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Acceptability of Water Chestnut Flour in "Puto" Making

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Abstract *– The combination of traditional food with modern taste is getting more common these days. One of the traditional foods which is being modified is puto, a popular Filipino snack. The main ingredients to make putoare flour, egg, and sugar. But today, we can find different kinds of puto with delicious and attractive topping. However, because of these modernizations, the nutritional value is being sacrificed. Thus, it is better to have a healthier alternative ingredient in making puto. Water chestnut or apulidare indigenous in the Philippines, China, Japan, India and Southeast Asia. Commercial cultivation of these plants is becoming popular in other countries. However, in the Philippines, it is being under-utilized and the farmers often neglect the potential of it in the agricultural industry. Thus, the research was undertaken based on the observation in our local community in which farmers disregard the potential of water chestnut. Also, incorporating water chestnut flour in making putoimproves the nutritional content of the product making it a good alternative for other well-refined flour used as the main ingredient. The research measured the level of acceptability of the different formulations of water chestnut flour in making puto through the sensorial characteristics analysis. Three formulations were made to identify the best preparation. It was found out that the Formulation 1 which has 1 cupwater chestnut flour and 3 cups all-purpose flour had the highest acceptability descriptive rating.*

Keywords *– Puto water chestnut, Sensorial characteristics, Water chestnut flour acceptability*

INTRODUCTION

Puto is a popular Filipino steamed cake that is traditionally made from ground rice. It used to be widely sold on the street, served with fresh grated coconut. *Puto* is also a term for different kinds of native steamed cakes, as well asthose made without rice. The key characteristics are thatthey are made with a various type of flour and they are cooked by steaming.

To this day, *puto*is cooked the old fashion way, but only in certain areas like Pasig, Biñan, Calasiao, Manapla, and Cagayan de Oro, among a few others.In these places, puto making is an important industry and the puto is named after the towns.Calasiao is the "Puto" or Rice Cake Capital of the Philippines; the town's Puto Market is a key stopover site to tasting and bringing home this local delicacy. Further, puto making has been the major source of income for families in certain barangay in Calasiao like Dinalaoan, Lumbang, Ambuetel and part of *Puto* is the town's One Town, One Product (OTOP) and an industry.

The traditional *puto* is made from fermented rice grains, water, and sugar. This rice cake is often made as small bite-size pieces, and is sticky and dense in texture. This variety is called *puto* calasiao, which originates from Calasiao, Pangasinan, and is one of the most popular versions of the rice cake in the Philippines. The traditional form of *puto* is plain white color sometimes added with certain common Filipino ingredients like coconut milk, ube and pandanwhich slightly changes the flavor and completely changes the color of the finished product.Modern variations of puto are made using non-traditional ingredients like ube, vanilla, or chocolate.

Moreover, a lot of *puto* recipes these days make use of wheat flour which makes the name 'rice cake' really a misnomer. The main ingredients in making *puto* used to be flour, egg, and sugar. But today, we can find any kind of *puto* with a topping such as chocolate, colorful sprinkle, and cheese.Rice flour or wheat flour as the main ingredients of *puto* is able to instantly convert the food into energy *Puto* supplies us with sufficient energy as soon as we eat it. Sugar also contributes to the process of transforming food into energy. *Puto* is steamed and doesn't require much cooking oil or butter during the cooking process.However we may consider*puto* as energy giving, yet we still need to limit the intake. The amount of carbohydrate in *puto* is not good to those with diabetes. Glucose of the rice flour and the white sugar

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addition will definitely raise the blood sugar. The carbohydrate in *puto* especially those made from highly refined grains such as white flour and rice flour and those that contain simple sugars are easily broken down and cause blood sugar levels to rise quickly.

Water chestnut or *apulid* is an aquatic vegetable that grows in marshes, underwater and in the mud. They are indigenous to China, Japan, India and Southeast Asia, Philippines, Australia, Pacific Islands and tropical Africa.Commercial cultivation of water chestnut is popular in India, Japan, China, Pakistan, Sri Lanka and other parts of Southeast Asia. Italso became popular in the country of Bangladesh since it is easy to grow, low cost of production, and good profit.

Furthermore, water chestnut has also been used in medicinal purposes such as in burning sensation, dyspepsia, intermittent fever fatigue, inflammation, bronchitis and debility. The nutritional content of the fruit is not less than that of the wheat.Aconducted by M.Faruket. al (2012) shown that water chestnut is an important source of carbohydrate, protein, lipids, vitamins and minerals and therefore, signifying its suitability for incorporation in human diet.

In the study of Musarat Shafi et.al (2016), water chest nut flour was compared with refined wheat flour in terms of their proximate composition, mineral content, functional, pasting and antioxidant properties andsensory analysis showed that cookies made from 100% water chestnut had fair acceptability due to their characteristic flavor. Also, water chestnut flour serves both as a gluten-free as well as antioxidant rich flour for production of cookies.

In the Philippines, water chestnut grows well in flooded rice paddies and lotus ponds. However, it is not fully utilized, unlike other countries. Thus, the present study was undertaken based on the observation in our local community in which farmers disregard the potential of water chestnut. The addition of water chestnut flour improves the nutritional content of the product making it a good alternative for other well refined flour used in making *puto*.

OBJECTIVES OF THE STUDY

The objective of the research is to produce and determine the acceptability of water chestnut flour in making *puto*. Specifically it is endeavored to identify the level of acceptability of waterchestnut flour in terms of flavor, texture and appearance.

MATERIALS AND METHODS

The research implemented experimental and descriptive research. Various formulations of water chestnut flour as an ingredient in making *puto* were prepared and determined their acceptability using a score card following 5- Hedonic scale.

Preparation for Various Formulations

Standard procedure in making *puto* was followed however, water chestnut flour was used instead of rice flour. The whole water chestnuts were bought from Lingayen, Pangasinan and were subjected to flour preparation: boiling, peeling, sun drying and milling. For formulation 1 (F1) contained 1 cup of water chestnut flour and 3 cups all-purpose flour; Formulation 2 (F2) had 2 cups of water chestnut flour and 2 cups all- purpose flour and lastly Formulation 3 (F3) had 3 cups of water chestnut flour and 1 cups all-purpose flour. A standard recipe for *puto* was used as a comparison for the determination of sensorial characteristics of water chestnut *puto*.

Determination of Acceptability of Various Formulations

Score card following the Five- Point Hedonic scale was used to determine the acceptability of the various formulations. The following arbitrary weights with corresponding descriptive values were used: 5- Highly Acceptable; 4- Moderately Acceptable; 3 Fairly Acceptable; Poorly Acceptable and 1 Not Acceptable.

Statistical Treatment

Average Weighted Mean (AWM) was used to determine the best formulation.

Respondents of the Study

The formulations various of *puto* using water chestnut flour has been evaluated by 35 Bachelor of Science in Nutrition and Dietetics students and 5 faculty members Pangasinan State University, Lingayen Campus. The respondents were interviewed after tasting the various formulations to validate their answers in the scorecard.

RESULTS AND DISCUSSION

Based on the sensorial characteristics appearance, flavor, texture, Formulation 1 which has 1 cup water chestnut flour and 3 cups water all-purpose flour had the highest average weighted mean followed by Formulation 2 and Formulation 3 making Formulation 1 as the best formulation with the total average weighted mean of 4.47 with a corresponding description of moderately acceptable.

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Based on interviews, the Formulation 1 has a desirable cooked flavor and has a smooth and non-lumpy texture and a light yellowish color. Formulation 2 produced yellowish-cream color, a slightly lumpy texture and Formulation 3 produced a dark- yellowish color, a taste like banana loaf bread with a rough and lumpy texture.

Table 1. Average Weighted Mean of the Acceptability of Various Formulations of Water Chestnut Flour in making *Puto* Based on Sensorial Characteristics Appearance, Aroma, Taste and Color

Formulations	Appearance	Flavor	Texture	Descriptive Equivalents	Ranking
Formulation 1	4.525	4.275	4.3	4.36	Moderately Accepted
Formulation 2	4.4	3.875	3.7	3.99	Moderately Accepted
Formulation 3	4.425	3.525	3.275	3.754	Moderately Accepted

CONCLUSION AND RECOMMENDATION

The formulated water chestnut flour in making*puto* has moderately acceptable descriptive rating which implies a potential market for the *puto*industry. The best formulation was Formulation 1 which has 1 cup of water chestnut flour and 3 cups all-purpose flour.

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