

BIBLIOGRAPHY

GAMA, ARNELYN M. APRIL 2012. Acceptability Of Duck Meat Patties Processed With Different Levels Of Malunggay (*Moringa Oleifera*) Leaves Powder. Benguet State University, La Trinidad, Benguet.

Adviser: Myrna B. Walsiyen MSc.

ABSTRACT

This study was conducted to determine the acceptability of duck meat patties processed with different levels of malunggay leaves powder in terms of appearance, flavor, juiciness, tenderness and the overall acceptability of the product, to determine the cost of producing duck meat patties processed with different levels of malunggay leaves powder and to determine the nutrient composition of duck meat patties processed with different levels of malunggay leaves powder. This study was conducted at the Meat Laboratory Room, Department of Animal Science under the College of Agriculture, Benguet State University.

A panel composed of twenty-five tasters was invited to evaluate the duck meat patties. The panel of tasters was composed of five teachers, five nutritionists, ten students, and five housewives.

The results showed that both the meat patties with no malunggay leaves powder and those with malunggay leaves powder added at the level of 15g/kg meat were very pleasing while the meat patties with higher malunggay leaves powder content i.e. added at



the level of 30g/kg meat was rated moderately pleasing in appearance. In terms of flavor, the patties with 0g malunggay leaves powder were rated desirable while both the patties with malunggay leaves powder added at the levels of 15g and 30g/kg meat were rated as moderately desirable. The juiciness of the control patties (0g malunggay leaves powder) was rated very juicy while the patties with malunggay leaves powder were rated moderately juicy. Tenderness of patties with 0g malunggay leaves powder was rated very tender and the patties with malunggay leaves powder were rated moderately tender. In terms of the overall acceptability, both the patties with 0g and those with malunggay leaves powder added at the level of 15/kg meat were liked very much while the patties with malunggay leaves powder added at the level of 30g/kg were liked moderately by the members of the panel of tasters.

Though both the nutrient composition and the total cost of production were not subjected to statistical analysis, results revealed that in terms of nutrient composition, it was only in the ash content where there was a slight increase in the patties with malunggay leaves powder.

On the other hand, the computation of the expenses revealed that the meat patties with malunggay leaves powder added at the level of 30g/kg meat had the highest expenditure which was Php 302.58 while the meat patties with malunggay leaves powder added at the level of 15g/kg meat had a production cost of Php 297.58. The patties with no malunggay leaves powder incurred the lowest production cost of Php 292.58.



INTRODUCTION

Processed meat products are defined as those in which the properties of fresh meat have been modified by the use of one or more procedures such as grinding or chopping, addition of seasonings, alteration of color, or heat treatment. Typical processed meat products include items such as cured ham, bacon, corned beef, and almost endless variety of sausages. Most of these products are subjected to a combination of several basic processing steps before reaching their final form.

Comminuting involves subdividing the raw meat materials, so that the product consists of small meat pieces, chunks, chips, or slices. Hamburger and ground beef are probably the most common comminuted products. Many commercial products begin as ground meat or meat chunks, pieces, or slices that are then formed into patties by machines using sufficient pressure to force the meat tightly together. These products are often marketed under the general titles of “burger” or “steaks”. They may even be breaded and precooked. Boneless poultry meat pieces, either chicken or turkey, can be formed into roll type products by using a suitable binder to hold the meat pieces together, and a casing which gives the product desired shape (Aberle *et. al.*, 1975).

Today, many meat products have been developed but still many meat processors are continuing to develop new products or are improving their existing meat products to satisfy the changing taste of the consumers. However, people now are getting more conscious about their health, and that they are always watchful for some healthy foods. Researchers have responded by adding healthful flavorings to the meat such as basil leaves, lemon grass extract, corn syrup and the like or by adding other plant materials to help



improve the nutritive value of the processed meat. It is for this reason why researcher would want to study the acceptability of duck meat patties with malunggay leaves powder.

There are various parts of the malunggay plant which are being used for health reasons. For one, the leaves of this plant proved to be a good source of calcium, iron, ascorbic acid and phosphorus. Its other parts such as the seeds, the young pods, and the flowers have been established to benefit individuals as far as anti-oxidant, anti-diabetic, circulatory stimulations, and such other activities that are most beneficial to mankind. There have been claims that malunggay can be used to lower blood pressure, aid in pains caused by rheumatism, headaches and migraines, as well as its being an anti-tumor plant. Malunggay is also used for purgative and anti-fungal purposes, as well. All these prove the claim that this plant is indeed multi-purpose.

Because of the above benefits, the researcher has been motivated to determine the acceptability of meat patties processed with different levels of malunggay leaves powder. Results of the study would benefit not only the researcher but also others like students, researchers, meat processors, and even consumers. The results can serve as reference to the students and researchers when they come up with related researches.

Generally, the objective of this study was to determine the acceptability of duck meat patties processed with different levels of powdered malunggay leaves. Specifically, this study aimed to determine the acceptability of duck meat patties processed with different levels of powdered malunggay leaves in terms of appearance, flavor, tenderness, juiciness and the overall acceptability of the product; to determine the cost of producing duck meat patties processed with powdered malunggay leaves; and to



determine the nutrient composition of duck meat patties processed with different levels of malunggay leaves powder.

The study was conducted at the Department of Animal Science Meat Laboratory, College of Agriculture, Benguet State University, Balili, La Trinidad, Benguet in May 2011.



REVIEW OF LITERATURE

Malunggay leaves was once considered a "poor man's vegetables" but now it is known as a "miracle tree" or "nature's medicine cabinet" by scientists and health care workers from around the world because it is loaded with vitamins and minerals that can be an effective remedy against many kinds of ailments. All parts of the malunggay tree are usable for nutritional and medicinal purposes - from the roots, trunk, and branches to the leaves, flowers, and seeds. The small, oval, dark-green leaves are famous vegetable ingredient in soup, fish and chicken dishes. The leaves can actually be eaten raw, but best added in meals due to its high concentration of nutrients. The roots is used to make tea, while the trunk, after it is scraped and squeezed for its juice, is used to clean wounds. Malunggay trees are generally grown in the backyards in countries of Southeast Asia, Central and South America, and Africa. It is said that these plants are "low maintenance," requiring little to no care (Len7288, 2011).

Table 1. Nutrient analysis per 100 gram pods/leaves of malunggay (Anonymous, 2011).

	PODS	LEAVES	LEAF POWDER
Moisture (%)	86.90	75.00	7.50
Fat (g)	0.10	1.70	2.30
Fiber (g)	4.80	0.90	19.20
Minerals (g)	2.00	2.30	0.00
Mg (mg)	24.00	24.00	368.00
P (mg)	110.00	70.00	204.00
K (mg)	259.00	259.00	1,324.00



Table 1. Continued

	PODS	LEAVES	LEAF POWDER
Fe (mg)	5.30	7.00	28.20
S (mg)	137.00	137.00	870.00
Oxalic acid (mg)	10.00	101.00	0.00
Vitamin A - B carotene (mg)	0.10	6.80	16.30
Vitamin B -choline (mg)	423.00	423.00	0.00
Vitamin B1 -thiamin (mg)	0.05	0.21	2.60
Vitamin B2 -riboflavin (mg)	0.07	0.05	20.50
Vitamin B3 -nicotinic acid (mg)	0.20	0.80	8.20
Vitamin C -ascorbic acid (mg)	120.00	220.00	17.30
Vitamin E -tocopherol acetate (mg)	0.00	0.00	113.00
Arginine (g/16gN)	3.60	6.00	0.00
Histidine (g/16g N)	1.10	2.10	0.00
Lysine (g/16g N)	1.50	4.30	0.00
Tryptophan (g/16g N)	0.80	1.90	0.00
Phenylalanine (g/16g N)	4.30	6.40	0.00
Methionine (g/16g N)	1.40	2.00	0.00
Threonine (g/16g N)	3.90	4.90	0.00
Leucine (g/16g N)	6.50	9.30	0.00
Isoleucine (g/16g N)	4.40	6.30	0.00
Valine (g/16g N)	5.40	7.10	0.00



Duck meat is considered as "white" meat, even though its meat is considerably darker than other poultry meats such as chicken or turkey. The reason for this is ducks are more active in comparison to chicken therefore they need and use up more oxygen. The extra oxygen in the body of the duck or other types of game bird, gives their meat the darker red color. White Pekin duck breast, without skin, contains 120 calories, 23 grams protein and 2 grams of fat. This is comparable to a skinless chicken or turkey breast; it has a rich, bold flavor (Frank, 2010).

Bacani (2010) conducted a research to determine the acceptability of meat patties fortified with different levels of powdered malunggay leaves and found out that malunggay can be used as seasoning ingredient to processed meat patties but having a little amount of powdered malunggay leaves in patties is the best. The study showed that placing 15g of powdered malunggay leaves in patties is much more acceptable than placing 30g in the meat patties because the taste is so strong and it also made the patties dull and less tender.

Cherry (2010) cited that the production of *Moringa oleifera* or "malunggay" fights poverty and malnutrition in the Philippines. The World Health Organization (WHO) promoted the benefits of the miracle vegetable. Malunggay is now known as a low-cost health enhancer in poor countries around the globe. Malunggay is rich in vitamin to the extent that it is one of the richest plant sources of Vitamins. Moringa has Vitamin A (Beta Carotene), Vitamin B1 (Thiamine), Vitamin B2 (Riboflavin), Vitamin B3 (Niacin), Vitamin B6 Pyrodixine), Vitamin B7 (Biotin), Vitamin C (Ascorbic Acid), Vitamin D (Cholecalciferol), Vitamin E (Tocopherol) and Vitamin K. Vitamin A is needed to prevent night blindness, promotes healthy skin, and fights infections. Vitamin C is needed to maintain healthy gums, assists in healing wounds, and helps the body use iron. Vitamin E



will protect the body against free radical damage to cells. Calcium and Vitamin D are essential to maintain strong bones and teeth. Malunggay contains all the essential minerals needed for maintaining strong bones. Good nutrition can help lessen the effects of diseases prevalent among elderly population and improve their quality of life.

The author also cited that nutritionists proved that 100 grams of malunggay leaves can give the body the following:

- 75 calories of energy (higher than ampalaya, squash, tomatoes, or carrots)
- 5.9 grams protein (higher than cauliflower, lettuce, or mustard)
- 12.8 grams carbohydrate (higher than okra, papaya, or watermelon)
- 353 milligrams calcium (higher than gabi leaves, mung beans, squash, and camote tops)
- 3.7 milligrams niacin (higher than other vegetables analyzed)
thiamin, phosphorus, and ascorbic acid.

Moringa is a remarkable discovery, which can make a tremendous difference in the health and quality of life. Mounting scientific evidence shows what has been known for thousands of years by people in the tropical parts of the world: Moringa is nature's medicine cabinet. It is best known as an excellent source of nutrition and a natural energy booster. Loaded with nutrients, vitamins and amino acids, it replenishes the body and provides what the body needs to get through a hectic weekday or active weekend. The answer seems to be Moringa's well-documented detoxifying effect. University laboratories around the world have studied Moringa's ability to purify water...attaching itself to harmful material and bacteria, and allowing them to be expelled as waste. The evidence points to this same process going on inside the body (Pati, 2009).



Tender meat generally is preferred by consumers, but just because meat is given a top quality grade does not guarantee its tenderness. The only real test is how easily the meat gives way to the teeth. Extreme variation of tenderness exist in beef, even within different areas of a single meat cut, but overall, natural meat tenderness is due to factors such as the cut, age, and fat content. Meats can also be treated to make them more tender by adding enzymes, salt, and acid or by subjecting them to mechanical or electrical treatments. Preparation, temperature, and time also have an influence on tenderness (Amanda, 2007).

The horseradish tree (*Moringa oleifera*) illustrates the point that what people eat is often dictated by custom and not by the actual edibility of a plant or a portion of it. The fern-like young leaves extremely rich in vitamins A and C are probably the most common vegetable in the Philippines where they are added to soups (Hutton, 1998).



MATERIALS AND METHOD

Materials

The materials used in the study were 6.3 kilograms of duck meat and 2.7 kilograms of beef; 135 grams of powdered malunggay leaves; spices and seasoning ingredients which include salt, pepper, onions, eggs, garlic, hamburger seasoning, milk powder, flour and cooking oil. The other materials used were the following; patty molder, cooking stoves, kitchen knives, frying pan, mixing bowl, measuring spoons and cups, chopping board, plates and weighing scale.

Methodologies

Preparation of meat and malunggay leaves powder. Good quality raw materials were selected and bought from the market. Five months old ducks were slaughtered early in the morning, after which the carcasses were washed and drained to remove excess water. After draining, these were deboned and grinded. Likewise, the ground beef was purchased from the market. On the other hand, the malunggay leaves were bundled and hang upside down in a well ventilated room. When the leaves dried up (Figure 1), these were roasted in a frying pan and ground manually (Figure 2).



Figure 1. Dried malunggay leaves



Figure 2. Malunggay leaves powder

Experimental treatments. There were three treatments in the study. Each treatment had three replications with 700g duck meat and 300g beef meat per replication. The different treatments were the following:

T₀- 0g malunggay leaves powder (Control)

T₁- 15g malunggay leaves powder

T₂- 30g malunggay leaves powder

Making of meat patties. To produce the patties in all the treatments, only one procedure was followed. The only difference was in the level of malunggay leaves powder that was added depending on what treatment these meat patties belong.

Following the measurements or levels of each of the ingredients as stated in Table 2, these different ingredients were mixed together. In mixing, the different seasonings except the egg, together with salt and malunggay leaves powder were mixed first. Then, the egg, water, and meat materials were added into the mixture after which the mixture was mixed again to attain more or less a homogenous mixture and at the same time to make the mixture tacky. The resulting mixtures as shown in Figures 3, 4 and 5, were refrigerated for two hours to make each mixture a little bit firm. After refrigeration, each mixture was molded into patties using a hamburger molder(Figures 6, 7 and 8), each patty weighing more or less 50 grams.

Organoleptic test. From the different treatments, patty samples were taken after which these were deep fried separately (Figures 9, 10 and 11). When cooked, the patties were sliced into bite sizes and placed in their respective containers previously coded. The patty samples then were presented to the panel of tasters for them to evaluate. Each member



of the panel of tasters was given a score card where he can put his ratings. The panelist was composed of five teachers, five nutritionists, ten students, and five housewives.

Table 2. Ingredients used for every kg of meat in making patties

MEAT MATERIALS	CURING MIX	SEASONINGS
300g beef, ground	1 tsp. salt, refined	½ tsp. black pepper, ground finely
700g duck meat, ground		1 tbsp. garlic, chopped finely
		½ cup onion, chopped finely
		1 tsp hamburger seasoning
		2 tsp. milk powder
		½ cup flour
		2 pcs. fresh, medium egg



Figure 3. Meat with 0g malunggay leaves powder



Figure 4. Meat with 15g malunggay leaves powder



Figure 5. Meat with 30g malunggay leaves powder



Figure 6. Meat patties with 0g malunggay leaves powder



Figure 7. Molded meat patties with 15g malunggay leaves powder



Figure 8. Meat patties with 30g malunggay leaves powder



Figure 9. Deep fried patties with 0g malunggay leaves powder



Figure 10. Deep fried patties with 15 malunggay leaves powder



Figure 11. Deep fried patties with 30g malunggay leaves powder

Composition of meat patties. Meanwhile, samples of meat patties per treatment were also obtained and brought to the Department of Science and Technology (DOST)-CAR, La Trinidad, Benguet for the nutrient analysis.

Data Gathered

1. Appearance of the product. The samples were evaluated as: (1) Very pleasing, (2) Moderately pleasing, (3) Dull
2. Tenderness of the product. The samples were evaluated as: (1) Very tender, (2) Moderately tender, (3) Tough
3. Juiciness of the product. The samples were evaluated as: (1) Very juicy, (2) Moderately juicy, (3) Not juicy
4. Flavor of the product. The samples were evaluated as: (1) Desirable, (2) Moderately desirable, (3) Undesirable
5. Acceptability. The samples were evaluated as: (1) Like very much, (2) Like moderately, (3) Dislike

6. Total cost of production. This was computed by getting the total direct cost by adding the total cost of meat materials and the ingredients.

7. Meat composition. This was determined at the DOST-CAR, La Trinidad, Benguet particularly the ash, carbohydrate, crude fat, crude protein, moisture, and the energy contents of the meat patties.

Data Analysis

The data gathered were recorded, tabulated, and analyzed for differences using the analysis of variance for Complete Random Design (CRD). The Duncan's Multiple Range Test was used to determine significant differences between treatment means.



RESULTS AND DISCUSSION

Appearance

The ratings for appearance as evaluated by the members of the panel of tasters are shown in Table 3. The statistical results revealed that the patties with no malunggay leaves powder and those with 15g malunggay leaves powder were not significantly different from each other but both were significantly different from the patties with 30g malunggay leaves powder in appearance. For the verbal rating, it is shown in the Table that the patties with no malunggay leaves powder and those with 15g malunggay leaves powder however, were both rated as very pleasing by the panel of tasters. The patties with 30g malunggay leaves powder were rated as moderately pleasing and this was probably because of the higher amount of malunggay leaves powder added that caused the patties to have a darker color. This result is different from the findings of Bacani (2010) where in 15g powdered malunggay leaves had a moderately pleasing effect to the panel of tasters and dull for the patties with 30g powdered malunggay leaves.

Table 3. Ratings for the appearance of meat patties in the different treatments.

TREATMENT	MEAN*	VERBAL RATING
0g malunggay leaves powder	1.22 ^b	Very Pleasing
15g malunggay leaves powder	1.44 ^b	Very Pleasing
30g malunggay leaves powder	2.20 ^a	Moderately Pleasing

*Means with the same letter are not significantly different at 5% DMRT



Tenderness

The ratings for tenderness of the patties from the different treatments are shown in Table 4. Statistical analysis revealed that there were highly significant differences between patties with no malunggay leaves powder and those with malunggay leaves powder. However, there was no significant difference between the means of the patties with malunggay leaves powder added at the level of 15g/kg meat and those with malunggay leaves powder added at the level of 30g/kg meat. It follows also that in the verbal rating, patties with no malunggay leaves powder were rated very tender and moderately tender for both the patties with malunggay leaves powder added at the level of 15 and 30g/kg meat. The patties with malunggay leaves powder were less tender compared to those with no malunggay leaves powder probably because the malunggay leaves have high fiber content. This result is similar with the study of Bacani (2010) who also found out that the addition of malunggay leaves powder made the patties less tender.

Juiciness

The juiciness of patties in the different treatments is shown in Table 5. Statistical

Table 4. Ratings for the tenderness of meat patties in the different treatments

TREATMENT	MEAN*	VERBAL RATING
0g malunggay leaves powder	1.45 ^b	Very Tender
15g malunggay leaves powder	1.51 ^a	Moderately Tender
30g malunggay leaves powder	2.27 ^a	Moderately Tender

*Means with the same letter are not significantly different at 5% DMRT



no malunggay leaves powder and the patties with malunggay leaves powder added at the level of 15g/kg meat. However, the later was not significantly different from the patties with malunggay leaves powder added at the level of 30g/kg meat. It follows also that in the verbal rating, patties with no malunggay leaves powder were rated very juicy while patties with malunggay leaves powder added at the level of 15g and 30g/kg meat were rated moderately juicy and this was possibly because malunggay leaves powder reduced the juiciness of meat patties.

Flavor

Table 6 presents the ratings for flavor of the meat patties in the different treatments as evaluated by the panel of tasters. Similar to juiciness, statistical analysis revealed that there were significant differences between the patties with no malunggay leaves powder and the patties with malunggay leaves powder added at the levels of 15g/kg meat. There were no significant differences, however, between the patties with malunggay leaves powder added at the level of 15g/kg meat and patties with malunggay leaves powder added at the level of 30g/kg meat. Verbally the patties with no malunggay leaves powder were rated desirable and the patties with malunggay leaves powder added

Table 5. Ratings for the juiciness of meat patties in the different treatments

TREATMENT	MEAN*	VERBAL RATING
0g malunggay leaves powder	1.37 ^b	Very Juicy
15g malunggay leaves powder	1.55 ^a	Moderately Juicy
30g malunggay leaves powder	2.41 ^a	Moderately Juicy

*Means with the same letter are not significantly different at 5% DMRT



at the levels of 15g and 30g/kg meat were both rated as moderately desirable. The above results reveal that the addition of malunggay leaves powder moderately reduced the flavor of the meat patties. This finding is similar to the findings of Bacani (2010) in a previous research who found out that the pork patties with powdered malunggay leaves added at the level of 30g/kg meat had the same result which was moderately desirable.

Acceptability

Table 7 shows the acceptability of the patties in the three treatments as rated by members of the taste panel. It is shown that the patties with no malunggay leaves powder and those with malunggay leaves powder added at the level of 15g/kg meat were not significantly different as revealed by the statistical analysis but both were significantly different from the patties with malunggay leaves powder added at the level of 30g/kg meat. For the verbal rating, it is also shown that both the patties with no malunggay leaves powder and those with malunggay leaves powder added at the levels of 15g and 30g/kg meat were liked very much by the members of the panel of tasters.

The patties with malunggay leaves powder added at the level of 30g/kg meat, however,

Table 6. Ratings for the flavor of meat patties in the different treatments

TREATMENT	MEAN*	VERBAL RATING
0g malunggay leaves powder	1.45 ^b	Desirable
15g malunggay leaves powder	1.53 ^a	Moderately Desirable
30g malunggay leaves powder	2.43 ^a	Moderately Desirable

*Means with the same letter are not significantly different at 5% DMRT



were liked moderately by the members of the panel of the tasters and this was probably because the higher level of powdered malunggay leaves made the patties darker in appearance which was less attractive to the eyes and altered the taste which was not so good to the taste buds of the panel of tasters. The result implies that malunggay leaves powder, when added to meat patties, should be at the level of 15g/kg meat to be more acceptable to the consumers.

Total Cost of Production

Table 8 shows the total cost of production of meat patties with different levels of malunggay leaves powder. It is shown in the Table that the patties with malunggay leaves powder added at the level of 30g/kg meat had the highest expenses of Php 302.58. This is expected for it contained the highest level of malunggay leaves powder. Meanwhile, the patties with malunggay leaves powder added at the level of 15g/kg meat had total cost of Php 297.58 and the patties with no malunggay leaves powder had a total cost of Php 292.58. It is revealed in the Table that there is an increase of Php 5 - 10 in the cost of production if powdered malunggay leaves is added at the level of 15 - 30g/kg meat in making patties. However, with the present trend where consumers are now becoming health conscious, they are willing to pay a little increase in the price for a healthier food.

Table 7. Ratings for the acceptability of meat patties in the different treatments

TREATMENT	MEAN*	VERBAL RATING
0g malunggay leaves powder	1.45 ^b	Like Very Much
15g malunggay leaves powder	1.40 ^b	Like Very Much
30g malunggay leaves powder	2.43 ^a	Like Moderately

*Means with the same letter are not significantly different at 5% DMRT



Table 8. Total cost of processing meat patties per kilogram of meat (Php)

INGREDIENTS	MEAT PATTIES WITH 0g MALUNGGAY POWDER (Php)	MEAT PATTIES WITH 15g MALUNGGAY POWDER (Php)	MEAT PATTIES WITH 30g MALUNGGAY POWDER (Php)
Duck meat	145.83	145.83	145.83
Beef	69.00	69.00	69.00
Powdered leaves	0.00	5.00	10.00
Salt	2.00	2.00	2.00
Black pepper	4.00	4.00	4.00
Garlic	3.50	3.50	3.50
Magic sarap	4.00	4.00	4.00
Onion	3.00	3.00	3.00
Hamburger Seasoning	13.25	13.25	13.25
Milk powde	7.75	7.75	7.75
Flour	7.00	7.00	7.00
Egg	10.00	10.00	10.00
Cooking oil	23.25	23.25	23.25
TOTAL COST OF PRODUCTION (Php)	292.58	297.58	302.58

Nutrient Composition of Meat Patties

Table 9 shows the composition of the patties produced in the different treatments. Though this was not subjected to statistical analysis, results of the study revealed that it is only in the ash content where an increase is observed in the patties with malunggay leaves powder compared to the patties with no malunggay leaves powder.



Table 9. Nutrient composition of meat patties produced in the different treatments*

NUTRIENT CONTENT	MEAT PATTIES WITH 0G MALUNGGAY LEAVES POWDER	MEAT PATTIES WITH 15G MALUNGGAY LEAVES POWDER	MEAT PATTIES WITH 30G MALUNGGAY LEAVES POWDER
Ash, % w/w	1.88	1.94	1.97
Carbohydrate, % w/w	5.67	7.02	3.50
Crude Fat, % w/w	9.86	8.82	10.78
Crude Protein, % w/w	15.11	16.52	15.61
Moisture, % w/w	67.48	65.71	68.14
Energy, kcal	172.00	174.00	173.00

*as analyzed at the DOST-CAR, La Trinidad, Benguet



SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

This study was conducted at the Meat Laboratory Room, Department of Animal Science under the College of Agriculture, Benguet State University, La Trinidad, Benguet. This study was conducted to determine the acceptability of duck meat patties processed with different levels of powdered malunggay leaves in terms of appearance, flavor, juiciness, tenderness and the overall acceptability of the product; to determine the cost of producing duck meat patties processed with different levels of malunggay leaves powder; and to determine the nutrient composition of duck meat patties processed with different levels of malunggay leaves powder.

The study involved three levels of malunggay leaves powder namely 0g (T₀ or control), 15g (T₁) and 30g (T₂) which at the same time composed the three treatments. Patties produced in the three treatments were cooked and subjected to a panel of tasters for evaluation. The panel of tasters were composed of 25 persons, five of which, were nutritionists, five were teachers, five were housewives and ten were students. Samples of the patties produced were also brought to the DOST-CAR for the determination of nutrient composition.

Results of the study revealed that in terms of appearance, no significant differences were observed between the patties with no malunggay leaves powder and those patties with malunggay leaves powder added at the level of 15g/kg meat. However, both of the above were significantly better in appearance compared to the patties with higher content of malunggay leaves powder or the malunggay leaves powder added at the level of 30g/kg meat. In verbal rating, it follows that the patties with no malunggay leaves powder and



those patties with malunggay leaves powder added at the level of 15g/kg meat were both very pleasing to the panel of tasters while patties with malunggay leaves powder but added at a higher level of 30g/kg meat were rated moderately pleasing.

In terms of tenderness, flavor and juiciness, patties with no malunggay leaves powder were significantly different from the patties with malunggay leaves powder. However, the patties with malunggay leaves powder added at the level of 15g/kg meat and at the level of 30g/kg meat were not significantly different from each other. In verbal rating, patties with no malunggay leaves powder were rated very tender while patties with malunggay leaves powder were rated moderately tender. Similarly, in terms of juiciness, patties with no malunggay leaves powder were rated very juicy and those patties with malunggay leaves powder were rated moderately juicy. Furthermore, in terms of flavor, patties with no malunggay leaves powder were rated desirable by the panel of tasters while patties with malunggay leaves powder were rated moderately desirable.

However, in terms of the overall acceptability no significant differences were observed between the patties with no malunggay leaves powder and those with malunggay leaves powder added at the level of 15g/kg meat but both of the above were significantly different from the patties with malunggay leaves powder added at the level of 30g/kg meat. In verbal rating, both the patties with no malunggay leaves powder and those with malunggay leaves powder added at the level of 15g/kg meat were liked very much by the panel of tasters. On the other hand, the patties with malunggay leaves powder added at the level of 30g/kg meat were liked moderately by the panel of tasters.



Because of the additional expense brought about by the cost of malunggay leaves powder, higher production costs were realized from the patties with malunggay leaves powder compared to the patties with no malunggay leaves powder.

Finally, for the nutrient composition, results revealed that it is only in the ash contents where an increase is observed from the patties with malunggay leaves powder compared to the patties with no malunggay leaves powder.

Conclusion

Based on the results of the study, it is concluded that the addition of malunggay leaves powder reduced the tenderness, juiciness and flavor of the meat patties and made the color of the patties darker not so much pleasing to the panel of tasters particularly if added at the level of 30g/kg meat. However, in the overall acceptability, it is concluded that the level of malunggay leaves powder added should be 15g/kg meat so that it will be liked very much by the consumers.

Though there was an increase in ash content observed in the meat patties with malunggay leaves powder, this finding is inconclusive as the nutrient composition analysis was not replicated to be subjected to statistical analysis.

Recommendation

Based on the results of the study, malunggay leaves powder can be added into the meat patties but it has to be at the level of 15g/kg meat to be relished by the consumers. However, further experiment should be done to include replications in the meat samples for nutrient composition analysis and also to include microcomponent of meat patties.



LITERATURE CITED

- ABERLE, E.D., J. C. FORREST, H.B. HEDRICK, M.D. JUDGE, R.A. MERKEL, 1975. Principles of Meat Science. San Francisco. W.H. Freeman and Company. Pp. 190-191.
- AMANDA, 2007. Tenderness of Meats Retrieved September 2011 from <http://www.allcookingtips.com/2007/26/12/tenderness-meats/>
- ANONYMOUS, 2011. Nutritional Value of Malunggay Pods/Leaves11. Retrieved September 2011 from <http://www.echotech.org/technical/technotes/Moringa>
- BACANI, J.E., 2010. Evaluation of Meat Patties Fortified with Powdered Malunggay (Moringa oleifera) leaves. Thesis Book. Pp 19.
- CHERRY. 2010. Malunggay Health Benefits retrieved April 2011 from <http://www.investigatoryprojectexample.com/news/malunggay-health-benefits.html>
- FRANK, E. 2010. Duck Selected as One of Indiana's 10 Healthiest Foods Retrieved April 2011 from <http://www.mapleleaffarms.com/13?article=187>
- HUTTON, W. 1998. Tropical Vegetables of the Philippines. Published by Periplus Editions (HK) Ltd. Singapore. Pp.48.
- LEN7288. 2011. Health Benefits of Malunggay Leaves Retrieved April 2011 from <http://hubpages.com/hub/Health-Benefits-of-Malunggay-Leaves>
- PATI, K. 2009. Moringa, Malunggay, Sajina Retrieved April 2011 from <http://www.malunggay.com/description.htm>

