegetables which may crystallize as oxalate stones in the urinary tract in some people (Faboya et al., 1983; Mohanraj et al., 2013). Because of its proven anti-ulcerative activity, it could be considered when treating gastric ulcers (Rengarajan et al., 2012; Mohanraj et al., 2013). Compared to major commercial vegetables such as spinach, broccoli, cabbage, lettuce, etc., sweet potato contains high concentrations of fiber, minerals, polyphenolics, anthocyanins. These are claimed to have antioxidant, anti-inflammatory, anti-cancer, anti-diabetic, cardioprotective, antimicrobial, immune system enhancing, cardiovascular effects, and hepatoprotective properties (Mohammad, 2021). Nutritional composition and properties are presented in Table 1 and also in Figure 1.

Table 1. Nutritional value of sweet potato, cooked, baked in skin, flesh, without salt

Nutritional value per 100 g		Vitamins (per 100 g)		Minerals (per 100 g)	
Energy	90 kcal	**Vitamin A**	961 µg	**Calcium (Ca)**	38 mg
Carbohydrates, by difference	20.7 g	**Thiamine (B1)**	0.107 mg	**Iron (Fe)**	0.69 mg
Fat	0.15 g	**Riboflavin (B2)**	0.106 mg	**Magnesium (Mg)**	27 mg
Protein	2.01 g	**Niacin (B3)**	1.49 mg	**Manganese (Mn)**	0.497 mg
Ash	1.35 g	**Vitamin B6**	0.286 mg	**Phosphorus (P)**	54 mg
Water	75.8 g	**Vitamin C, total ascorbic acid**	19.6 mg	**Potassium (K)**	475 mg
Fiber, total dietary	3.3 g	**Vitamin K**	2.3 µg	**Sodium (Na)**	36 mg
Sugars, total including NLEA	6.48 g	**Betaine**	34.6 mg	**Zinc (Zn)**	0.32 mg
Starch	7.05 g	**Carotene, beta**	11500 µg	**Copper (Cu)**	0.161 mg
Fructose	0.5 g	**Carotene, alpha**	43 µg	**Selenium (Se)**	0.2 µg
Sucrose	2.28 g				
Maltose	3.12 g				
Glucose	0.57 g				

Source: USDA, 2019

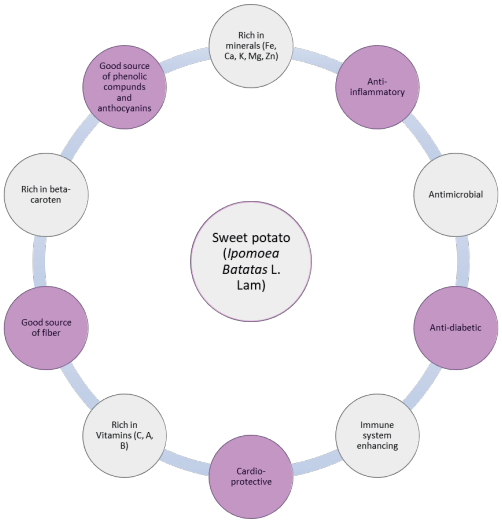

Figure 1. Nutritional composition and health benefits of sweet potato (*Ipomoea batatas* (L.) Lam)

MATERIALS AND METHODS

The aim of this study is to present some innovative products with sweet potato and some fruits and customers' perception of this. The sweet potato (*Ipomoea batatas* (L.) Lam) tubers were provided from SCDCPN Dăbuleni and the other fruits from the experimental field from the experimental field within the Faculty of Horticulture, Bucharest.

The products were prepared at the pastry ''Moesis by Angelo", in Tulcea, Romania and in the Integrated Fruit Growing Laboratory.

The raw material used for the products was: boiled and grated **white and purple sweet potato**; fruits: jujube (*Ziziphus jujuba* Mill.) (dehydrated diced and powder), pawpaw (*Asimina triloba* Dunal), kiwi (*Actinidia deliciosa*), banana, apricots (*Prunus armeniaca*), peaches (*Prunus persica*), apple (*Malus domestica*), pears (Pyrus); cocoa; honey; sugar; white and black chocolate; cheese (Figures 2-5).

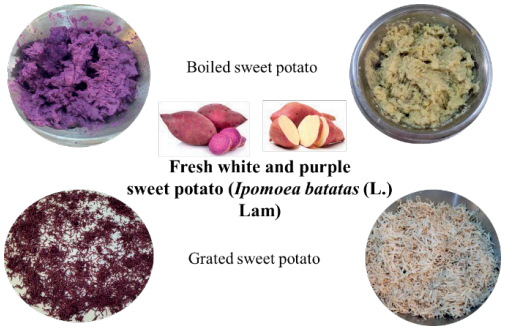

Figure 2. Sweet potato (*Ipomoea batatas* (L.) Lam) white and purple

The products that were made:

PIE with:

- grated white sweet potato
- grated purple sweet potato
- boiled white sweet potato and cheese
- boiled purple sweet potato and cheese
- boiled white sweet potato and jujube
- grated white sweet potato and powder of jujube
- grated purple sweet potato and powder of jujube
- boiled white and purple sweet potato and sugar
- boiled white sweet potato and ground walnut

Figure 3. Pie with white and purple sweet potato

Cream with:

- white chocolate and boiled **white sweet potato**
- white chocolate, **white sweet potato** and **pawpaw**
- white chocolate and boiled **purple sweet potato**
- black chocolate with milk and boiled **white sweet potato**
- black chocolate and boiled **white sweet potato**
- white chocolate, boiled **purple sweet potato** and **pawpaw**

Figure 4. Cream with white and purple sweet potato

Boiled purple sweet potato with:

- kiwi
- apple
- pears
- banana
- cocoa and honey
- apricots
- peaches
- pawpaw

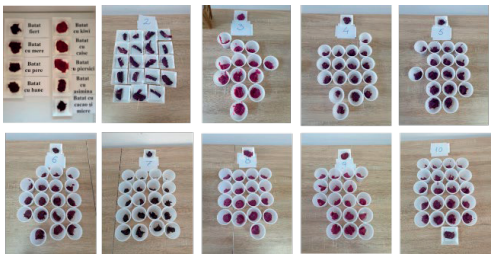

Figure 5. Boiled purple potato with fruits

The combinations of sweet potato and other fruits was to see how they look together and that is the most appreciated variant.

RESULTS AND DISCUSSIONS

The tasting was made at the Research Center for Studies of Food Quality and Agricultural Products, within the University of Agronomic Sciences and Veterinary Medicine of Bucharest (Figure 6).

Figure 6. The products testing

Customers' perception consisted on the evaluation of general appearance, color, texture, taste and flavor, noticed with grades from 1 to 7, using a Hedonic scale, and it was made by specialized persons.

The results show us that:
The difference between **grated and boiled sweet potato** is that grated potatoes oxidize much faster.

The pie with white sweet potato and diced **jujube** was the most appreciated among the 9 recipes maybe also for the aroma given by the white potato in combination with the natural taste of sugar from jujube (Figure 7).

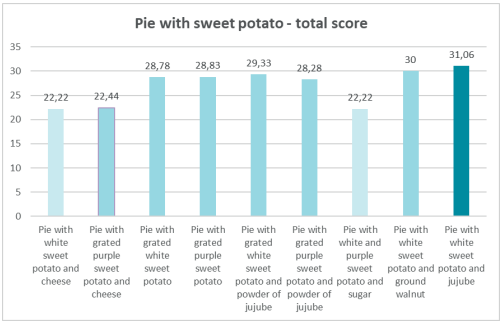

Figure 7. Pie with sweet potato – total score

The combination of **purple sweet potato**, cocoa and honey was also very appreciated and in the case of combination with **kiwi fruits**, the color was very interesting because kiwi has a high vitamin C content and the resulting color was pink (Figure 8).

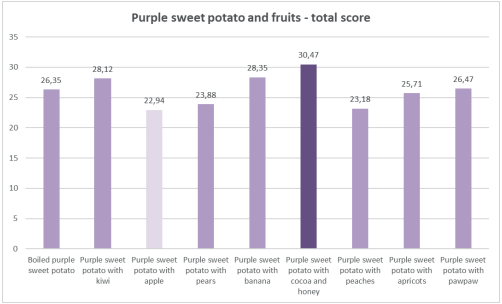

Figure 8. Purple sweet potato and fruits – total score

CONCLUSIONS

We **concluded** that: **sweet potato** (white or purple) is an important base in the preparation of desserts, due to the **color** it gives to the product and its nutritional properties but and jujube being a perfect substitute for the sugar, because it has a very **high nutraceutical value**, beside the sweetening strength.

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