PRODUCTION OF PUMPKIN CHURROS.

Jutamas Moolwong[*]
[*]*Faculty of Science and Technology, Suan Sunandha Rajabhat University, Bangkok Thailand*
E-Mail: [*]*jutamas.mo@ssru.ac.th, jutamas_mw@hotmail.com*

ABSTRACT

Churros has known in Thai as "Spainese Pa Thong Ko", is star sprinkled shaped bread made from the dough that is fried into a long bar. It soft and crispy texture with sugar or cinnamon powder before serve. It's popular dessert to eat along with hot chocolate, tea or coffee, considered as a unique dessert. It is also the traditional Spanish dessert that is famous throughout the world. Recently, Thailand has a culture of eating Churros widely. Due to the environment and Consumption behavior nowadays has changed. Thai people prefer to eat fried food as a main course and snack for providing energy to makes consumers happiness. The survey found that teenagers or working adults receive energy from snacks equal to 1 in 4 energy that should be intakes per day, resulting in the body receiving less beneficial nutrients. Based on the above information, the author is aware of the importance of the problem and has the idea to develop a dessert recipe based on slightly improving the formula in Churros pastry. In addition to reducing the amount of flour it, also helps adding nutrients to the dessert. By experimenting with supplementing pumpkin at an appropriate level and being accepted by consumers, selecting 3 Churros recipes was tested to get the standard formula that received the highest satisfaction score. After that, the standard formulas were used to supplement pumpkin at 3 different levels, namely 10%, 20% and 30% respectively. When studying the needs of target consumers who are likely to consume in the age of 18-25 years, a total of 30 people were tested. By Sensory evaluation and Consumer acceptability, the results were statistically analyzed by SPSS program analyzing one-way ANOVA and comparing the mean values by LSD. The result found that the Churros supplement with pumpkin at the level of 30% has the highest satisfaction scores; physical, odor, color, taste, texture, and overall liking. with an average of 3.87, 3.77, 4.00, 4.27, 4.03 and 4.37 respectively. From the experiment of adding pumpkin meat in Churros pastries helps to increase nutritional value. Emerging new products are alternative products for health conscious consumers and increase the value of pumpkin for local plants to have higher value as well.

Keyword: churros, pumpkin, sensory

INTRODUCTION

Churros or Thai people know well as Spanish deep-fried dough stick, fried dough in star shape which imitated from Shera sheep's horn. The original recipe will be similar with Choux Cream but it's changed from baking to frying. The shape is long stick with soft and crispy texture. Nowadays it is enhanced to produce in many shapes for variety such as long stick, round and heart shapes, (figure 1).

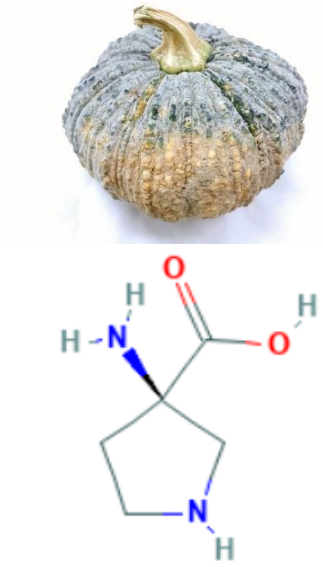
Then dip it in chocolate and put sugar icing or cinnamon powder on top before serving in order to make it more delicious which is popular to eat with hot chocolate, tea and coffee. Spanish like to have churros for breakfast. It has identity and also well known around the world as national dessert of Spain. Churros is popular in France, Philippine, Portugal, and America. In Thailand, Churros has been seen numerously at a shop along the street or café. Normally Churros is distributed without filling or mixed fruit. It only makes from flour.

Figure 1. churros

At the present, the research found out that teenage or worker gain the more calories from dessert and snack, 1in4 of energy that should consume in each day. This made our body gains less good nutrient. From above information, researcher has realized the cause of problem which leads to new recipe for decreasing wheat flour. By using pumpkin to replace some wheat flour in making Churros [1]. Due to pumpkin has a high nutrition and medical substance that can cook both savory and dessert or can be eaten as a snack.

Pumpkin is orange and yellow when it grows well. It is vine vegetable which is significantly planted in every parts of Thailand. Pumpkin can eat for whole parts, be healthy food and medicine. Raw pumpkin provides 25% of protein, 7% of fat and 68% of carbohydrate. In a 100-gram amount, pumpkin contains 1.1% of vitamin A (1,600 IU) and 9 milligram of vitamin C [2]. It is also the source of carotenoids 7,260 µg/100 g and β-carotene that is initial substance of vitamin A which has antioxidants and help to protect cancer, Coronary heart disease, anti-aging, skin disease prevention, relieves pain in the knees and lumbar as well. Eating pumpkin with peel can stimulate insulin which is a substance that decrease sugar levels in the body to prevent diabetes [3].

Not only above nutrients, pumpkin has also contained polysaccharide, para-aminobenzoic acid, sterol, protein peptide [4]. Some research has compared pumpkin with other vegetable and found out that it has less energy and low fat. It is suitable for everyone who wants to control body weight. From these information, pumpkin is useful to produce many healthy products [5], [6].



From: Fang, S, T., Li, L, C., Niu, C, I., Tseng, K, F., (1961)

Figure 2. The chemical composition of Cucurbitine (3-Amino-3 carboxylprolidnine) [7]

Pumpkin has Cucurbitine (3-Amino-3 carboxylprolidnine) in the seed. It can get rid of parasites and also contains unsaturated fatty acid which are Omega 3 and Omega 6 such as linoleic acid, oleic acid, palmitic acid and stearic acid. These acids can prevent atherosclerosis and protect the liver. Furthermore, pumpkin is also cheap, easy to eat and provides natural sweet with aroma. Frying is the processing that extensively use in food industry.

During the process of frying, raw materials are fried into hot oil with higher temperature than boiling point. This process helps the water of raw materials evaporate which make food crispy with good odor and look more delicious [8]. The researcher aims to use pumpkin to replace some flour for reducing flour and add more nutrients into this snack. Not only create new product but also generate more income for food and snack industry in Thailand which is interesting for both Thai and foreign businessman. Moreover, it can support the raw materials from Thai agriculture to use to produce new product and promote new income for entrepreneur.

OBJECTIVES

1. To study the process of Churros production by using pumpkin instead some parts of flour.
2. To study the effect of consumer acceptance on Pumpkin Churros for creating the new product as alternative products for consumers.

MATERIALS AND METHODS

1. Preparing pumpkin

Pumpkin was prepared by choosing mature pumpkins, washed and cleaned all soil. Then cut into layers, steamed at medium heat for 20 minutes. When the pumpkin was cooked well, blended by using a sieve to make pumpkin smooth and prepared for mixing in the next step.

cut into layers

steam at medium heat

blend by using a sieve

Figure 3. Preparation pumpkin

2. Raw materials for making Churros

The main ingredients of Churros were flour (kite brand) 625 grams, butter (orchid brand) 500 grams, condensed milk (carnation brand) 375 grams, egg 600 grams, salt 25 grams, baking soda 25 grams, water 500 milliliters, vegetable oil for frying 1 liter, sugar and cinnamon powder for mixing before serving

After that, used the standard recipe to do the experiment by using pumpkin to replace some flour in 3 different ratios: 10%, 20% and 30%, sequentially with 10% of using pumpkin to replace 62 grams of flour, 20% of using pumpkin to replace124 grams of flour and 30% of using pumpkin to replace186 grams of flour.

Figure 4. Raw materials for making Churros

3. Pumpkin Churros preparation

When all the ingredients were ready, started to cook by putting condensed milk, water, butter, salt into a pot and heat by low temperature. Then stirred at all time in order to make all the ingredients melt together. After that added flour and baking soda, stirred quickly until the ingredients mix well and become dough.

When the dough was cooked well, the dough did not stick to the pot. Then mixed the pumpkin with dough until it became was the same texture. When the dough was warm, added eggs one by one to prevent the dough has more liquid.

Mix eggs and flour together until it is sticky before put it into a piping bag. Use the star-shaped piping nozzle which is a symbol of Churros and then squeeze into hot oil. Fry at a temperature of 190-195 degrees Celsius for 3 minutes, turning it back once every 1 minutes it will make the pumpkin churros looks delicious.

Figure 5. Process of making Churros

4. Sensory evaluation

The Sensory evaluation and Consumer acceptability of Pumpkin Churros in 3 different levels, which are 10%, 20% and 30% with 30 consumers who are between 18-25 years old. They are undergraduate students from Faculty of Science and Technology, Suan Sunandha Rajabhat University. By studying the Sensory evaluation and Consumer acceptability of all sensory attributes which is odor, colors, tastes, texture and overall preference in 5 levels (5 -point Hydronic Scale).

5. Statistical analysis

The results of Sensory evaluation and Consumer acceptability were physicals, odor, color, taste, texture and overall of preference. Statistical analysis SPSS was done using by analyzing one-way ANOVA and comparing the mean by LSD, the determining significant differences between testing samples was at a confidence level at 95% ($P<0.05$).

RESULTS AND DISCUSSIONS

Sensory evaluations of Pumpkin Churros

The result of Sensory evaluation and Consumer acceptability of Pumpkin Churros in 3 different Pumpkin levels, which were 10%, 20% and 30% divided in to sensory attributes as odor, color, taste, texture and overall of preference were shown in Table 1.

Table 1. The results of Sensory evaluation and Consumer acceptability of Pumpkin Churros in 3 different levels, which are 10%, 20% and 30%.

Topics	Quantity of pumpkin 10%	Quantity of pumpkin 20%	Quantity of pumpkin 30 %
Physical characteristic	3.53±0.78	3.60±0.67	3.87±0.73
Odor	2.73±0.87	3.30±0.65	3.77±0.94
Color	3.13±0.90	3.63±0.56	4.00±0.74
Taste	3.10±0.88	3.50±0.63	4.27±0.74
Texture	2.93±0.87	3.67±0.71	4.03±0.89
Overall of preference	3.03±0.85	3.60±0.56	4.37±0.72

The results from Table 1 showed at 30% had the highest mean scores of satisfaction in terms of physical characteristics got 3.87 points, odor got 3.77 points, color got 4.00 points, taste got 4.27 points, texture got 4.03 points, and overall of preference got 4.37 points. The second was Churros Pumpkin 20% and the lowest was Churros Pumpkin 10%. When data were analyzed by using SPSS, One way ANOVA analysis found that the sensory test results of odor, color, taste, texture, and overall of preference of Pumpkin Churros in 3 different levels which are 10%, 20% and 30% significantly differences as statistic at the level of 0.05, except for the physical characteristics of Pumpkin Churros in 3 different levels which are 10%, 20% and 30% were not significantly different at the 0.05 level.

Therefore 3 levels of Churros pumpkin have mean score in Sensory evaluation and Consumer acceptability which are odor, color, taste, texture, and overall of preference. The tested has significantly different as statistical at level 0.05 and it must be compared to the mean by pairing LSD method.

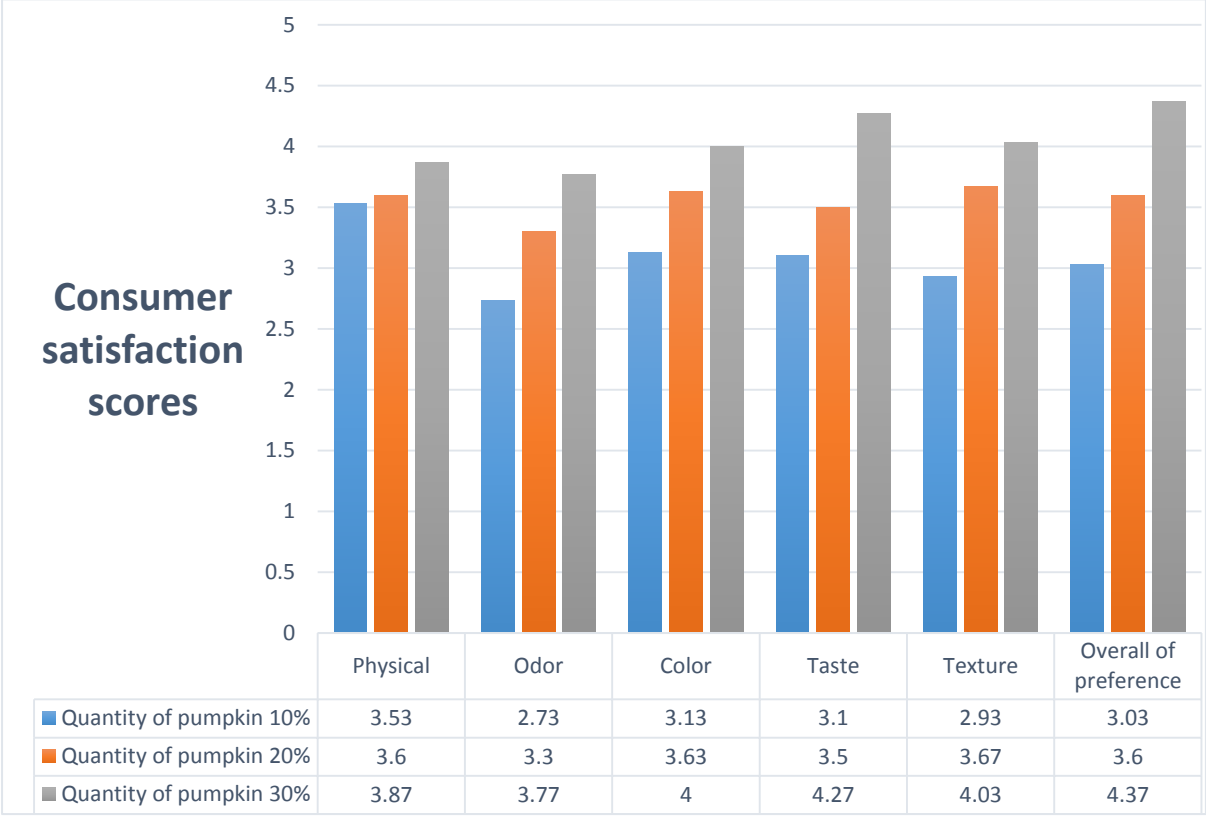
Table 2. the result of testing of Sensory evaluation and Consumer acceptability for Churros pumpkin by comparing the mean of LSD method.

Topics of evaluation	Quantity of pumpkin 10%	Quantity of pumpkin 20%	Quantity of pumpkin 30 %
Physical characteristics^{ns}	3.53±0.78^{ns}	3.60±0.67^{ns}	3.87±0.73^{ns}
Odor	2.73±0.87^{c}	3.30±0.65^{b}	3.77±0.94^{a}
Color	3.13±0.90^{b}	3.63±0.56^{a}	4.00±0.74^{a}
Taste	3.10±0.88^{c}	3.50±0.63^{b}	4.27±0.74^{a}
Texture	2.93±0.87^{b}	3.67±0.71^{a}	4.03±0.89^{a}
Overall of preference	3.03±0.85^{c}	3.60±0.56^{b}	4.37±0.72^{a}

^{ns} means no Non significance at the 0.05 level

Comparison by using LSD method at the statistical significance level 0.05. From Table 2, it showed that the mean of physical characteristics Of Churros Pumpkin in all 3 levels is not different significantly but the mean of Churros pumpkin preference at 10% and Churros pumpkin at 20%and 30% have significantly different as statistic at the level of 0.05. For odor, color, taste, texture, and overall of preference of Churros pumpkin at level 20%and 30% is not different but Churros pumpkin at level 30% has highest mean and was accepted from consumer.

Chart 1. Results of consumer satisfaction for 3 Churros pumpkin level



CONCLUSION

The result of churros recipe that is accepted from consumer to produce as Churros product in 3 levels as 10%, 20%, and 30% by mix pumpkin into the standard recipe. The Sensory evaluation found that at 30% had the highest mean scores of satisfaction in terms of physical characteristics 3.87 points, odor 3.77 points, color 4.00 points, taste 4.27 points, texture 4.03 points, and overall of preference 4.37 points. Churros Pumpkin 20% and the lowest is Churros Pumpkin 10%. When data were statistically analyzed, it found that the sensory test results of odor, color, taste, texture, and overall of preference of Pumpkin Churros in 3 different levels which are 10%, 20% and 30% were significantly different as statistic at the level of 0.05, but the physical characteristics at all levers Churros in were not significantly different at the 0.05 level.

Therefore 3 levels of Churros pumpkin have mean score in Sensory evaluation and Consumer acceptability which are odor, color, taste, texture, and overall of preference. The tested has significantly different as statistical at level 0.05 and it must be compared to the mean by pairing LSD method. When the result is analyzed by LSD method. It is showed that the mean of physical characteristics Of Churros Pumpkin in all 3 levels is not different significantly but the mean of Churros pumpkin preference at 10% and Churros pumpkin at 20%and 30% have significantly different as statistic at the level of 0.05. For odor, color, taste, texture, and overall of preference of Churros pumpkin at level 20%and 30% is not different but Churros pumpkin at level 30% has highest mean and was accepted from consumer.

ACKNOWLEDGEMENTS

This work was funded by Suan Sunandha Rajabhat University. The researcher would like to thank the Institute of Research and Development, Suan Sunandha Rajabhat University in the support of research grant for this work and also we would like to thank the Committee of the Personnel Development Fund of Suan Sunandha Rajabhat University for support registration fee and travelling expenses to join the International Academic Multidisciplines Research Conference (ICBTS) in Rome, the Italia on March 3 –5, 2020.

REFERENCES

[1] Caili, F., Huan, S., and Quanhong, L. (2006). A Review on Pharmacological Activities and Utilization Technologies of Pumpkin. *Plant Foods for Human Nutrition*, 61, pp. 73–80.

[2] Robinson, R.W., and Decker-Walters, D.S. (1997). Cucurbits. *CAB International*. New York.

[3] Murkovic, M., Mulleder, U., and Neunteufl, H. (2002). Carotenoid Content in Different Varieties of Pumpkins. *Journal of Food Composition Analysis*, 15, pp. 633–638.

[4] Appendino, G., Jakupovic, J., Belloro, E., and Marchesini, A. (1999). Multiflorane triterpenoid esters from pumpkin. An unexpected extrafolic source of PABA. *Phytochemistry*, 51, pp. 1021–1026.

[5] See, E.W.A., Nadiah, W., and Noor Aziah, A.A. (2007). Physico-chemical and sensory evaluation of breads supplemented with pumpkin flour. *Asean Food Journal*, 14, pp. 123-130.

[6] Saeleaw, P., and Schleining, G. (2011). Composition, physicochemical and morphological characterization of pumpkin flour. In P.S.Taoukis., N.G. Stoforos, V.T. Karathanos, G.D. Saravacos (Eds.), *Proceedings of the ICEF11- 11th International Congress on Engineering and Food "FOOD PROCESS ENGINEERING IN A CHANGING WORLD"*. April.

[7] Fang, S.T., Li, L.C., Niu, C.I., and Tseng, K.F. (1961). Chemical studies on Cucurbita moschata. I. The isolation and structural studies of cucurbitin, a new amino acid. *Sci Sin*, 10, pp. 845–851.

[8] Aukkanit, N., and Sirichockworakit, *S.* (2014). *Optimization of Processing Conditions for Vacuum Fried Holy Basil*, Faculty of Science and Technologys, Suansunandha Rajabhat University. 5, pp. 1-35.