



Acceptability of Value Added Products from Giant Swamp Taro (*Cyrtosperma chamissonis*) Corm

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Abstract Giant Swamp Taro “*Cyrtosperma chamissonis*” is a native plant in the Philippines. It can also be found in Bohol, Philippines especially in swampy coastal areas. It is used as food and is prepared in several ways like roasting, grating, or baking the corm whole. Giant Swamp Taro has traditionally been an important emergency crop in times of natural disaster and food scarcity. It is rich in calories, fibre, calcium, iron, zinc, β -carotene, thiamine and Vitamin C. This study ventured to produce T1- Taro Espasol with Young Buko, and T2- Taro Espasol with Peanuts; to determine its acceptability; and to promote the product to the rural community. This is an experimental study using parallel group design with sixty panelists assessing the product in six sensory attributes; appearance, texture or mouthfeel, cohesiveness, odor, taste and general acceptability, utilizing Hedonic Scale. It was found out that T2 or Giant Swamp Taro with peanuts ranked first in four sensory attributes; cohesiveness (tie with T0) - Crumbly, Odor - Very Pleasant, Taste - Moderately Palatable, and in General Acceptability-Very Much Acceptable. T2 ranked second in texture-Less Soft and third in Appearance - Very Attractive. On the other hand, T1 or Giant Swamp Taro with Young Buko got the highest in Appearance-Very Attractive, cohesiveness (tie with T2)- Crumbly, second in taste-Moderately Palatable, and in ‘general Acceptability- Very Much Acceptable and third in Texture and Mouthfeel- less soft, and odor - Very Pleasant. Meanwhile, T0 ranked first in texture and mouthfeel - less soft, second in appearance - Very Attractive, Odor - Very Pleasant and third in Cohesiveness - Crumbly, Taste - Moderately Palatable, and General Acceptability - Very Much Acceptable. It can be concluded that the three treatments of Giant Swamp Taro Espasol are generally acceptable. It is easy for the rural people to prepare the recipe since it is cooked using carajay and tools which are available in rural communities. Giant Swamp Taro flour can substitute glutinous rice in recipes.

Keywords giant swamp taro, corm, espasol, hedonic tasting, taro flour, glutinous rice

INTRODUCTION

Giant Swamp Taro (*Cyrtosperma chamissonis*) is a native plant of the Philippines that has dozens of varieties thriving on most of three tropical islands in the Pacific (Hopkins, 2012). It is one of the few subsistence crops that grow well within swampy areas. It may be field stored in the ground for very long periods (up to 30 years or more) and has traditionally been an important emergency crop of times of natural disaster and food scarcity. In fact in Tonga and some other island, this is considered as famine food (Manner, 2011).

Englberger and Levendusky of the Island Food Community of Pomhpei promote giant swamp taro along with other local foods can protect against many serious diseases such as Vitamin A

deficiency, anemia, diabetes, heart disease and cancer (Wagner, 2006). It is rich in minerals (zinc, calcium and iron), β -carotene, and fiber (Manner, 2011).

Giant Swamp Taro is highly valued but consumption is infrequent. It can be eaten to replace other crops like breadfruit when not in season, it can withstand strong winds and hurricanes, thus providing food security (Englberger et al., 2004).

The main product of Giant Swamp Taro is the corm which can be roasted, boiled, baked, mashed, grated and combined with other starches for eating. The leaves and inflorescences can be eaten as vegetables and the petioles yield a fiber suitable for weaving. The big leaves are used as food wrapper and also to cover the earth oven (Hopkins, 2012).

In the Philippines, especially in Bohol, Giant Swamp Taro are not given much value as food, it is only eaten when nothing can be eaten anymore, when there are still other food to eat, Giant Swamp Taro is forgotten. In Anda, Bohol for example many Giant Swamp Taro are dying because it is not taken as food. So to promote Giant Swamp Taro, the researcher thought of making recipes out of taro so that it can be fully utilized. The researcher believed that there is enough supply of Giant Swamp Taro since in the eastern part of Bohol, around 15 hectares are planted with Giant Swamp Taro which according to the President of the Cooperative producing taro flour cannot cause its extinction but can save the dying taro since the cause of its death is the non-consumption of the mother corm. So, that 15 hectare taro farm is more than enough to supply the raw material if a huge volume is needed in the production of more taro products.

This study ventured to produce Espasol utilizing Giant Swamp Taro flour as the main ingredient. Espasol is a type of rice cake made out of rice flour cooked in coconut milk, sweetened and dusted with toasted rice flour. It originated in Laguna, Philippines and popularly sold in major thoroughfares, bus stops and specialty shops in Laguna (Merano, 2009). The researcher assumed that Giant Swamp Taro flour can replace malagkit/glutinous rice flour in the recipe.

The researchers believed that in this study the Giant Swamp Taro farmers can get benefit from the new recipes, their taro corms can be utilized as a snack item and not be left behind unconsumed or unutilized or just as food for hogs. The rural community can also get benefit because they can use the new recipe as new addition to their snack or dessert. The entrepreneurs can mass produce these recipes and sell them for another income.

OBJECTIVE

The study aimed to produce Espasol from Giant Swamp Taro; to identify the ingredients, tools, equipment and the procedure in producing the three treatments of Giant Swamp Taro Espasol; to determine the acceptability of the product; to promote the products to the local community and to encourage them to use the products. The products were developed at Bohol Island State University, Main Campus, Tagbilaran City, Bohol, Philippines for Academic Year 2012-2013.

METHODOLOGY

This study is experimental using parallel group design and utilizing five-point Hedonic Scale. The finished products were subjected to sensory appraisals of sixty panelists consisting of twenty community people, thirty students and ten Food Technology instructors. Sensory appraisal is a scientific method used to evoke, measure, analyze and interpret reactions to those characteristics of food materials as they are perceived by the senses of sight, smell, touch and hearing (ASTM MNL 14).

This study was conducted in the Food Technology Laboratory of Bohol Island State University Main Campus, Tagbilaran City. The sixty panelists broken down as follows: twenty-five community people, twenty-five Food Technology students and ten Food Technology instructors. They were chosen to make sure that each must be free from taste perception disorders, odor perception disorders, color blindness and denture defects which might affect their judgment of the product (Hashimi, 2007).

The researchers formulated the four recipes utilizing Giant Swamp Taro flour in three

treatments; first is the Plain Swamp Taro Espasol as treatment, second is the Giant Swamp Taro with Young Buko as treatment 1 and the third is Giant Swamp Taro with Peanuts for Treatment 2. The products were evaluated two times, first in the afternoon and the other in the following day, since according to Panlasang Pinoy, Espasol has best result if consumed the next day as it will firm-up. The five point Hedonic Scale was used with the following range and descriptive rating.

Table 1 Descriptive rating

Numerical Rating	Descriptive Rating					
	Appearance	Texture	Cohesiveness	Odor	Taste	General Acceptability
4.50-5.00	Most Attractive	Soft	Tender	Most Pleasant	Highly Palatable	Most Acceptable
3.50-4.49	Very Attractive	Less Soft	Crumbly	Pleasant	Moderately Palatable	Very Much Acceptable
2.50-3.49	Attractive	Firm	Grainy	Pleasant	Palatable	Acceptable
1.50-2.49	Less Attractive	Less Hard	Fibrous	Less Pleasant	Less Palatable	Less Acceptable
1.00-1.49	Not Attractive	Hard	Coarse	Unpleasant	Not Palatable	Not Acceptable

RESULTS AND DISCUSSIONS

The researchers found out that the following are the ingredients of the three treatments of Giant Swamp Taro Espasol.

Table 2 Ingredients

Ingredients	To	T1	T2
	Plain Giant Swamp Taro Espasol	Giant Swamp Taro Espasol with Young Buko	Giant Swamp Taro Espasol with peanuts
2 cups Giant Swamp Taro flour	√	√	√
2 cups coconut milk	√	√	√
¾ cup centrifugal sugar	√	√	√
¼ cup brown sugar	√	√	√
1 cup Taro flour for dusting	√	√	√
1 stalk pandan tied to knot	√	√	√
1 cup young buko, shredded		√	
½ cup peanuts, toasted and crushed			√
1 sheet water cellophane for wrapping	√	√	√

The three treatments of Giant Swamp Taro used Giant Swamp Taro flour, coconut milk, centrifugal and brown sugar, pandan leaves for flavoring, young buko for treatment 1, crushed peanuts for treatment 2 and water cellophane for wrapping for the three treatments.

Tools/equipment needed: The preparation of the three treatments of Giant Swamp Taro recipes required the use of the following tools and equipment: flour sifter, spatula, rubber spatula, measuring cup, measuring spoon, coconut grater, strainer, wooden ladle, tin sheets, carajay, stove.

Procedure: The procedure used in preparing the three treatments of Espasol are as follows: Heat the carajay, add the Giant Swamp Taro flour. Cook in medium heat until toasted or golden brown while continues mixing. Turn off heat, set aside. This will be used for dusting. In a mixing bowl, put together coconut cream, sugar and pandan. Mix and transfer to a carajay. Bring to a boil then lower the heat to medium. Remove pandan leaves and continue boiling, add the flour until thick. Place in a tin sheet dusted with flour then flatten with a rolling pin. Slice into long strips. Roll it to form a cylindrical shape cake. Roll each in toasted flour. Wrap in water cellophane.

The three treatments were then subjected to sensory evaluation by the panelists. First was right after cooking and the second was a day after it was prepared. The panelists were asked to take a glass of water in between tasting of the product so as not to mix the taste of the products. Likewise

they were also blindfolded when evaluating the taste and the odor of the three treatments of Giant swamp Espasol so that their judgment of the product will not be affected by the appearance of the product.

Table 3 Result of sensory evaluation

Attributes	Treatments	Trial 1	Trial 2	Average	Rank	Descriptive Rating
Appearance	T0	4.29	4.1	4.20	2	Very Attractive
	T1	4.24	4.5	4.37	1	Very Attractive
	T2	4.28	3.9	4.09	3	Very Attractive
Texture/ Mouthfeel	T0	4.29	4.65	4.47	1	Less Soft
	T1	4.18	4.5	4.34	3	Less Soft
	T2	4.22	4.55	4.38	2	Less Soft
Cohesiveness	T0	4.36	4.4	4.38	3	Crumbly
	T1	4.5	4.4	4.45	1.5	Crumbly
	T2	4.4	4.5	4.45	1.5	Crumbly
Odor	T0	4.43	4.2	4.32	2	Very Pleasant
	T1	4.24	4.1	4.17	3	Very Pleasant
	T2	4.4	4.5	4.45	1	Very Pleasant
Taste	T0	4.38	4.25	4.32	3	Moderately Palatable
	T1	4.31	4.55	4.43	2	Moderately Palatable
	T2	4.59	4.3	4.44	1	Moderately Palatable
General Acceptability	T0	4.3	4.3	4.3	3	Very Much Acceptable
	T1	4.27	4.45	4.36	2	Very Much Acceptable
	T2	4.34	4.6	4.47	1	Very Much Acceptable

Result of the First Trial

As shown in the result of the first trial, in appearance, T0 or the Plain Giant Swamp Taro Espasol ranked first while T1 or Giant Swamp Taro Espasol with Young Buko ranked third but all the treatments received a descriptive rating of Very Attractive. When comes to texture, still T0 ranked first while T1 ranked third with a descriptive Rating of Less Soft. For cohesiveness, T1 got the highest rating with a descriptive rating of Tender while T0 got the lowest with a Descriptive Rating of Crumbly. For Odor, T0 has the highest rating while T1 got the lowest; Taste, T2 got the rating of 4.59, described as Highly Palatable and T2, the lowest has a rating of 4.31 Moderately Palatable. Result disclosed that T2 ranked first in General Acceptability with T1, the lowest, the three treatments received a Descriptive Rating of Very Much Acceptable.

Result of the Second Trial

As manifested in the result of Second Trial, T1 got a rating of 4.5 or Most Attractive in Appearance while T2 got 3.9 or Very Attractive in the same Attribute. On the other hand, T0 got 4.65 or Soft while T2 got 4.55 both described as Soft in Texture and Mouthfeel. For cohesiveness, T2 has the highest rating of 4.5 with a descriptive Rating of Tender and T0 and T1 got a tie rating of 4.4 described as Crumbly. In odor, T2 has a rating of 4.5 or Most Pleasant while T1 has 4.1 or Very Pleasant. For Taste, T1 has a rating of 4.55 or Highly Palatable and T0 has 4.25 or Moderately Palatable and for General Acceptability, T2 has the highest rating of 4.6 or Most Acceptable and T0 has 4.3 or Very Much acceptable. The result of the second trial affirmed that Espasol has better result when allowed to firm up since in the General Acceptability T2 is rated Most Acceptable and the other two treatments were rated Very Much Acceptable while in the texture and mouthfeel the three treatments were rated soft.

Average Rating of First and Second Trial

The overall rating disclosed that T2 or Giant Swamp Taro Espasol with peanuts ranked first in four attributes, Cohesiveness, (tie with T1), Odor, Taste and General Acceptability. The result is in consonance with the theory of Gatchalian which states that when the Odor and Taste of the product

are acceptable, the product is generally acceptable. T0 on the other hand got the highest rating in Texture and mouthfeel while T1 ranked first in appearance and cohesiveness (tie with T2).

Shelf Life

Samples of the products were allowed to stand at room temperature to observe the changes that may take place, it was observed that T0 and T2 lasted for 6 days while T1 lasted only for three days. The addition of young buko caused the Espasol to spoil earlier than the other treatments which were T0 Plain Giant Swamp Espasol and T2- Giant Swamp Espasol with Peanuts. The addition of peanuts in T2 had contributed the shelf life of the product and so it lasted longer.

Marketability

The three products were displayed at the university canteen other products were displayed at the cooperative store of Anda, Bohol where many Giant Swamp Taro can be found. After a week of display in the cooperative store, the three treatments were all sold out, while in the university canteen it took two weeks for the product to be sold out.

CONCLUSION

Giant Swamp Taro Espasol can be prepared using the taro flour. It can be used for food other than the usual boiling which rural people used to eat like the three treatments of Espasol in this study. The three treatments are all acceptable for food. It is easy for the rural people to prepare since it is cooked using carajay and tools which are available in the rural communities. Giant Swamp Taro flour can substitute glutinous rice in recipes.

It is recommended that information dissemination be done to promote the use of Giant Swamp Taro Espasol as snack items; preparing these value-added products from giant Swamp Taro be extended to rural community so that these nutritious snack items can be used as part of their meals; value-added products from Giant Swamp Taro be introduced to the entrepreneurs so that these can be mass produced and sold in the community; and other food technologists be inspired to experiment other products using Giant Swamp Taro with a hint that this could be used as substitute for glutinous rice.

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REFERENCES

- ASTM MNL. 14. The role of sensory analysis in quality control. (Retrieved from: www.wikipedia.org/wiki/Sensory-analysis).
- Englberger, L., Jonhson, E. and Paul, Y. 2004. Report on the visit to the Pohnpei atollisland of mokil documenting and promoting local food crops. (Accessed: August 1, 2013).
- Hashimi, I. 2007. Evaluation Techniques. (Retrieved from [http://www.iaom-mea.com/EduMat/Dec.11/Session 5/Tech 10-AGF-IAOM-Muscat-07pdf](http://www.iaom-mea.com/EduMat/Dec.11/Session%205/Tech%2010-AGF-IAOM-Muscat-07.pdf). Accessed : October 22, 2013).
- Hopkins, I. 2012. Giant swamp taro: Uptapped potential in the pacific. (Retrieved from : blogs.worldwatch.org/.../giant-swamp-taro-untapped-potential-in-the-pac, accessed : October 28, 2013).
- Manner, H. 2011. Farm and forestry production and marketing profile for giant swamp taro. (Retrieved from [http:// agroforestry.net/scps](http://agroforestry.net/scps), Accessed : August 3, 2013).

- Morano, V. 2009. Espasol. (Retrieved from <http://panlasangpinoy.com/2009/10/24/espasol/>, Accessed : July 15, 2013).
- Wagner, K. 2006. Geneflow: A publication about agricultural biodiversity. (Retrieved from books.google.com.ph/book?isbn=9290437243. <http://www.spc.int/lrd/cepactacc/swamptaro.ph.p>, Accessed : August 2, 2013).