

# PURPLE SWEET POTATO (*IPOMOEA BATATAS L. LAM.*) CAKES.

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## ABSTRACT

Bakery products are the food of westerners. Making the cakes normally it has to use the very simple and high calories ingredients e.g. wheat flour, butter and sugar etc. From this topic, the researcher found that the application of using purple sweet potato as a high antioxidant level ingredient of Anthocyanin to be an interesting ingredient for making purple sweet potato chiffon type cake can be the good way for developing of valuable bakery and cake product and to be a new way of bakery products development that's as a goal of the experiment. The application of using purple sweet potato for chiffon type cake making process by acceptance testing of 30 consumers using 5-point hedonic scale from the score 1-5 and analyzing by using statistic program with t-test, the result showed that.

The comparison of 5 factors, consumers accepted the purple sweet potato to be a new kind of cake from every factors has the high to very high score level from scale of Best [6] so we can conclude that the chiffon type cake from purple sweet potato can be an interesting, valuable product and can be developed in the new things of bakery products from the new and useful ingredient.

**Keywords:** purple sweet potato, cake, chiffon cake

## INTRODUCTION

The word cake is of Viking origin, derived from the Norse word "kaka." The first cakes ever made are actually quite different from the ones we eat today. Interestingly, the ancient Egyptians were the first culture to exhibit baking skills, and during Ancient Times the cakes were more bread-like in appearance and sweetened with honey. The Greeks also had an early form of cheesecake, while the Romans developed versions of fruitcakes with raisins, nuts and other fruits. Meanwhile in mid-17th century Europe, cakes were frequently baked as a result of advances in technology and access to ingredients. Europe is credited with the invention of modern cakes, which were round and topped with icing. Incidentally, the first icing was usually a boiled mixture of sugar, egg whites, and some flavorings. During this time, many cakes still contained dried fruits, like currants and citrons.

Then, in the 19th century, cake, as we know it today, became more popular. However, the treat was considered a luxury as sweet ingredients like sugar and chocolate were very expensive. During this time, cakes were baked with extra refined white flour and baking powder instead of yeast. Buttercream frostings also began replacing traditionally boiled icings. Also, the advancements in temperature controlled ovens, a baker's life became much easier. No longer did the bakers have to continually watch and wait for the cake to finish baking. Even more, the Industrial Revolution made ingredients more readily available, which made them cheaper, so more people could bake them or even buy them at the store [1].

For cake history in Thailand, looking no different from a typical sponge cake, the Khanom Farang cake may not appear unusually appealing, but its long, rich and interesting history, which traces back to the Thon Buri period over two centuries ago, makes this plain

sponge more than just a desert. "Khanom Farang Kudi Chin" has become a reminder of the long-standing relationship between the Thais and the Portuguese. The Portuguese were the first Europeans to set foot in Siam as Thailand was known at the time, and records show that Portuguese seamen first arrived on these shores over 500 years ago. The area's famous sponge cake embodies the cultural assimilation that occurred among foreign settlers. While the cake was baked in a Portuguese style, the pumpkin topping came from the Chinese who considered it an auspicious fruit. What makes the Kudi Chin cake even more noteworthy is that there are now only three families in the community that still make it the traditional way using the old recipe which has been passed down from generation to generation [2].



**Figure 1.** "Khanom Farang Kudi Chin," a Portuguese sponge cake is a cultural icon that bears evidence of cultural assimilation among Portuguese and Chinese migrants in Thailand [2].

Nowadays, Cake producing business in Thailand applied some fruits such as orange, mango, durian etc. to be a fruit ingredient of cake to improve value creation of cakes by tropical fruit and can create more of the cake product value and price as Nattapol et al. using the Jerusalem Artichoke (*Helianthus tuberosus L.*) for development of Low-Fat Chiffon Cakes by Fat Substitution [3] so the researcher found that the application of using purple sweet potato (*Ipomoea batatas l. Lam.*) as a high antioxidant level ingredient of Anthocyanin that make food look pretty are touted to also have beneficial health effects. They eradicate free radicals that have been attributed to causing cancer and can help protect the liver and lower blood pressure. Purple sweet potatoes are also a good source of potassium and fiber, and high in B6, vitamin C, and antioxidants. Additionally, they have a low glycemic index, which is why sweet potatoes of any variety are often preferred for diabetic diet [4] to be an interesting ingredient for making purple sweet potato chiffon type cake can be the good way for developing of valuable bakery and cake product and to be a new way of bakery products development that's as a goal of the experiment.



**Figure 2.** Purple sweet potatoes [4].

Purple sweet potatoes (*Ipomoea batatas Lam*) are a direct relative of the well-known orange sweet potato and come from the same family. The difference in color is explained by the presence of anthocyanins and antioxidants that give the flesh its purple color as a direct relative of the orange-fleshed variety, purple sweet potatoes are rich in essential vitamins (including vitamin A/beta carotene, which makes this crop even more important in commonly deficient areas in Africa) and minerals, as well as a large amount of fiber, which helps provide the sensation of fullness and satiety. The origin of purple sweet potato traces back to South America, but because it is such a robust farming crop, its production has spanned the world, including Africa and China. Over time, different types have been developed including the Okinawan, Japanese, Taiwanese, and Stokes varieties [5].

## OBJECTIVE

To study the process of cake making by using the purple sweet potatoes instead some part of wheat flour and their consumer acceptance

## MATERIALS AND METHODS

### 1. Purple sweet potatoes preparation.

Clean and peel purple sweet potatoes, after that cut it into smaller pieces to be easier for steaming. Put the purple sweet potatoes into the steamer and steam it for 10 minutes since the water is boiled or steam until seeing the purple potatoes to be cooked. Once cooked, use a clean cloth to wrap your hands and remove all the purple skins and place them in a sieve and grate them for a fine texture as the picture shown in Figure.3



**Figure 3.** Purple sweet potatoes preparation process.

### 2. Purple sweet potato cake production.

Prepare all ingredients of batter cake production by using 80 g. of cake flour, 1 teaspoon of baking powder, ¼ teaspoon of salt, 45 g. of sugar, 65 g. of coconut milk, 40 g. of vegetable oil, 3 egg yolks, 70 g. of steamed and sieved purple sweet potato, 2 teaspoons of vanilla butter flavor, 3 eggs white, another 45 g. of sugar and ¼ teaspoon of cream of tartar. Sift all the dried ingredients and mix it together after that beat another liquid ingredients in the mixing bowl, beat the yolk part except egg white, 45 g. of sugar and cream of tartar till it is fluffy and soft as shown in Figure 4.



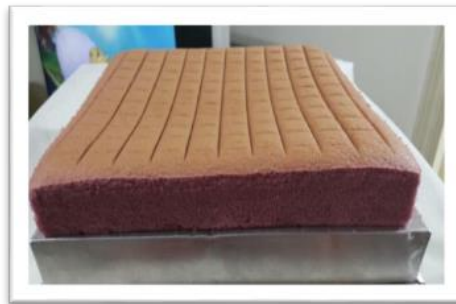
**Figure 4.** All ingredients and mixing of egg yolk and cream of tartar.

Mixing the egg white part are egg white, 45 g. of sugar and cream of tartar by fastest speed in the mixing bowl and whisk well until light and fluffy. Sift together the dried ingredient. Gradually, add this to the egg yolk and egg part mixtures, mix till the batter is fluffy and soft. Add vanilla essence and blend well. Vanilla essence is important to camouflage the smell of eggs as shown in Figure 5.



**Figure 5.** Beaten of egg white part and batter of purple sweet potato cake.

Put the batter of purple sweet potato cake into the tray. Bake it at 180 degree Celsius for 30-33 min. and transfer to racks and let cool 10 minutes, then run a knife around the edge of the pans and turn the cakes out onto the racks to cool completely. Remove the parchment. Trim the tops of the cakes with a long serrated knife to make them level, if desired as shown in Figure 6.



**Figure 6.** Bake purple sweet potato cake.

### **3. Purple sweet potato cream making.**

Whisk 250 g. of the steamed purple sweet potato and 100 g. of whipping cream. Blend it well, add 30 g. of butter, 50 g. of sugar and  $\frac{1}{4}$  teaspoon of salt, mix till the batter is fluffy and soft. Trim the tops of the cakes with a long serrated knife to make them level, cut it into the small pieces and spread it on with whisked purple sweet potato cream on the top for decoration as shown in Figure 7.



**Figure 7.** Purple sweet potato cakes.

#### 4. Sensory evaluation and Statistical analysis

For sensory evaluation were from 30 volunteer consumers, students and teachers from Suan Sunandha Rajabhat University by using 5-point hedonic scales from the score 1-5 with 5 factors consideration were texture of cake, color, taste of cake, acceptance of consumer and overall liking. The data were analyzed by using SPSS statistic program with t-test at significant mean difference between two sets of paired data between normal chiffon cake and purple sweet potato cakes by using chiffon type cake making method. The determining significant differences between testing samples at a confidence level at 95% ( $P < 0.05$ ).

### RESULTS AND DISCUSSIONS

#### The result of Sensory evaluation and Statistical analysis between normal chiffon cake and purple sweet potato cakes.

For the sensory evaluation of purple sweet potato cakes were evaluated from 30 volunteer consumers by using 5-point hedonic scales from the score 1-5 with 5 factors consideration were texture of cake, color, taste of cake, acceptance of consumer and overall liking. The range of the scores by using the score evaluation from Best are the score from 4.21 – 5.00 is High to very high, the score from 3.41 – 4.20 is Substantial, the score from 2.61 – 3.40 is Moderate, the score from 1.81 – 2.60 is Low and the score from 1.00 – 1.80 is Negligible. [6] The result of sensory satisfaction test of consumers between normal chiffon cake and purple sweet potato cakes as Table 1. showed that the purple sweet potato cakes had higher average score from normal chiffon cake in the factors of color of cake, taste of cake, acceptance of consumer and overall liking as  $4.31 \pm 0.42$ ,  $4.42 \pm 0.37$ ,  $4.46 \pm 0.56$  and  $4.36 \pm 0.64$  respectively. After The data were analyzed by using SPSS statistic program with t-test at significant mean difference between two sets of paired data between normal chiffon cake and purple sweet potato cakes. The determining significant differences between testing samples at a confidence level at 95% ( $P < 0.05$ ) as in Table 1. showed that the factors in texture of cake, color of cake and taste of cake were difference or it were statistic significant different by sensory evaluation at at 95% ( $P < 0.05$ ) as showed data in table 1. below.

**Table 1.** The result of sensory satisfaction test of consumers between normal chiffon cake and purple sweet potato cakes.

Samples / Evaluated factors	Normal chiffon cake	Purple sweet potato cakes	t-test for equality of mean		
			t	df	Sig.
Texture of cake	$4.25 \pm 0.44$	$4.20 \pm 0.35$	-2.856	29	0.021*
Color of cake	$4.00 \pm 0.38$	$4.31 \pm 0.42$	-3.674	29	0.000*
Taste of cake	$4.22 \pm 0.54$	$4.42 \pm 0.37$	-2.427	29	0.028*
Acceptance of consumer	$4.17 \pm 0.61$	$4.46 \pm 0.56$	-1.986	29	0.059
Overall liking	$4.21 \pm 0.48$	$4.36 \pm 0.64$	-1.344	29	0.063

### CONCLUSION

The comparison of 5 factors, consumers accepted the purple sweet potato to be a new kind of cake from every factors has the high to very high score level from scale of Best [5] so we can conclude that the chiffon type cake from purple sweet potato can be an interesting, valuable product contained a high antioxidant level ingredient of Anthocyanin and can be developed in the new things of bakery products from the new and useful ingredient.



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