ACCEP T ABIL ITY OF HORSE RADISH “MALUNGGAY” FOOD WRAPPER

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Abstract - The powerful vegetable and packed with significant nutrients that our body needs is known as Malunggay by the Filipinos and Horse radish in English. It is scientifically called as Moringa Oleifera. It is considered as the most nutritious vegetable in the world which particularly the great source of rich in vitamins A, vit. C and iron. Other health benefits includes, dietary fiber, vitamin-C, folate, potassium, calcium, magnesium, zinc, and manganese. Malunggay leaves and immature green pod which is known as drumstick are commonly prepared and ingredients of different dishes of Filipinos. Its leaves commonly known to increase lactation in nursing mothers. Many people ignored this vegetable or doesn’t want to eat especially children just because of its pungent odor. Rather get bored on the usual way of preparation. With this reason, the researcher thought of another kind of food article to give variation on the preparation and made it as food wrapper used in preparing lumpia, omelette, shanghai, siomai, and other kind of foods to be wrapped. Experimental and descriptive-survey were the research method used. There were 100 respondents; 25 faculty & staff, 50 students from the university, and 25 consumers from the market place. Food taste test was applied in evaluating the good attributes of the food wrapper using the Score sheet 9-Point Hedonic Scale with face to face interview. The data were analyzed and interpreted with the used of frequency count, percentage and mean score.

The respondents accepted and liked very much the food wrapper especially in preparing vegetable lumpia and omelette. It is recommended that it should be subjected to microbial test to lengthen the shelf-life. This study serves as a reference of food processor who would want to indulge business in making food wrapper. Likewise, as reference of future researchers in transforming agricultural yields particularly foods that are not well accepted by the people.

Key word - Malunggay, Food Wrapper, Health benefits

Malunggay is a wellknown vegetable by Filipinos and Horse radish or simply called Moringa by English speakers. It is scientifically called “Moringa Oleifera”. This vegetable belongs to brassicaceae family plant closely related to wasabi, mustard, cabbage, and broccoli. It is originated in Southern Europe and Western Asia. It has a remarkable history and grown steadily over the years. It is easily cultivated, grows fast and survives well in countries with warm, temperate, subtropical or tropical climate like in the Philippines. It is a tree vegetable which bears green leaves and green pod if fully grown.

It is a powerful vegetable packed with beneficial nutrients and known as the most nutritious vegetable in the world. It is commonly known to increase lactation in nursing mothers. It is a great source of vitamins A, vit. C and iron and has a wide variety of health benefits which includes, dietary fiber, vitamin-C, folate, potassium, calcium, magnesium, zinc, and manganese. Further, this vegetable is not only for nutritional value but on medicinal purposes because it aids weight loss, lower down blood pressure, alleviates respiratory conditions, promote heart health, stimulate healthy digestion, makes the bones strong, A good antioxidant that boost the strength of immune system and stimulate the activity and production of white blood cells. Good defender against free radicals in the body and fight off cancer and impede the spread of metastasis of cancerous cells. This vegetable also contained phytochemicals some of which give the pungent odor which serves so well as food additives and good ingredients in cuisine particularly on Filipino dishes. Its leaves and its immature green pod which is known as “drumstick” are commonly prepared and ingredients on Filipino cuisine. But many people still ignored this vegetable or doesn’t want to eat especially children just because of its pungent odor. Rather get bored on the usual way of preparation.

With this reason, the researcher thought of another kind of food article to make it appetizing serving the food and give variation on food preparation. Malunggay leaves was made as food wrapper used in preparing lumpia, omelette, shanghai, siomai, and other kind of foods to be wrapped.

On the other hand, with this study malunggay growers have reference in processing nutritious food wrapper used in preparing foods for their family members. Likewise, help the people who doesn’t want to eat malunggay, the nutritious vegetable, so as to sustain their good health. Interested food processors can make this food article as an additional products for their food business that will circulate in the market place. For the incoming researcher, this is a reference for them in processing agricultural yields which are not acceptable and can make it palatable and an appetizing food product.
STATEMENT OF OBJECTIVES

1. To determine the characteristics of malunggay food wrapper in terms of the following.
   a. Sensory Attributes
      • Palatability
      • Texture
      • Appearance
   b. Shelf-life Storage
      • Refrigerator temperature
      • Chiller temperature
      • Room temperature

2. To identify the level of acceptability of malunggay food wrapper in terms of its attributes.

3. To determine the cost of the product when translated into business.

4. To draw implications of the study on Technology and Livelihood Education Program (TLE) and Small and Medium Enterprise (SME).

METHODOLOGY

This study used the experimental method of research. There were 100 respondents used; 25 faculty & staff, 50 students, and 25 outsiders from the community and randomly selected. Three (3) approaches were applied in getting information about the acceptability of malunggay food wrapper and these are; 1) conducted food taste test, 2) survey questionnaire, and 3) face to face interview.

There were five (5) trials being conducted and the following are the number of preparations made on the formulation of malunggay wrapper.

For Preparation # 1: 1 ½ cup fresh young malunggay leaves, 1 cup of tap water, ½ cup corn starch, two large eggs, 1 teaspoon salt, were the ingredients used. Malunggay leaves were minced manually to make it finer, cornstarch & salt were shifted to remove the hard particles. In a mixing bowl, put the beaten eggs, a cup of water, stir properly. Then gradually add the dry ingredients respectively using wooden spoon. Then poured amount of mixture directly in a frying pan with 1 tablespoon hot oil. Eight pieces of malunggay wrapper was produced. Cooked food wrappers had a coarse texture, seemly salty, oily in appearance, and pungent in taste. Because there was no specific measurement used in cooking the malunggay mixture, food wrapper being cooked varied on different sizes.

For Preparation # 2; the same procedure and ingredients was used but the amount of ground young malunggay leaves was lessen into 1 cup, salt was also reduced into ½ teaspoon. Mixture was measured into ½ cup per batch in cooking and fry in the same amount of oil. Ten (10) mm in diameter frying pan in size was used in cooking enough to spread the mixture. Malunggay food wrapper had a lumpy texture and oily in appearance.

For Preparation # 3; the same procedure and amount of ingredients was utilized as well as the cooking ware. But on this preparation, the amount of cornstarch reduced into ¼ cup and malunggay leaves were minced through blender to make the leaves finer. Malunggay mixture was passed through in a blender to make the texture smooth. Then cooked in a greased frying pan with ¼ teaspoon of oil. The oily appearance of the food wrapper was eliminated but couldn’t identify the malunggay leaves on the product.

For Preparation # 4; the procedure on number three (3) was followed as well as the ingredients used but the leaves of malunggay was minced manually. All other ingredients were mixed together and passed through in a blender to make the mixture smooth. Then minced malunggay leaves was added manually on the mixture. Good texture and appearance was attained. Respondents were satisfied on the product.

For Preparation # 5, (Optional) Use procedure # 4. To make the food wrapper more richer in taste half cup of water was substituted into evaporated milk and in cooking the product ¼ teaspoon butter was used to grease the frying pan. The product obtained good palatability, texture and appearance which the respondents like it very much.

Note: For every preparation, created malunggay food wrapper was used in preparing vegetable lumpia, often than not with the used of local vegetables either chopped winged beans, string beans, pechay, julienne squash or Baguio vegetables. Likewise, in cooking vegetable omelette malunggay wrapper is good. That, if it is use in siomai or shanghai, it should be cut based on the size that it would want to.

The doneness of the product was determined through its appearance which is firm in texture. There were 8 pieces of malunggay food wrapper produced for every preparation done with a thickness of ½ inch.

Acceptability of Horse Radish “Malunggay” Food Wrapper
Table 1 shows the number of preparations in formulating the good characteristics of malunggay food wrapper. That, ingredients used such as minced young malunggay leaves, cornstarch, salt was reduced respectively to obtain the good taste and texture of the product. On the fifth preparation half cup of water was substituted into evaporated milk and butter was used in frying the malunggay mixture so as to make the food wrapper product palatable. On the 5th trial denotes the good formulation of the malunggay food wrapper.

<table>
<thead>
<tr>
<th>Process</th>
<th>Preparation</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual mixing</td>
<td>Manual mixing</td>
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<tr>
<td>Blending/Mixing</td>
<td>Blending/Mixing</td>
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<td>Blending/Mixing</td>
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</table>

Table 2. Shelflife Storage of the Malunggay Food Wrapper

When it comes to shelf life of the product, table 2 illustrates the time duration of the produced wrapper for seven (7) days or one week. Under the room temperature the malunggay food wrapper sample stayed only for three (3) days, taste was no longer good. While samples set aside in refrigerator and chiller characteristics were still good. It is best if the food wrapper will be heated in microwave or ungreased frying pan with low fire for 1-2 minutes before using in wrapping the food. This means that the food wrapper is best to store in a cool place.

There were 100 respondents randomly selected who evaluated the product. Twenty five (25) faculty & staff, fifty (50) students respondents from the college and twenty five (25) outsiders. The malunggay wrapper was evaluated with the used of the different procedures such as taste test, face to face interview and through the aid of questionnaire. The level of acceptability of the malunggay food wrapper was evaluated using the following Nine (9) Point Hedonic Scale to determine the consumers acceptability on the characteristics of the product.

Weighted mean was used to indicate the level of acceptability of the product. Using the aforementioned scale, the level of acceptability of the product was described using the following ranges:

8:50-9:00: like extremely
7:50-8:00: like very much
6:50-7:49: like moderately
5:50-6:49: like slightly
4:50-5:49: neither like nor dislike
3:50-4:49: dislike slightly
2:50-3:49: dislike moderately
1:50-2:49: dislike very much
1:00-1:49: dislike extremely

Sensory evaluation and shelf life test were the type of evaluation applied in getting the desirable attributes of the malunggay food wrapper.

Shelf life of the malunggay food wrapper was tested on different places with various temperature for one week duration; 8°C, 5°C and at 33°C or 90°F. This was done to find out how long the food wrapper would stay good as shown on Table 2.

Acceptability of the food wrapper was measured based on the product’s attributes such as the palatability (taste, aroma, & flavor), texture and appearance (color, moldability & shape). The general acceptability was determined on the basis of the overall impression of the respondents toward the product. The acceptance of the consumers on the product was based on the characteristics stated and
general acceptability was determined using the weighted mean score seen on Table 3.

The mean was derived from the average of the weighted means of respondent’s response on the attributes of the product. The verbal interpretation of each mean was based on the Nine (9) Point Hedonic Scale. The sum total of the mean score of responses revealed the general acceptability of the malunggay food wrapper, this implies the respondent’s acceptance on the newly produced wrapper as a whole. Shown on the table below.

<table>
<thead>
<tr>
<th>Evaluators</th>
<th>Weighted Mean</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Faculty</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparation</td>
<td></td>
<td></td>
</tr>
<tr>
<td># 1</td>
<td>3.77</td>
<td>Neither like nor dislike</td>
</tr>
<tr>
<td># 2</td>
<td>5.47</td>
<td>Like slightly</td>
</tr>
<tr>
<td># 3</td>
<td>6.45</td>
<td>Like moderately</td>
</tr>
<tr>
<td># 4</td>
<td>7.89</td>
<td>Like moderately</td>
</tr>
<tr>
<td># 5</td>
<td>8.79</td>
<td>Like very much</td>
</tr>
<tr>
<td>Total mean</td>
<td>6.19</td>
<td></td>
</tr>
<tr>
<td>2. Students</td>
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<td></td>
</tr>
<tr>
<td>Preparation</td>
<td></td>
<td></td>
</tr>
<tr>
<td># 1</td>
<td>6.45</td>
<td>Like slightly</td>
</tr>
<tr>
<td># 2</td>
<td>6.56</td>
<td>Like moderately</td>
</tr>
<tr>
<td># 3</td>
<td>7.15</td>
<td>Like moderately</td>
</tr>
<tr>
<td># 4</td>
<td>8.25</td>
<td>Like very much</td>
</tr>
<tr>
<td># 5</td>
<td>8.52</td>
<td>Like extremely</td>
</tr>
<tr>
<td>Total mean</td>
<td>7.39</td>
<td></td>
</tr>
<tr>
<td>3. Community</td>
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<tr>
<td>Preparation</td>
<td></td>
<td></td>
</tr>
<tr>
<td># 1</td>
<td>4.89</td>
<td>Neither nor dislike</td>
</tr>
<tr>
<td># 2</td>
<td>5.91</td>
<td>Neither nor dislike</td>
</tr>
<tr>
<td># 3</td>
<td>7.25</td>
<td>Like moderately</td>
</tr>
<tr>
<td># 4</td>
<td>7.49</td>
<td>Like moderately</td>
</tr>
<tr>
<td># 5</td>
<td>8.58</td>
<td>Like extremely</td>
</tr>
<tr>
<td>Total mean</td>
<td>6.74</td>
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</tr>
</tbody>
</table>

Table 3. Perception Mean Score of the Respondents on the Acceptability of Malunggay Food Wrapper


Table 3 presents the mean of acceptability level of malunggay food wrapper as perceived by the respondents. That, the lowest mean score that the respondents rating were on the 1st & 2nd preparation which faculty respondents had a mean score of 4.62 which means that they neither like or dislike the product. Student respondents like slightly and like moderately the product as revealed on mean score 6.45 and 6.56 respectively. Meanwhile, community respondents perception has a mean score of 4.89 & 5.91 which indicated that they neither like nor dislike the product. However, all the respondents accepted all the succeeding trials being done which their perception mean score acceptability varies respectively on the ascending manner. This means that malunggay food wrapper being produced is like extremely in terms of its palatability, texture, and appearance.

RESULTS AND DISCUSSION

Formulation Stage

The right formulation of the newly produced food wrapper utilized 1 cup of young malunggay leaves, ½ cup of water, ½ cup of evaporated milk, ¼ cup of cornstarch, 2 large eggs, and ¼ teaspoon of butter was used to grease the pan in frying the food wrapper per batch.

In terms of nutrient content, malunggay food wrapper gives fiber, vitamin A, vitamin C, minerals, folic acid, potassium, calcium, magnesium, zinc, & manganese. Likewise, it is significantly used in medical purposes particularly in preventing cancer.

Sensory Evaluation

a) Shelf life Storage

Under the refrigerator temp at 5°C, malunggay food wrapper maintained its good attributes until the seventh (7) day likewise in chilling temperature at 8°C. After thawing and heated, the taste was still good but the texture of the chilled wrapper became little bit flabby. The food wrapper under the room temperature at 33°C or 90°F, deteriorated on the 3rd day. It had a spoiled taste; and molds thrived.

b) Palatability

As far as palatability is concerned, the taste of the refrigerated newly cooked malunggay food wrapper maintained its good taste, aroma, flavor and good texture. While the food wrapper set aside in the chiller, the texture after heating became little bit flabby.
Whereas, the food wrapper that was placed on the shelf/cabinet obtained molds and had undesirable taste after three days.

**Level of Acceptability**
As to the level of acceptability, evaluation varied, ranging from 3.77 for first preparation to 8.58 for the last (fifth) preparation. On the last preparation, the respondents gave a rating equivalent to "like extremely" level. They accepted all the attributes of the product. They were pleased with the appearance, especially the color. While on the texture particularly on its firmness, the respondents like extremely the product.

The malunggay food wrapper was well accepted by the respondents along its physical attributes; palatability (taste, flavor, aroma or odor); texture (smooth & soft) and appearance (color & moldability). Since the procedure in preparing the food wrapper is easy to follow and the raw materials needed are cheap, the researcher recommends it for desserts and for business.

**Implication of the Study to Technology and Livelihood Curriculum and Small and Medium Enterprise**
This study opened the door for more adventures in preparing desserts using cheap and easily obtained raw material. Malunggay vegetable is easily grown anywhere particular in dry place like in the Philippines. As such, it could be turned into food varieties which will appeal in any cuisine either in the family, food chain, restaurant or any food business.

Moreover, the generated facts and observations in this study could be of great help in the improvement of the TLE curriculum especially on food area. Curriculum planners may include subjects like Food Research & Product Development, Product Design, Product Quality Assessment and Product Quality Standardization, in which the students would be given more awareness and be more equipped with knowledge in doing researches along food.

With this study, a good business could be established especially to those who are under employed and make it as their source of income. It point out to the farmer how to process their yields and make food that will be served on their table. Thus, help minimize food waste and help increase production of malunggay vegetables.

Marketability of the product was also considered from the point of view of the processor and consumer. It was done during the face-to-face interview when the food taste test was conducted. On the side of the processor, the minimal expenses incurred on the formulation of the newly produced food wrapper made the product affordable. This was used as gauge of marketability. On the consumer’s side, the acceptance of the product’s characteristics and market competitiveness in terms of price, and nutrient content were utilized as indicators of marketability.

For further development of the product microbiological test should be done and nutritional content should be studied for customer’s information about the nutritive value of the maluggay food wrapper. Home managers especially the unemployed one should learn how to process agricultural yields and make as their source of income. Technology and Livelihood Education (TLE) teachers should further their skills instruction to equip the students the necessary skills & knowledge in doing researches along food. Curriculum planners should strengthen the TLE program particularly on Food area to develop the potentials of the students to become productive and responsible citizen.

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**Journal Article**

Acceptability of Horse Radish “Malunggay” Food Wrapper


Thesis


Website

[4] https://www.youtube.com/watch?v=sorKXRi4Do