

## **Taro Root Candy: Acceptability, Purchase Intent and Preference of Consumers**

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*This study dealt with the acceptability, purchase intent and consumers' preferences of taro root candy. A total of sixty (60) respondents from one of the local colleges of the province of Pampanga were recruited to be the consumers of this study. The product test of over-all acceptability and sensory evaluation of the taro root candy were rated using the nine-point Hedonic scale. There are different variables of the taro measurement in the production of taro root candy. Product 3 has the highest rank in terms of food acceptability, specifically its appearance, taste, texture and the over-all acceptability. Moreover, this was followed by product 1, ranking the highest in terms of aroma, and purchased intent and this was the most preferred product. There are no significant differences in terms of the over-all acceptability for the product 3. Furthermore, there are significant differences in terms of appearance, aroma, taste, texture, and purchase intent for product 3 and aroma for product 1.*

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*Keywords: Taro, Preference, Acceptability*

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### **Introduction**

Taro is a tropical root crop that can be grown easily. Taro can be cultivated either under wetland conditions or under dry land conditions given adequate irrigation or rainfall. In the old days, Hawaiians grew taro under wetland condition and they harvested them for the preparation of poi (taro paste). The practice is still carried on nowadays in Hawaii. Consumers with Hawaiian ancestry prefer poi and it is indispensable in occasions such as luaus (feasts). However, the gradual decrease of available wet-land in Hawaii and the hard work involved in the production of this crop has endangered the production of wetland taro. Taro growers are currently attempting the production of poi taro under dry land conditions with irrigation and mechanization. Under dry land conditions, taro growers can produce another taro crop successfully in Hawaii. This is the Chinese or Bunlong taro. It is gaining considerable interest among the farmers because of the simpler growing conditions and better profit as compared to the poi taro. In Hawaii, Chinese taro is consumed mainly in the form of deep-fried taro chips (a snack product) and deep fried baskets (shredded taro molded into basket shape and then deep fried) in restaurants. Other ways of consuming taro in Hawaii include steamed taro cakes, taro butter, taro bread or rolls, taro pancakes and taro chunks in casserole. However, the limited consumption and use of taro in Hawaii and the limited export marketing connections are not good enough to attract the farmers to increase their production. We have to develop other forms of consumption and uses, and a diversified marketing strategy to promote taro in the agricultural segment of the Hawaii economy. The increased export potential of fresh taro to the West Coast and Canada, and the development of taro-based food products in Hawaii are two of the more promising alternatives. In this presentation, the researcher discusses the taro-based products only (*Wai-Kit Nip, Department of Food Science and Human Nutrition, University of Hawaii at Manoa*).

Aside from taro's amazing purpose for baked products, taro root crop has eight proven benefits. According to Marc Seward (2016), taro can reduce the risk of lung and mouth cancer, helps maintain

healthy skin, heart, and immune system. It is good for the eyes, promotes better circulation of blood throughout the body, regulates digestive system, and blood sugar level and control insulin release.

While the culinary uses for this root crop are virtually endless, did you know that the taro plant has uses outside the kitchen as well? Here are some examples. The corm peelings and leaves of taro are sometimes fed to pigs. Boiled taro corms are also fed to weanling pigs to give them energy. The petioles and leaves of the plant can be used to make dyes for kappa (bark cloth). In Africa, the leaf stalk of taro has been used for plaiting. The corms and cornels are used by the paper industry and for manufacturing of medicinal tablets. The plant is used in garden and lawn landscaping for aesthetic purposes. (Dr. Mercola, (2018), Mercola's Food Facts)

Although the root is the most popular part of the plant for culinary use, take note that the large leaves are edible, too. Both the root and leaves should always be cooked because raw consumption may cause burning pain and swelling of the lips, mouth and tongue, as well as gastric inflammation.

Aside from being a source of numerous health benefits, taro can also give unique taste for some dessert; in fact, it was utilized in McDonald's pie, Wiggies gabi keso ice cream, Zagu's shake and Minute Burger's smoothie that Filipino consumers definitely love.

## **Methodology**

### *Research Design*

A cross-sectional, experimental research design was used in answering the questions posed in this study. The researcher sought to understand if the variations in the amount of taro root placed in creating taro candy had an effect on the food acceptability and purchase intention of the participants and also to determine if the said variations had an effect on the participants' preference. To answer this, the researcher controlled extraneous variables through the use of controlled treatments or products. First, a base process including base ingredients which were evaporated milk, condensed milk, sugar and vanilla extract was created and strictly followed. The process of making the base taro root candy are as follows: In a pot, melt 1 tbsp. butter and then add ¼ cup evaporated milk, ¼ cup condensed milk, ¼ cup sugar; stir them constantly until well-combined. Next, prepare the taro root to be placed in the stirred mixture. Wash the taro root thoroughly, peel the roots using a peeler or knife and boil the peeled root in a pot set at 100 degrees Celsius for approximately 20 minutes. Add the boiled taro root to the prepared mixture, and stir over low fire until the texture becomes viscous. Finally, transfer the mixture to a mold or any container and let the temperature cool down. After the preparation of the base ingredients followed by the standard process, the researcher created three variations in the amount of taro root added to the mixture, specifically, Product 1 (2 cups taro root), Product 2 (3 cups taro root) and Product 3 (4 cups taro root). The produced products were then used as the main treatments for the study. The products were given to non-randomly selected participants, accompanied by the questionnaires mentioned in the prior sections of this paper. The data were gathered, encoded and prepared for various statistical analysis and hypothesis testing.

### *Respondents*

The participants included in this study were students and employees of a local college situated in Pampanga. The sample acquired for this study comprised of 39 (65%) females and 21 (35%) males with ages ranging from 16 to 55; with ages 16-20 comprising the majority of the sample (38 or 63%).

### *Instrument*

#### *9-point Hedonic Scale*

In measuring food acceptability, the researcher chose the 9-point Hedonic scale (Jones et al. 1955). It is comprised of five items which correspond to an aspect of a product specifically food. The main characteristics of this scale are that each category is associated with a verbal description from “dislike extremely” to “like extremely” and that it has a neutral category “neither like nor dislike”. It has been tested for both external and internal validity (Trijp and Schifferstein, 1995) and internal and external reliability (Curia et al., 2001) and (Yeh et al., 1998). See Appendix for the sample instrument used in this study.

#### *5-point Purchase Intent Questionnaire*

In acquiring the purchase intent of the participants, the researcher made use of the 5-point purchase intent questionnaire. The said questionnaire consisted of a single item or question, which measured the purchase intent of the participant through a 5-point Likert scale. The Likert scale involved numerical and verbal descriptions ranging from 5 (I will definitely buy/ bibilhin ko ito) which is the highest to 1 (I will definitely will not buy / di ko talaga bibilhin ito) which is the lowest.

### *Statistical Treatment*

In this study, Regression Analysis, Pearson-R, ANOVA, T-test, frequency count, and weighted mean were utilized. All data and information were gathered in order to be tallied, tabulated, classified, analyzed, and interpreted. The weighted values assigned to the awareness of college students were patterned after Likert Scaling.

## **Results and Discussion**

### *Descriptive Summary of Data*

*Table 1. Consumer acceptability on the appearance*

<b>Product</b>	<b>Mean</b>	<b>Std. Deviation</b>
1	7.12	1.19
2	7.15	1.01
3	7.32	1.14

The table presents the descriptive summary for the food acceptability of the participants (N=60) on products 1, 2 and 3 specifically appearance. Based on the table, product 3 (mean=7.32, sd=1.14) was

shown to have the largest mean and a measure of spread that is 1.14 standard deviations close to the mean score. This was followed by product 2 (mean=7.15, sd=1.01) and product 3 (mean=7.12, sd=1.19); both of which displayed measures of spread that are closely similar to that of product 3.

*Table 2. Consumer acceptability on the aroma*

<b>Product</b>	<b>Mean</b>	<b>Std. Deviation</b>
1	7.48	1.24
2	7.17	1.01
3	7.40	1.25

The table states the descriptive summary for the food acceptability of the participants (N=60) on products 1, 2 and 3 specifically aroma. Based on the table, product 1 (mean=7.48, sd=1.24) was shown to have the largest mean and a measure of spread that is 1.24 standard deviations close to the mean score. This was followed by product 2 (mean=7.40, sd=1.25) and product 3 (mean=7.17, sd=1.01); both of which displayed measures of spread that are closely similar to that of product 1.

*Table 3. Consumer acceptability on the taste*

<b>Product</b>	<b>Mean</b>	<b>Std. Deviation</b>
1	7.33	1.19
2	7.20	0.94
3	7.37	1.31

The table presents the descriptive summary for the food acceptability of the participants (N=60) on products 1, 2 and 3 specifically taste. Based on the table, product 3 (mean=7.37, sd=1.31) was shown to have the largest mean and a measure of spread that is 1.31 standard deviations close to the mean score. This was followed by product 1 (mean=7.33, sd=1.19) and product 2 (mean=7.20, sd=0.94); both of which displayed measures of spread that are closely similar to that of product 3.

*Table 4. Consumer acceptability on the texture*

<b>Product</b>	<b>Mean</b>	<b>Std. Deviation</b>
1	6.88	1.06
2	7.00	1.04
3	7.33	1.16

The table presents the descriptive summary for the food acceptability of the participants (N=60) on products 1, 2 and 3 specifically texture. Based on the table, product 3 (mean=7.33, sd=1.16) was shown to have the largest mean and a measure of spread that is 1.16 standard deviations close to the mean score. This was followed by product 2 (mean=7.00, sd=1.04) and product 3 (mean=6.88, sd=1.06); both of which displayed measures of spread that are closely similar to that of product 3.

*Table 5. Consumer acceptability on the over-all acceptability*

<b>Product</b>	<b>Mean</b>	<b>Std. Deviation</b>
1	7.43	1.09
2	7.40	0.87
3	7.45	1.17

The table states the descriptive summary for the food acceptability of the participants (N=60) on products 1, 2 and 3. Based on the table, product 3 (mean=7.45, sd=1.17) was shown to have the largest mean and a measure of spread that is 1.17 standard deviations close to the mean score. This was followed by product 1 (mean=7.43, sd=1.09) and product 2 (mean=7.40, sd=0.87); both of which displayed measures of spread that are closely similar to that of product 3.

*Table 6. Consumer acceptability on the purchase intent*

<b>Product</b>	<b>Mean</b>	<b>Std. Deviation</b>
1	2.45	1.70
2	1.60	1.22
3	2.20	1.63

The table presents the descriptive summary for the purchase intent of the participants (N=60) on products 1, 2 and 3. Based on the table, product 1 (mean=2.45, sd=1.70) was shown to have the largest mean and a measure of spread that is 1.70 standard deviations close to the mean score. This was followed by product 3 (mean=2.20, sd=1.63) and product 2 (mean=1.60, sd=1.22); both of which displayed measures of spread that are closely similar to that of product 1.

#### **Friedman's ANOVA**

*Table 7. Differences in perceived appearance*

<b>Product</b>	<b>Mean Rank</b>	<b>X<sup>2</sup></b>	<b>df</b>	<b>Asymp Sig.</b>
1	1.93			
2	1.95	2.34	2	0.31
3	2.13			

*Significant at 0.05*

The table presents the differences in food acceptability of the participants based on appearance for product 1 ( mean rank = 1.93), product 2 ( mean rank = 1.95) and product 3 ( mean rank = 2.13). Although the sample was found to be normally distributed due to the largeness of the sample(N=60) and the equality of the variance was achieved, the non-random nature of the sampling procedure in the study led the researcher to employ a non-parametric repeated-measures statistical test specifically Friedman's Test. According to the results of the test, an x<sup>2</sup> value of 2.34 was found with an associated probability value of 0.31 (Asymptotic Significance). It can be ascertained that the differences found in the mean ranks of this sample are likely to be a result of sampling error. Thus, the researcher lacks the evidence to conclude that there is a significant difference in the sensory perceptions of the participants specifically in appearance. It is concluded that based on the results of the test, there is no significant differences found in the food acceptability specifically, appearance. Furthermore, it can be inferred that the appearance of products 1, 2 and 3 has no effect on the food acceptability of the participants.

*Table 8. Differences in perceived aroma*

<b>Product</b>	<b>Mean Rank</b>	<b>X<sup>2</sup></b>	<b>df</b>	<b>Asymp Sig.</b>
1	2.13			
2	1.78	7.64	2	0.02
3	2.08			

*Significant at 0.05*

The table presents the differences in the food acceptability of the participants based on aroma for product 1 ( mean rank = 2.13), product 2 ( mean rank = 1.78) and product 3 ( mean rank = 2.08). Although the sample was found to be normally distributed due to the largeness of the sample (N=60) and the equality of the variance was achieved, the non-random nature of the sampling procedure in the study led the researcher to employ a non-parametric repeated-measures statistical test specifically Friedman's Test. Based on the results of the test, an  $\chi^2$  value of 7.64 was found with an associated probability value of 0.02 (Asymptotic Significance). It can be ascertained that the differences found in the mean ranks of this sample are unlikely to be a result of sampling error. Thus, this is an ample evidence to conclude that there is a significant difference in the sensory perceptions of the participants specifically in aroma. It is concluded that based on the results of the test, there is a significant difference found in the sensory perceptions specifically in aroma. Furthermore, it can be inferred that the aroma of products 1, 2 and 3 has a significant effect on the sensory perceptions of the participants and can be further inferred that product 3 is the most appealing in terms of aroma among the products.

*Table 9. Differences in perceived taste*

<b>Product</b>	<b>Mean Rank</b>	<b>X<sup>2</sup></b>	<b>df</b>	<b>Asymp Sig.</b>
1	1.99			
2	1.88	2.77	2	0.25
3	2.13			

*Significant at 0.05*

The table presents the differences in the food acceptability of the participants based on taste for product 1 ( mean rank = 1.99), product 2 ( mean rank = 1.88) and product 3 ( mean rank = 2.13). Although the sample was found to be normally distributed due to the largeness of the sample (N=60) and the equality of the variance was achieved, the non-random nature of the sampling procedure in the study led the researcher to employ a non-parametric repeated-measures statistical test specifically Friedman's Test. Based on the results of the test, an  $\chi^2$  value of 2.34 was found with an associated probability value of 0.25 (Asymptotic Significance). It can be ascertained that the differences found in the mean ranks of this sample are likely to be a result of sampling error. Thus, the researcher lacks the evidence to conclude that there is a significant difference in the food acceptability specifically in taste. It is concluded that based on the results of the test, that there is no significant differences found in the food acceptability specifically, taste, of the participants. Furthermore, it can be inferred that the taste of products 1, 2 and 3 has no effect on the food acceptability of the participants.

*Table 10. Differences in Perceived Texture*

<b>Product</b>	<b>Mean Rank</b>	<b>X<sup>2</sup></b>	<b>df</b>	<b>Asymp Sig.</b>
1	1.84			
2	1.9	10.78	2	0.005
3	2.26			

*Significant at 0.05*

The table presents the differences in the food acceptability of the participants based on texture for product 1 ( mean rank = 1.84), product 2 ( mean rank = 1.90) and product 3 ( mean rank = 2.26).

Although the sample was found to be normally distributed due to the largeness of the sample (N=60) and the equality of the variance was achieved, the non-random nature of the sampling procedure in the study has led the researcher to employ a non-parametric repeated-measures statistical test specifically Friedman's Test. According to the results of the test, a  $\chi^2$  value of 10.78 was found with an associated probability value of 0.005 (Asymptotic Significance). It can be ascertained that the differences found in the mean ranks of this sample are highly unlikely to be a result of sampling error. Thus, this is ample evidence to conclude that there is a significant difference in the food acceptability of the participants specifically, texture. It is concluded that based on the results of the test, that there is a significant difference found in the food acceptability specifically, texture, of the participants. Furthermore, it can be inferred that the texture of products 1, 2 and 3 has a significant effect on the food acceptability of the participants and can be further inferred product 3 is the most appealing in terms of texture among the products.

*Table 11. Differences in Perceived Over- all Acceptability*

<b>Product</b>	<b>Mean Rank</b>	<b>X<sup>2</sup></b>	<b>df</b>	<b>Asymp Sig.</b>
1	1.98			
2	1.94	.91	2	0.634
3	2.08			

*Significant at 0.05*

The table presents the differences in the food acceptability of the participants based on over-all acceptability for product 1 ( mean rank = 1.98), product 2 ( mean rank = 1.94) and product 3 ( mean rank = 2.08). Although the sample was found to be normally distributed due to the largeness of the sample(N=60) and the equality of the variance was achieved, the non-random nature of the sampling procedure in the study has led the researcher to employ a non-parametric repeated-measures statistical test specifically Friedman's Test. Based on the results of the test, a  $\chi^2$  value of 0.91 was found with an associated probability value of 0.634 (Asymptotic Significance). It can be ascertained that the differences found in the mean ranks of this sample are likely to be a result of sampling error. Thus, the researcher lacks the evidence to conclude that there is a significant difference in the food acceptability of the participants specifically, over-all acceptability. It is concluded that based on the results of the test, that there is no significant differences found in the food acceptability specifically, over-all acceptability, of the participants. Furthermore, it can be inferred that the taste of products 1, 2 and 3 has no effect on the food acceptability specifically, the over-all acceptability of the participants.

*Table 12. Differences in perceived aroma*

<b>Product</b>	<b>Mean Rank</b>	<b>X<sup>2</sup></b>	<b>df</b>	<b>Asymp Sig.</b>
1	2.16			
2	1.79	5.65	2	0.059
3	2.05			

*Significant at 0.05*

The table presents the differences in the participants' purchase intent for product 1 ( mean rank = 2.16), product 2 ( mean rank = 1.79) and product 3 ( mean rank = 2.05). Although the sample was found to be normally distributed due to the largeness of the sample (N=60), the non-homogeneity of the variance and the non-random nature of the sampling procedure in the study led the researcher to employ a

non-parametric repeated-measures statistical test specifically Friedman's Test. Based on the results of the test, an  $\chi^2$  value of 5.65 was found with an associated probability value of 0.059 (Asymptotic Significance). It can be ascertained that the differences found in the mean ranks of this sample are unlikely to be a result of sampling error. Thus, this is an ample evidence to conclude that there is a significant difference in the participants' purchase intent. It is concluded that based on the results of the test, there is a significant difference in the purchase intent of the participants for product 1, 2 and 3. Furthermore, it can be inferred that products 1, 2 and 3 have a significant effect on the purchase intent of the participants and can be further inferred that product 1 has the most effect on purchase intent.

*Table 13. Chi-square goodness-to-fit test on product preference*

<b>Frequency of Preferred Product</b>	<b>Observed N</b>	<b>Expected N</b>	<b>X<sup>2</sup></b>	<b>df</b>	<b>Asymp Sig.</b>
1	26	20	6.30	2	0.043
2	11	20			
3	23	20			

*Significant at 0.05*

To determine which among products 1, 2 and 3 the participants significantly prefer, a one variable chi-square test was conducted. This test was conducted to answer specifically if the observed frequencies significantly differ to that of the expected frequencies for the product preference of the respondents (N=60). According to the results of the  $\chi^2$  test, an  $\chi^2$  value of 6.30 and a df of 2 were determined with an associated probability value of 0.043 (Asymptotic significance). This means that if the null hypothesis was true, such a value or observation would rarely occur ( 4 in 100). Thus, it can be accepted that there is a significant difference in the observed and expected frequencies of products 1, 2 and 3. Furthermore, it can be concluded that not all the products given to the participants share an equal preference and it can be further inferred that products 1 and 3 are more preferred compared to product 2.

## **Conclusion**

Among the products produced by the researcher, it was found out that based on the results presented in terms of the food acceptability, the highest rank in terms of appearance, taste, texture, and over-all acceptability was product 3. Furthermore, this was followed by product 1, ranking the highest in terms of aroma, and purchased intent and the most preferred product. There are no significant differences in terms of over-all acceptability. Furthermore, there is a significant difference in terms of appearance, aroma, taste, texture, and purchase intent. Product 3 is the most preferred followed by product 1 while product 2 was the least preferred.

## **Recommendations**

In reference to the conclusions drawn from the study, these recommendations are made.

1. Researchers can utilize taro root candy to produce innovative products, must do other researches with taro and study its nutritional analysis compared to the regular commercialize candy, must



conduct research in baking another bread such as *pandesal*, cookies, tarts and other baked products from taro.

2. TLE teachers must consider taro in preparing bread products and other dishes in their laboratory classes for the bakers can develop taro delicacies in addition to the existing root crop-based bread.
3. Agriculturists must consider taro as one of the root crops that they need to produce in the production of nutritious ingredients for foods.
4. The community must use taro as a nutritious ingredient in foods for Filipinos.
5. Future researchers must look into the possibility of a wide scope for this kind of research and its applicability to other areas of teaching.

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