

# Utilization, preparation and evaluation of pork and chicken nuggets with *moringa oleifera lamk* and *tamarindus indica* leaves powder

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## ARTICLE INFORMATION

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## ABSTRACT

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*This study aimed to utilize, prepare and evaluate chicken and pork nuggets with Moringa Oleifera Lamk and Tamarindus Indica leaves powder. The respondents were the 200 residents of selected barangays of Marikina City, Metro Manila, ranging from 7 to 45 years old.*

*The respondents agree that the prepared chicken nuggets with 5 grams, 10 grams and 15 grams of Moringa Oleifera Lamk and Tamarindus Indica leaves powder are tender,*

*as evidenced by the average weighted mean of 4.55, 4.51 and 4.29 respectively. The respondents strongly agree on the aroma of the prepared chicken nuggets, as shown by the weighted mean of 4.82, 4.81 and 4.85 respectively.*

*The respondents agree on the tenderness of the prepared pork nuggets, as shown by the average weighted mean of 4.54, 4.45 and 4.49 respectively. In terms of aroma, the respondents strongly agree on the prepared pork nuggets, as shown by the average weighted mean of 4.93, 4.94 and 4.91.*

*The respondents evaluated on the marketability of both chicken and pork nuggets as moderately agree, as evidenced by the average weighted means of 3.22 and 3.38 respectively.*

### Keywords

Acceptability, Formulation, Marketability

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## Introduction

This study aimed to utilize, prepare, and evaluate chicken and pork nuggets with *Moringa Oleifera Lamk* and *Tamarindus Indica* leaves powder in terms of tenderness, taste, color, aroma, juiciness and marketability. The conceptual models of the study were the preparation of *Moringa Oleifera Lamk* and *Tamarindus Indica* leaves powder and the evaluation of pork and chicken nuggets.

The fact that the country is facing a global crisis and that prices of basic commodities go high, it is high time that we thought of a better way of alleviating malnutrition problems because children are reluctant to eat leafy vegetables like *malunggay*, *saluyot*, *pechay* and *camote* tops. Thus, there should be a way by which these

leafy vegetables could be mixed with favorites dishes or snack items.

Chicken nuggets and pork nuggets have increased their popularity in the food industry since these were invented by Robert Baker of Cornell University. It was in the early 80's when McDonald launched the nugget on its menu and patented its recipe for Chicken McNuggets to gain public acceptance (*Bhosale, et. al., 2011*). The chicken nugget is the only nugget accepted worldwide that has reached the level of popularity.

The increase in awareness for a healthier diet and the increase in demand for higher quality meat alternatives have led to changes in the formulation of chicken nuggets. Meat alternatives such as soy and wheat proteins have made improvement in the areas of flavor and texture.

Children enjoy the crispness of nuggets, but not crispness of vegetables. Mothers are always having a hard time introducing vegetables to their children because of their texture and taste. Attempts have been made by the different food processing sectors to introduce vegetables to children in such a way that these would not taste and appear as expected. Leafy vegetables were processed into powder in order to meet the nutritional requirements of the consumers.

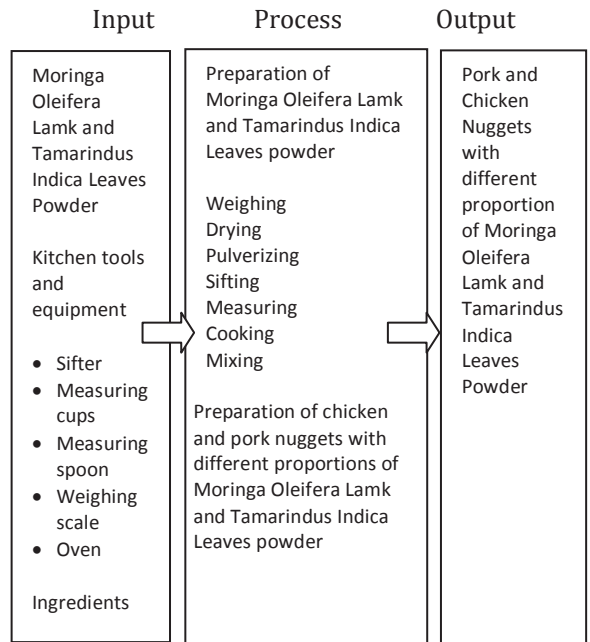
One of the green leafy vegetables found to have high nutritional value is the *malunggay* or *Moringa Oleifera Lamk*. Many reports have appeared in scientific journals describing the nutritional properties of malunggay leaves. Known by scientist as a “miracle vegetable”, it is an excellent source of nutrition and a natural energy booster. Loaded with nutrients, vitamins and amino acids, it replenishes the body and provides what one needs to get through hectic week day.

Another leaf which was proven to have a medicinal as well antimicrobial effect is the *tamarind* leaf or *Tamarindus Indica* leaves. These have been used for centuries as a medicinal plant. It is used traditionally in abdominal pain, diarrhea, dysentery, infection; wound healing, constipation, gonorrhoea and eye diseases. It has also an antifungal, antiseptic effect and also used to destroy worms in children.

Because of these components of *Moringa Oleifera Lamk* and *Tamarindus Indica* leaves, the researcher was motivated to conduct this study which utilizes their leaves in powdered form to suppress malnutrition and to produce nutritious dishes.

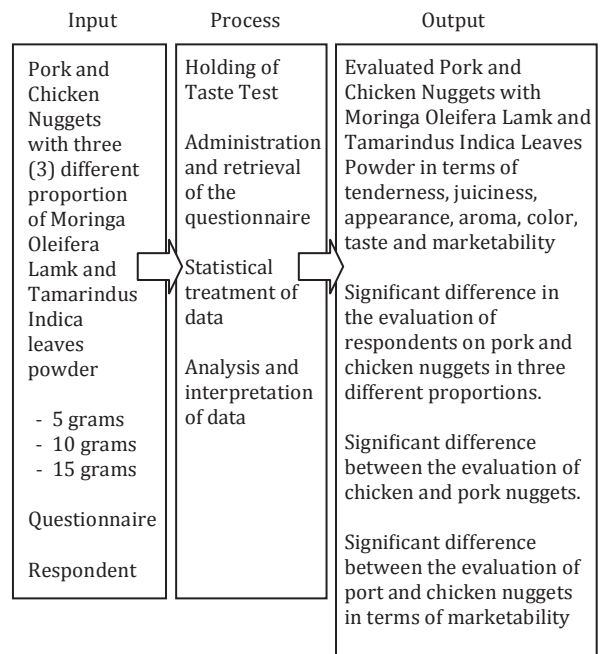
**Conceptual Models of the Study**

**Conceptual Model for the Preparation of Moringa Oleifera Lamk and Tamarindus Indica Leaves Powder**



The input consists of Moringa Oleifera Lamk and Tamarindus Indica leaves, kitchen tools, equipment and ingredients. The process consists of preparing the leaves powder such as drying, and pulverizing and preparing pork and chicken nuggets with powdered leaves.

**Conceptual Model for the Evaluation of Pork and Chicken Nuggets**



The input consists of the prepared chicken and pork nuggets with three different proportions, the questionnaire and the respondents.

The process involves conducting a taste test, administration and retrieval of the checklist, statistical treatment of data and the analysis and interpretation of statistical results were part of the process.

The output includes the evaluated chicken and pork nuggets in terms of tenderness, taste, juiciness, aroma, color and marketability and the significant difference in the evaluation of the respondents in three different proportions of Moringa Oleifera Lamk and Tamarindus Indica leaves powder

## Method

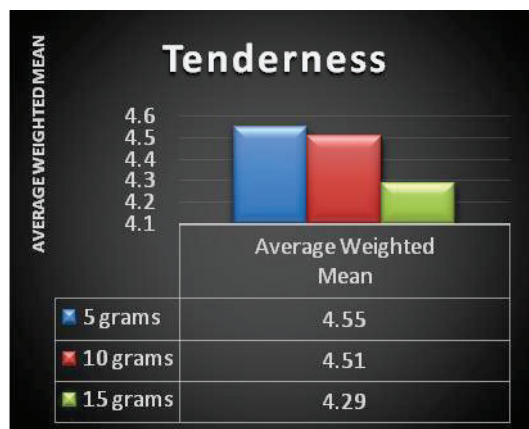
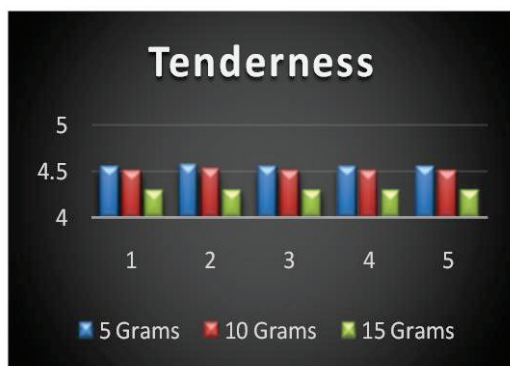
Using the experimental method of research, the study establishes cause-and-effect relationship between the independent and dependent variables by means of manipulating their control and randomization.

Two hundred (200) residents of selected barangays of Marikina City ranging from 7 – 45 years old comprised the respondents.

Analysis of variance, weighted mean and t-test were used as the statistical tool to treat the data, while evaluation check list or questionnaire helped in gathering data to assess the prepared chicken and pork nuggets with 5 grams, 10 grams and 15 grams of the forecited leaves powder.

## Results

Table 1  
Evaluation of Respondents on the Chicken Nuggets in Three Different Proportions of Moringa Oleifera and Tamarindus Indica leaves Powder as to Tenderness



As gleamed from the table the respondents have an average weighted mean of 4.55, 4.51, and 4.29 in the three proportions respectively, all interpreted as "agree". Although all respondents agree on the three proportions, the chicken nuggets with 5 grams of leaves powder is the most preferred, as evidenced by the highest weighted mean.

This means that the respondents find the prepared chicken nuggets with the proportioned grams of leaves powder are the most acceptable in terms of tenderness.

Table 2  
 Evaluation of Respondents on the Chicken Nuggets in Three Different Proportions of the chosen leaves powder in terms of Taste

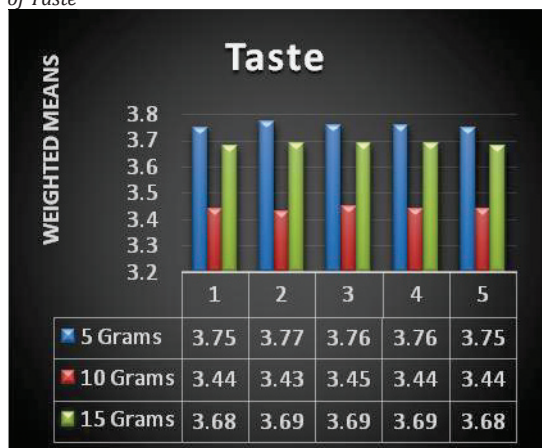
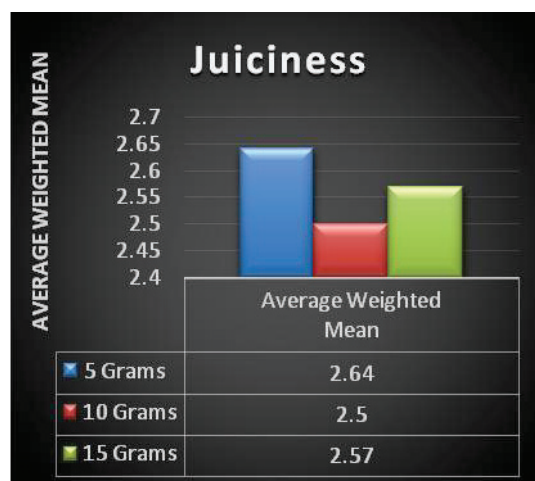
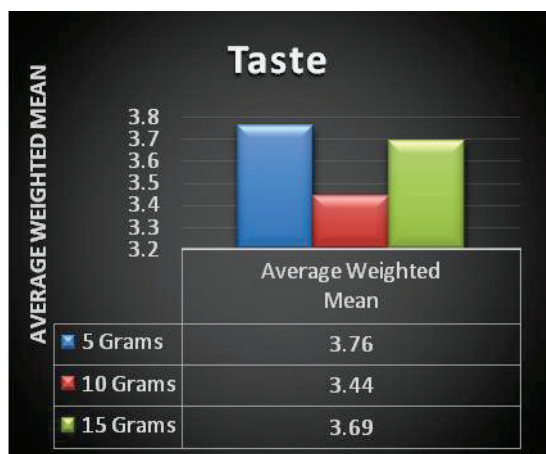
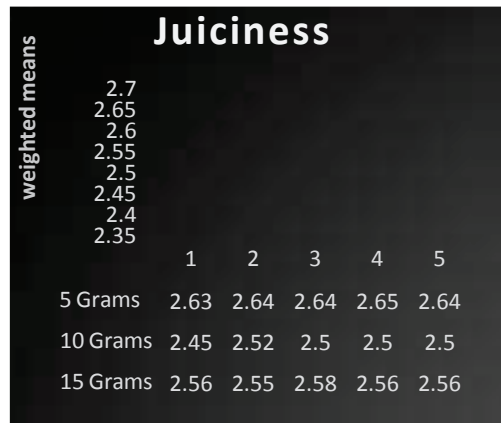


Table 3  
 Evaluation of Respondents on the Chicken Nuggets in Three Different Proportions in terms of Juiciness



As presented in the table, the respondents have an average mean of 3.76 in 5 grams proportion that corresponds to “agree”, 3.44 in 10 grams proportion to “moderately agree” and 3.69 in 15 grams proportion which is interpreted as “agree”. This means that the chicken nuggets in the three proportions of the aforementioned leaves powder taste good, no distinct flavor, has a blended taste and has a natural chicken flavor.

Further scrutiny of the values revealed that the nuggets with 5 grams proportion have the highest weighted mean which means that it is the most acceptable in terms of taste.

The table yielded that the respondents have an average weighted mean of 2.64, 2.50 and 2.57 in the three proportions respectively, all interpreted as “moderately agree”.

This means that the respondents find the prepared chicken nuggets in three different proportions are slightly moist, easy to bite and not dry. The results further reveal that as for juiciness the nuggets with 5 grams of the prepared leaves powder are the most preferred.

Table 4  
 Evaluation of Respondents on the Chicken Nuggets in Three Different Proportions of Moringa Oleifera and Tamarindus Indica leaves Powder as for Aroma

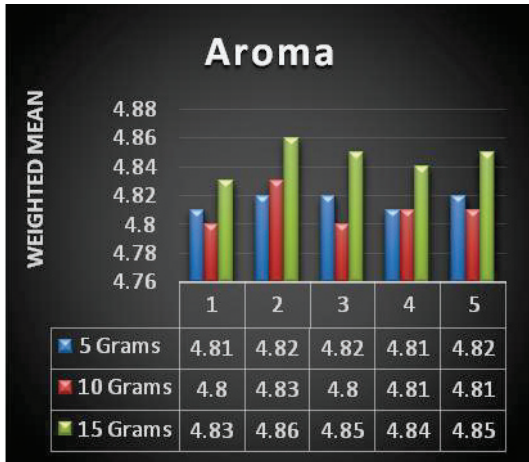
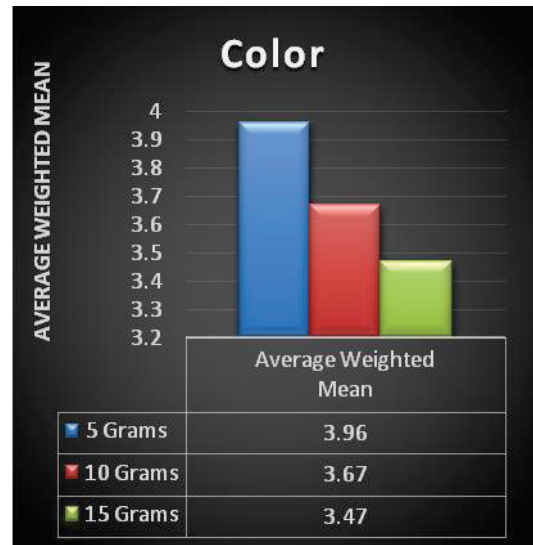
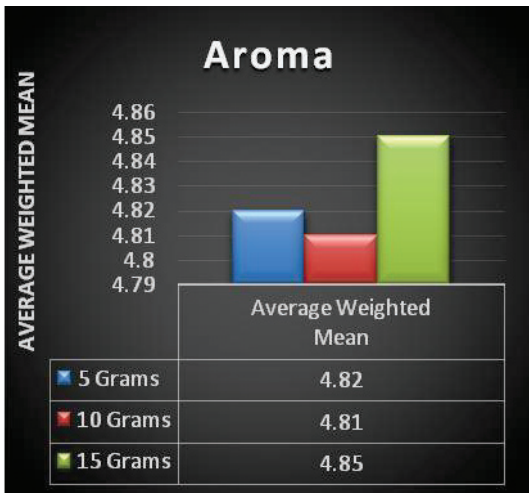
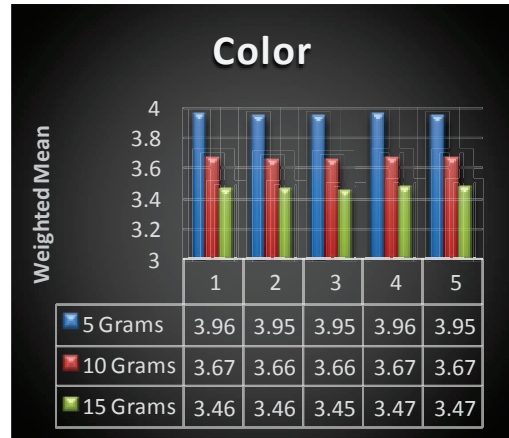


Table 5  
 Evaluation of Respondents on the Chicken Nuggets in Three Different Proportions of Moringa Oleifera and Tamarindus Indica leaves Powder in terms of Color



Based on the table, the respondents have an average liking for the three proportions interpreted as “strongly agree”.

It only means that the respondents find the prepared chicken nuggets with 5, 10 and 15 grams of the aforementioned leaves powder have an enticing smell, exceed a natural aroma of chicken, with no distinctive odor nor any rancid smell.

Presented in table 6 is the respondents’ average mean of 3.96, 3.67 and 3.47 in the three proportions respectively in which the first two weighted means are interpreted as “agree,” and the third 3.47 as “moderately agree”.

This means that the respondents find the prepared chicken nuggets with 5, 10, and 15grams of the aforementioned leaves powder have uniform color, attractive and have an even color inside.



Table 6  
*Evaluation of Respondents on the Pork Nuggets in Three Different Proportions of Moringa Oleifera and Tamarindus Indica leaves Powder in terms of Tenderness*

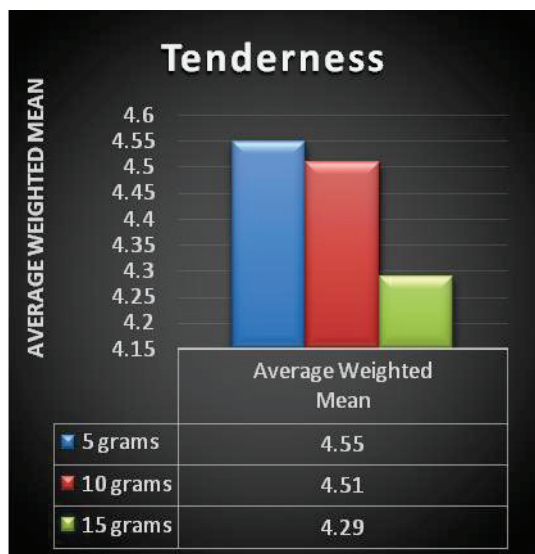
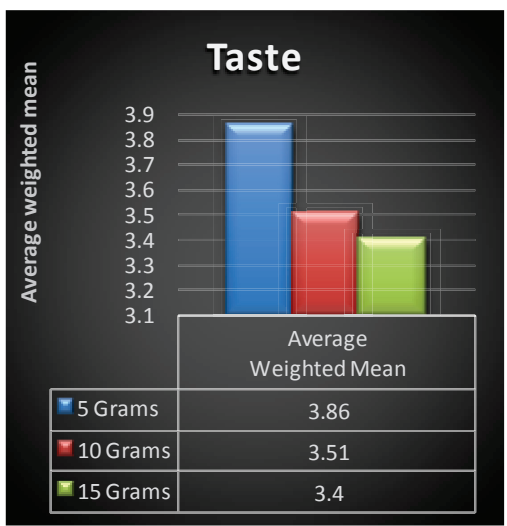
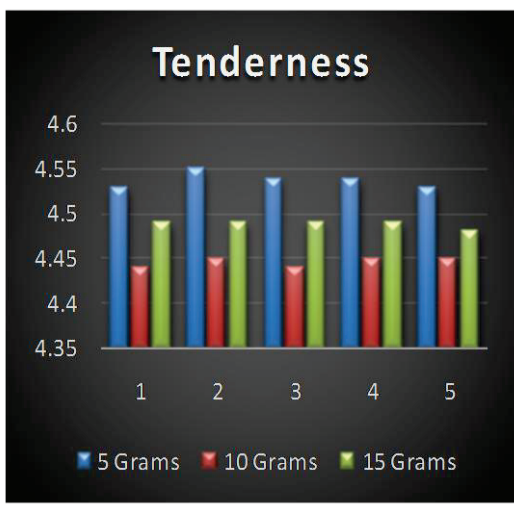
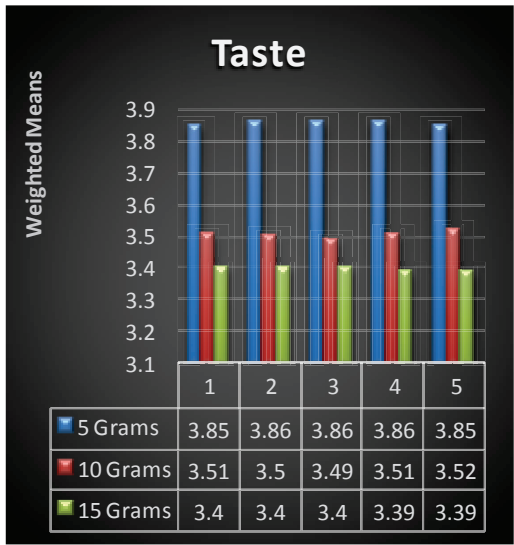


Table 7  
*Evaluation of Respondents on the Pork Nuggets in Three Different Proportions of Moringa Oleifera and Tamarindus Indica leaves Powder in terms of Taste*



Based on the table, the respondents have an average weighted mean of 4.54, 4.45 and 4.49 in the three proportions respectively all interpreted as “agree”.

This means that the respondents find the prepared pork nuggets have a tender mouth feel, can be easily chewed, fine to the bite and leaves particles after being chewed.

Table 8 yielded that the respondents have an average weighted mean of 3.86, 3.51 and 3.40 in the three proportions respectively with 5, and 10 grams proportions as the most preferred or agreed.

This means that the respondents find the prepared pork nuggets taste very good, lacks distinct flavour and neither have after taste.

Table 8  
 Respondents' Evaluation on the Pork Nuggets in Three Different Proportions of *Moringa Oleifera* and *Tamarindus Indica* leaves Powder in terms of Juiciness

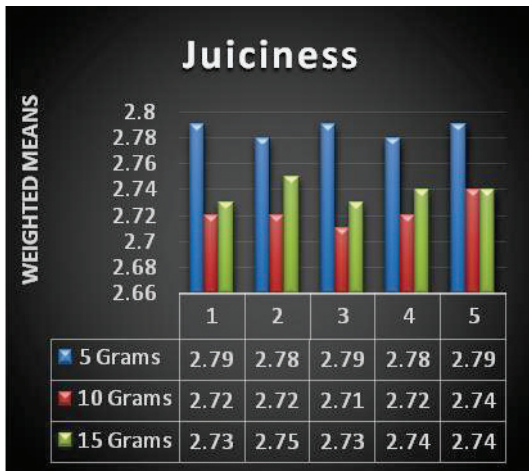
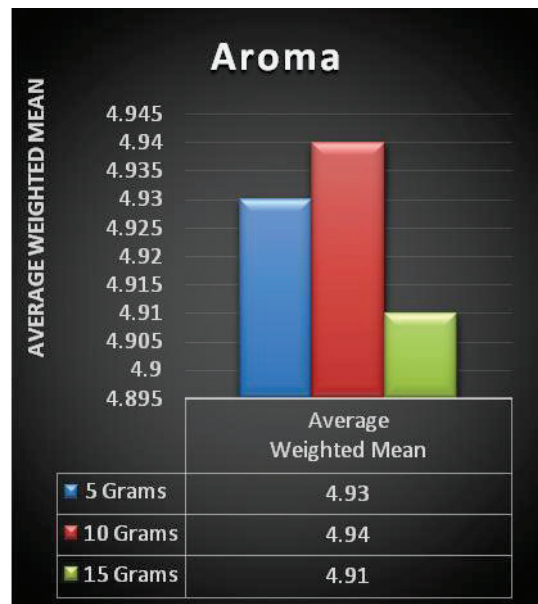
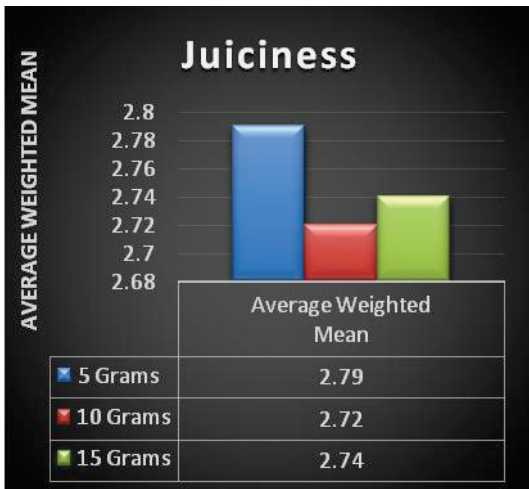
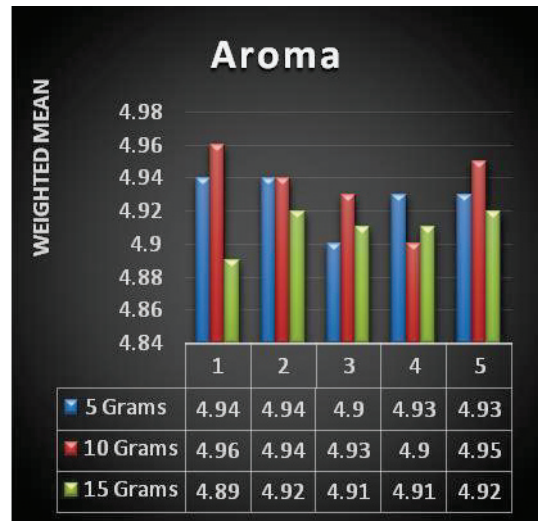


Table 9  
 Evaluation of Respondents on the Pork Nuggets in Three Different Proportions of *Moringa Oleifera* and *Tamarindus Indica* leaves Powder in terms of Aroma



Based on the table, the respondents have an average weighted mean of 2.79, 2.72 and 2.74 in the three proportions respectively, all interpreted as “moderately agree”. A closer look at the values, suggests that however, pork nuggets with 5 grams of *Moringa Oleifera* and *Tamarindus Indica* leaves powder have the highest weighted mean. This finding implies that the nuggets with 5 grams proportion are the most acceptable to the respondents. Furthermore, this means that the respondents find the prepared pork nuggets with 5, 10 and 15 grams proportion of *Moringa Oleifera* and *Tamarindus Indica* leaves powder have a juicy texture, slightly moist, easy to bite, not dry and savory.

Table 10 revealed that the respondents have an average mean of 4.93, 4.94 and 4.91 in the three proportions respectively, which are interpreted as “strongly agree”.

This means that the respondents find the prepared pork nuggets with 5, 10 and 15 grams of *Moringa Oleifera* and *Tamarindus Indica* leaves powder have enticing smell, does not smell rancid, has a natural aroma of pork and lacks distinctive odor.

Table 10  
 Respondents' Evaluation on the Pork Nuggets in Three Different Proportions of *Moringa Oleifera* and *Tamarindus Indica* leaves Powder in terms of Color

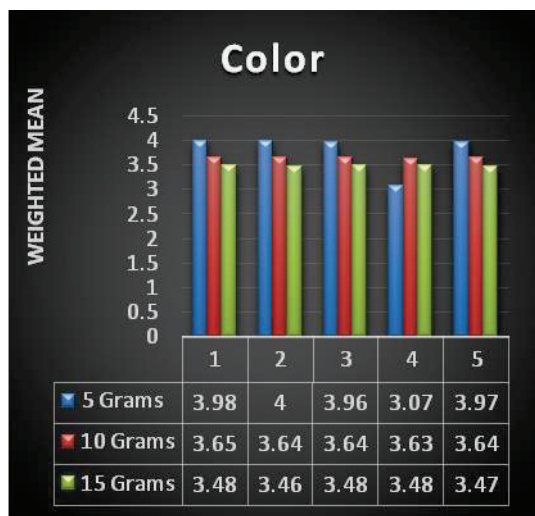


Table 11  
 Evaluation of Respondents on the Chicken Nuggets in Three Different Proportions of *Moringa Oleifera* and *Tamarindus Indica* leaves Powder in terms of Marketability

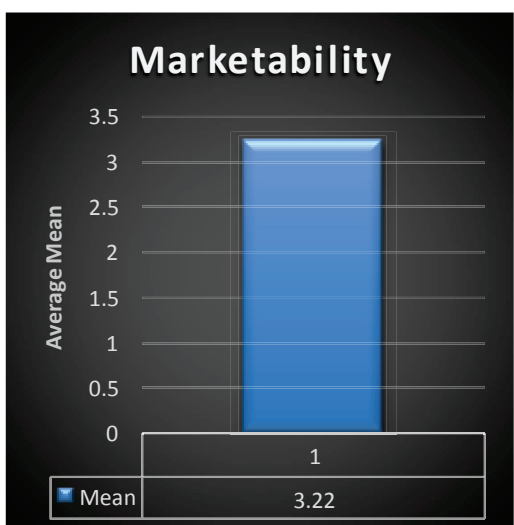
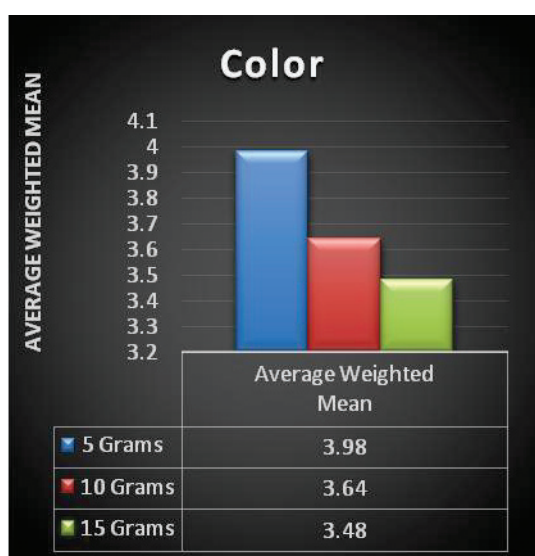
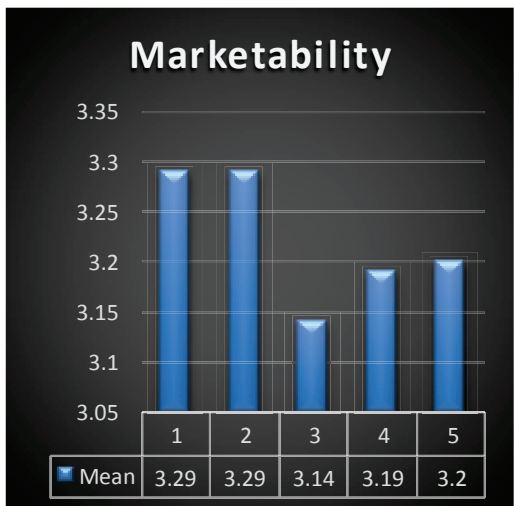


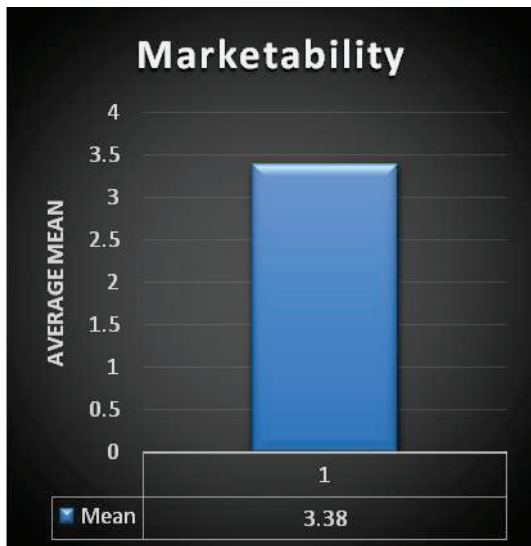
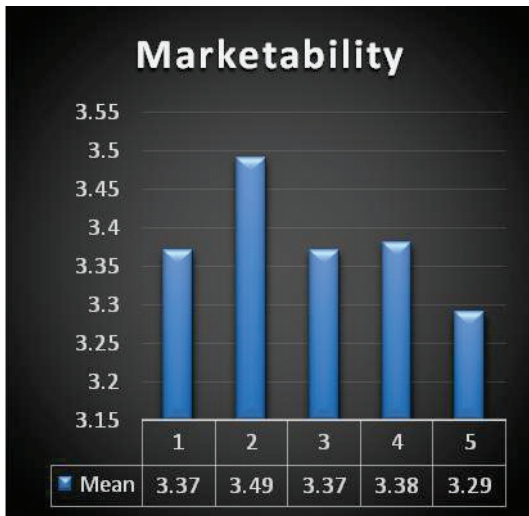
Table 11 yielded that the respondents have an average weighted mean of 3.98, 3.64 and 3.48 in the three proportions respectively which are interpreted as “agree”.

This means that the respondents find the prepared chicken nuggets with the varied proportion of grams of the aforementioned leaves powder have uniform color, attractive, has dark golden brown edges and even color inside.

From the table 12, it can be inferred that the respondents evaluation on the marketability of chicken nuggets has an average mean of 3.22 interpreted as “moderately agree”. This means that the chicken nuggets are affordable, they can be sold easily, the package design is attractive and its label states complete information.



Table 12  
 Evaluation of Respondents on the Pork Nuggets in Three Different Proportions of *Moringa Oleifera* and *Tamarindus Indica* leaves Powder in terms of Marketability



The respondents rated the overall marketability of pork nuggets with a general mean of 3.38 interpreted as “moderately agree”

This means that the respondents find the prepared pork nuggets to be affordable, can be sold easily, have attractive packaging whose label states complete information.

Table 13  
 T-test between the respondents’ on the chicken and pork nuggets

Respondents	Number	Mean	Standard Deviation	Computed t Value	Tabular t Value 0.05, 398 df	Decision	Interpretation
Chicken	200	3.80	0.27	-3.39	1.97	Reject Ho	Significant
Pork	200	3.89	0.25				

It can be gleaned in the table that the computed  $t$  value of -3.39 is greater than the tabular  $t$  value of 1.97 which led to the rejection of null hypothesis. Therefore, at 0.05 level of significance, it can be concluded that there is significant difference in the respondents’ evaluation on the chicken and pork nuggets. This means that the pork nuggets are more acceptable and preferred than the chicken nuggets.

Table 14  
 T-test between the perceptions of the respondents on the marketability of chicken and pork nuggets

Respondents	Number	Mean	Standard Deviation	Computed t Value	Tabular t Value 0.05, 390 df	Decision	Interpretation
Chicken	196	3.22	0.37	-4.29	1.97	Reject Ho	Significant
Pork	196	3.38	0.36				

As seen in table 15, the computed  $t$  value of -4.29 is greater than the tabular  $t$  value of 1.97 which led to the rejection of null hypothesis. Therefore, at 0.05 level of significance, it can be claimed that there is significant difference in the respondents’ perception on the marketability of the chicken and pork nuggets. This implies that the pork nuggets are more marketable than the chicken nuggets with *Moringa Oleifera* and *Tamarindus Indica* leaves powder.

## **Conclusion**

1. The prepared chicken and pork nuggets with 5 grams, 10 grams and 15 grams of *Moringa Oleifera Lamk* and *Tamarindus Indica* leaves powder are both acceptable in terms of tenderness, taste, juiciness, aroma and color.
2. The pork nuggets with 5 grams of *Moringa Oleifera Lamk* and *Tamarindus Indica* leaves powder are the most acceptable in terms of tenderness, taste, juiciness, aroma, color and marketability.

## **Recommendations**

1. Pork nuggets with 5 grams of *Moringa Oleifera Lamk* and *Tamarindus Indica* leaves powder be patented for mass production.
2. Students and teachers be encouraged to prepare pork nuggets with *Moringa Oleifera Lamk* and *Tamarindus Indica* leaves powder to be sold as part of the income generating projects of the school.
3. Study on the shelf-life and microbial analysis of the prepared nuggets be conducted.

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