

## **BIBLIOGRAPHY**

CARDONA, GRACE B. APRIL 2012. Acceptability of duck meat patties extended with oyster mushroom (*Pleurotus ostreatus*). Benguet State University, La Trinidad, Benguet.

Adviser: Myrna B. Walsiyen MSc.

## **ABSTRACT**

This study was conducted at the Meat Laboratory Section of the Department of Animal Science, under the College of Agriculture, Benguet State University. To determine the acceptability of duck meat patties extended with oyster mushroom in terms of appearance, tenderness, flavor, juiciness and the overall acceptability of the patties; the cost of processing duck meat into patties extended with oyster mushroom and to determine the composition of duck meat patties extended with oyster mushroom.

Sensory evaluation showed that all treatments had the same ratings in terms of appearance, juiciness and flavor. However, in terms of tenderness and acceptability, it was observed that the processed patties extended with oyster mushroom obtained better ratings. Patties extended with oyster mushroom were more tender and were liked very much by the member of the panel of tasters. The patties not extended with oyster mushroom were liked moderately by the members of the panel of tasters.



Results also revealed that higher cost of production were realized from the patties extended with oyster mushroom. However, more patties were produced so that this can offset the additional expense incurred.

In terms of nutrient composition, results showed that using 100-200g oyster mushroom as extenders did not greatly affect the protein and ash content of the patties but the crude fat was greatly reduced. However such results maybe due to other factors as the nutrient composition was not replicated to be subjected to statistical analysis

Based on the result of the study, it is recommended that oyster mushroom may be used as extenders in making meat patties at the level of 100-200g/kg meat. However, it is recommend that studies be conducted to subject the patties to nutrition facts but these should be replicated for more conclusive results.



## INTRODUCTION

Meat processing has become both an art and science. Creativity leads to the coming up of new production processes and attractive products are developed to suit the taste of the consumer (Del Feiro, 1996).

Many of the consumers now are getting conscious on what they eat and that it is not only the eating quality of the processed product that they look into but also its nutritive value. Others even prefer to eat meat products that are free of chemical residues.

In many of the processed meat products, beef, pork and chicken are the ones commonly used. Very few of the processors are using meat derived from other species. It is then the aim of the researcher to find out the acceptability of duck meat as patties for hamburger and to cause variety but without reducing so much the nutritive value of the meat patties produced, oyster mushroom will be included as extenders.

Duck meat like other meats, is an excellent source of high quality protein containing a well balanced array of amino acid. Duck meat also contains generous amounts of iron, phosphorous, zinc, copper, selenium and lesser amounts of the minerals, potassium and magnesium, vitamins E, A, C and folic acid. Duck is rich in fatty acids. Duck is basically just like chicken, but with a slightly stronger flavor (<http://www.carnivoraca.com>, 2011).

On the other hand oyster mushroom has a high nutritional value for its high level of vitamins and proteins and its non-saturated fatty acids (Fundazioa, 2004). Its protein content is second to legumes, and has all the minerals salts required by the body (<http://contylinemushrooms.com>, 2011).

The result of this study, if found satisfactory, will benefit not only the researcher herself but also the meat processors, student and the consumers. The results will serve as



reference to the meat processors to help them improve their meat products. It will also serve as reference to other student and researchers in coming up with other related studies.

Generally, this study was conducted to determine the acceptability of duck meat as meat patty extended with oyster mushroom.

Specifically, it aimed to determine:

a. the acceptability of duck meat as meat patty extended with oyster mushroom, in terms of appearance, tenderness, juiciness, flavor and overall acceptability of the patty.

b. the total cost of processing duck meat into patties extended with oyster mushroom

c. the composition of meat patties extended with oyster mushroom.

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



## REVIEW OF LITERATURE

Ibarra (1983) stated that there are three reasons why man eats meat. First, it provides satiety unequalled by other food items. An individual who eats meat with a meat dish feels satisfied for a long period. Second, meat can be prepared in several ways, hence, it adds variety to the menu. There are many recipes where meat is utilized singly or in combination with other food items. Meat is probably the only single food material which can be prepared in many ways. Third, meat provides nutrient almost in the proportion and amount needed by a human body, especially in terms of protein. He also mentioned, however, that meat is highly perishable. Without proper handling when exposed to surrounding, spoilage will readily occur.

Duck meat is a good source of protein, but contains a little less per serving than chicken. It is low in calories if the fat and skin are separated from the meat (Labbe, 2010).

Pekin duck is native to China and rose extensively in America for its dark, rich and flavorful meat. These ducks are forced fed prior to harvest in order to get them to market weight. These ducks are raised for flavor. Pekin duck is technically red meat and like a fine steak, is best cooked no more than medium rare (<http://blackangusmeat.com>, 2011).

Hobbs (2011) stated that oyster mushroom have been used for thousand of years as a culinary and medicinal ingredient. The white mushrooms resemble oysters, and can be found growing in the wild on dead trees or fallen logs. They have a rich history in traditional Chinese medicine from as early as 3,000 years ago, particularly as a tonic for the immune system.

Dubost (2010) cited that oyster mushroom contain ergothioneine, a unique antioxidant exclusively produced by fungi. The study found that oyster mushrooms have



significant antioxidant properties that protect cells in the body. A 3 oz. serving of oyster mushrooms contains 13 mg of ergothioneine , and cooking the mushrooms does not reduce to stress.

The nutrient composition of a 100g oyster mushroom is as follows as cited in <http://satpudamushroom.com>.(2011)

Calories	38
Protein	15%-25%
Fat	2.2g
Vitamin B1 ( Thiamine)	0.56mg
Vitamin B2 (Riboflavin)	0.55mg
Vitamin B3 (Niacin)	12.3 mg
Fiber	2.8 g
Carbohydrate	6.5g
Phosphorous	140mg
Calcium	28 mg
Iron	1.7 mg



## MATERIALS AND METHODS

### Materials

The materials used in the study were 9 kilograms of meat ( duck meat which is about 5 months old and beef, combined) and 900 grams of oyster mushroom.

The other materials that were used include the following: weighing scale, cooking stove, mixing bowl, measuring spoons and cups, refrigerator, chopping board, knives, pan, molder, spatula and curing ingredients/seasonings like salt, sugar, garlic, hamburger seasoning, milk powder, flour, black pepper, onion finely chopped and fresh egg ( Table 1).

### Methodology

Preparation of meat and oyster mushroom. The meat used was obtained from newly slaughtered ducks and this was grinded finely and so with the beef. Meanwhile, fresh oyster mushrooms (Figure 1) were washed and drained to remove excess water after which these were sliced thinly into small peices.

Experimental treatments. There were three treatments in the study and each treatment was replicated three times. One kilogram of meat (700 grams duck meat plus 300 grams ground beef) was used for each replication. The treatments were as follows:

T<sub>0</sub>-0g oyster mushroom

T<sub>1</sub>-100g oyster mushroom

T<sub>2</sub>-200g oyster mushroom



Making of meat patties. In the preparation of meat patties, all treatments followed the same procedure. The only difference was on the level of sliced oyster mushrooms (Figure 2) that was added depending on what treatment where these patties belong.

Table 1. Curing ingredients/seasonings used for every kg of meat in making patties

MEAT MATERIALS	CURING MIX	SEASONING	TREATMENT
700 g duck meat	1tsp sugar	1tsp garlic	T <sub>0</sub> -0g oyster mushroom
300 g beef	1tsp salt	1tsp hamburger	T <sub>1</sub> -100g oyster mushroom
	¼ cup water	seasoning	T <sub>2</sub> -200g oyster mushroom
		2tbsp milk powder	
		½ cup flour	
		½ black pepper	
		½ cup onion finely	
		chopped	
		2pcs. eggs	

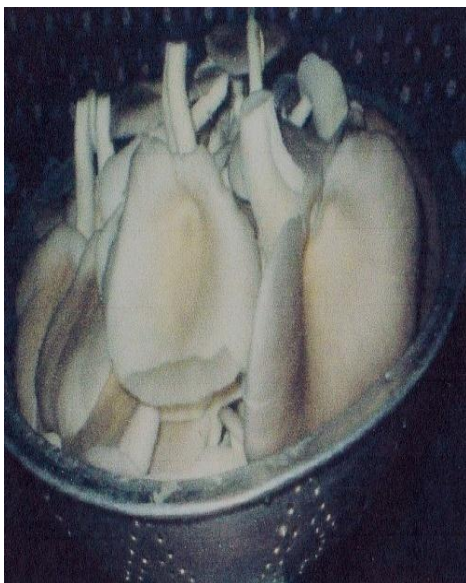


Figure 1. Oyster mushrooms



Figure 2. Sliced oyster mushrooms



In a large bowl, all the non-meat ingredients except water were mixed together namely the salt, garlic, hamburger seasoning, milk powder, flour, black pepper, onion (finely chopped), eggs and lastly the oyster mushroom. Then the meat material and water were added into the mixture and was mixed again to make it more or less homogeneous ( Figure 3). From the mixture, patties were formed using a molder (Figure 4).The patties were arranged in trays and were refrigerated overnight for curing.



Figure 3. Meat mixture by treatment ready for molding



Figure 4. Molded patties by treatments

Organoleptic test. After curing, the patties were pan-fried (Figure 5) separately under moderate heat using vegetable oil. When cooked, samples were obtained per treatment. These were sliced into bite sizes and placed inside their respective container which were previously coded. After which, these were subjected to the panel of tasters for evaluation. The panel of tasters was composed of 5 teachers, 5 students, 5 food server, 5 housewives and 5 dieticians. Before the taste test, each member of the panel was given score card for him/her to write down his/her respective rating for each sample.

Composition of meat patties. From the different treatments, a sample from each treatment was also obtained and these were brought to the Department of Science and Technology (DOST), La Trinidad Benguet for the nutritional analysis.

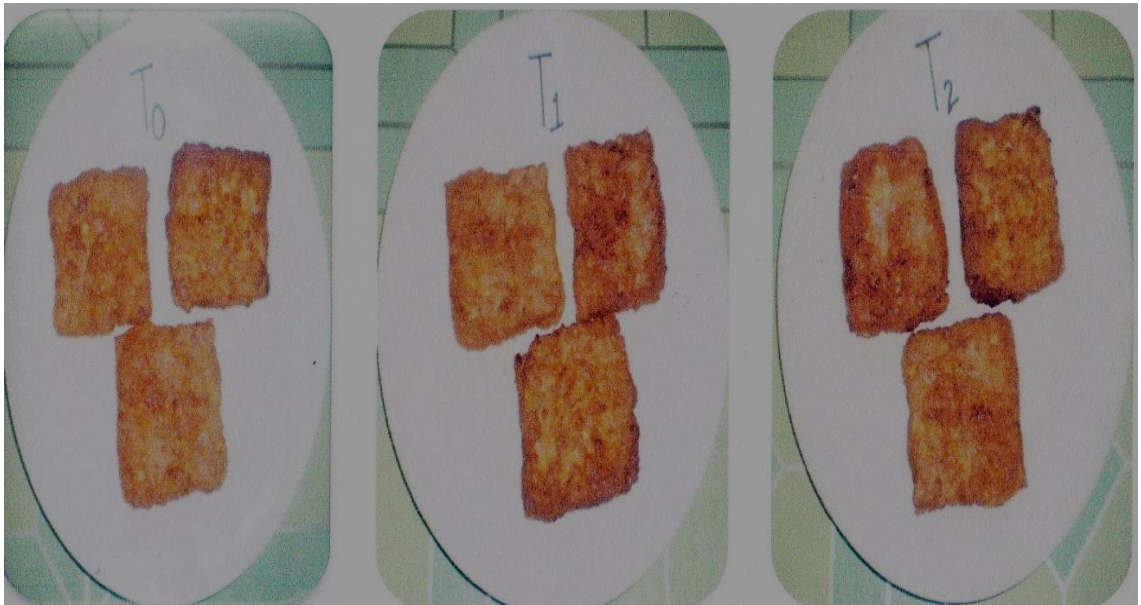


Figure 5. Deep- fried patties by treatment

## Data Gathered

1. Appearance- The samples were evaluated as:

- (1) Very Pleasing
- (2) Moderately Pleasing
- (3) Dull

2. Tenderness- The taste panels evaluated the samples as:

- (1) Very Tender
- (2) Moderately Tender
- (3) Tough

3. Juiciness- The taste panels evaluated the samples as:

- (1) Very Juicy
- (2) Moderately Juicy
- (3) Not Juicy

4. Flavor- The samples were evaluated as:

- (1) Very Good
- (2) Good
- (3) Poor

5. Acceptability- The samples were evaluated as:

- (1) Like Very Much
- (2) Like Moderately
- (3) Dislike

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



7. Composition of meat patties. This was determined at the DOST-CAR, La Trinidad, Benguet, in terms of ash, carbohydrates, energy, crude fat, crude protein, and the moisture contents.

#### Data Analysis

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



## RESULTS AND DISCUSSION

### Appearance of the Patties

Table 2 presents the mean ratings for the appearance of the patties in the different treatments as evaluated by the members of the panel of tasters. It is presented that there were no significant differences between treatment means as revealed by the statistical analysis. This implies that the patties in the three treatments were more or less similar in appearance. It is also implied that the oyster mushrooms when added into the meat patties at the level of 100-200 g/kg meat did not greatly affect the appearance particularly the color of such patties. In the verbal description, the patties in the treatments were all rated as moderately pleasing in appearance

### Tenderness of the Patties

Table 3 shows the ratings for tenderness of the patties in the different treatments. It is presented that there were significant differences among treatment means as revealed by the statistical analysis. No significant difference was revealed between the patties extended with oyster mushroom at the levels of 100g and 200g/kg meat but these were significantly more tender compared to the patties in the control or patties with no oyster mushroom. It follows then that verbally, the patties extended with oyster mushrooms were rated as very tender and moderately tender for the patties with no oyster mushroom. The results reveals that adding oyster mushrooms in making meat patties makes the product more tender at the level of 100g -200g /kg meat.



Table 2. Ratings for the appearance of patties in the three treatments

TREATMENT	MEAN*	VERBAL DESCRIPTION
T <sub>0</sub> -0g oyster mushroom	1.59 <sup>a</sup>	Moderately Pleasing
T <sub>1</sub> -100g oyster mushroom	1.56 <sup>a</sup>	Moderately Pleasing
T <sub>2</sub> -200g oyster mushroom	1.52 <sup>a</sup>	Moderately Pleasing

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

Table 3. Ratings for the tenderness of patties in the three treatments

TREATMENT	MEAN*	VERBAL DESCRIPTION
0g oyster mushroom	1.57 <sup>b</sup>	Moderately tender
100g oyster mushroom	1.48 <sup>a</sup>	Very Tender
200g oyster mushroom	1.45 <sup>a</sup>	Very Tender

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

#### Juiciness of the patties

Table 4 shows the ratings for the juiciness of the patties in the three treatments. It is shown that there are no significant differences between treatment means as revealed by the statistical analysis. This implies that the juiciness of the processed patties, with and without oyster mushroom, were more or less similar. In addition the patties in the three treatments were all verbally rated as moderately juicy. The results further imply that the addition of the oyster mushroom into the processed patties did not alter the juiciness of the products.





### Flavor of the Patties

Table 5 presents the ratings for flavor of the processed patties in the different treatments. Similar to juiciness, no significant differences were observed between treatment means. This means that the patties, with or without oyster mushroom, had more or less the same flavor. Patties in the treatments were all verbally rated to have a very good flavor.

Table 4. Ratings for the juiciness of patties in the three treatments

TREATMENT	MEAN*	VERBAL DESCRIPTION
0g oyster mushroom	1.63 <sup>a</sup>	Moderately juicy
100g oyster mushroom	1.57 <sup>a</sup>	Moderately juicy
200g oyster mushroom	1.57 <sup>a</sup>	Moderately juicy

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

Table 5. Ratings for the flavor of patties in the three treatments

TREATMENT	MEAN*	VERBAL DESCRIPTION
0g oyster mushroom	1.45 <sup>a</sup>	Very good
100g oyster mushroom	1.44 <sup>a</sup>	Very good
200g oyster mushroom	1.41 <sup>a</sup>	Very good

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



### Acceptability of the Patties

Table 6 presents the ratings for the acceptability of the processed patties in the different treatments. No significant differences were observed between the patties with 100g oyster mushroom and those with 200g oyster mushroom as revealed by the statistical analysis. However, both of the above were significantly different from the patties with no oyster mushroom. Verbally, the patties with oyster mushroom (both 100g and 200g) were liked very much by the member of the panel of tasters while the patties with no oyster mushrooms were liked moderately. The result reveals that oyster mushrooms may be used as patty extender at the level of 100-200g/kg meat and at the same time to improve the overall acceptability of the product.

Table 6. Ratings for the acceptability of patties in the three treatments

TREATMENT	MEAN*	VERBAL DESCRIPTION
0g oyster mushroom	1.60 <sup>b</sup>	Like moderately
100g oyster mushroom	1.40 <sup>a</sup>	Like very much
200g oyster mushroom	1.38 <sup>a</sup>	Like very much

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





### Total Cost of Production (TCP)

Table 7 presents the total cost of making the patties in the different treatments. Because of the additional expenditure on oyster mushrooms, higher total costs were observed from the patties extended with oyster mushrooms compared to the patties with no oyster mushrooms. A total cost of Php. 306.33 was realized from the patties extended with 100g oyster mushrooms and Php. 320.33 from the meat patties extended with 200g oyster mushrooms. Patties with no oyster mushrooms had a total cost of Php.292.33.

However,even if it appears in the Table that the patties extended with oyster muhsroom had higher costs of production compared to the patties extended with oyster mushroom, there were more patties produced, additional of 2 and 4 patties, in the treatments extended with 100 and 200g oyster muhsrooms per kg meat, respectively. So, in actual computation or if the cost of production is in terms of per patty produced, still lower costs of production will be realized from the patties extended with oyster mushroom.The cost of producing a patty in the control group or with no oyster muhrooms was Php. 13.29; Php. 12.76 for the patty extended with oyster mushrooms at the level of 100g/kg meat and Php. 12.32 for the patty with oyster mushrooms added at the level of 200g/kg meat.



Table 7. Total cost of processing patties per kilogram by treatment (Php)

INGREDIENTS	PATTY WITHOUT OYSTER MUSHROOM	PATTY WITH 100g OYSTER MUSHROOM	PATTY WITH 200g OYSTER MUSHROOM
Duck meat	145.83	145.83	145.83
Ground beef	69.00	69.00	69.00
Refine sugar	1.00	1.00	1.00
Garlic	3.25	3.25	3.25
Salt	2.00	2.00	2.00
Hamburger seasoning	14.25	14.25	14.25
Milk powder	7.75	7.75	7.75
Cornstarch	7.00	7.00	7.00
Black pepper	4.00	4.00	4.00
Magic sarap	2.00	2.00	2.00
Onion finely chopped	3.00	3.00	3.00
Fresh egg medium	10.00	10.00	10.00
Cooking oil	23.25	23.25	23.25
Oyster mushroom	—	14.00	28.00
Total Cost of Production (Php)	292.33	306.33	320.33
Total no. of patties produced	22.00	24.00	26.00
Cost of production per patty	13.29	12.76	12.32



## Composition of Meat Patties

Table 8 presents the composition of the meat patties at the different treatments as analyzed at the DOST-CAR, La Trinidad, Benguet. It is revealed in the Table that the addition of oyster mushroom into the patties did not greatly affect the protein and ash contents of the products.

It had, however, caused an increase in the carbohydrate content and had greatly reduced the crude fat contents of the patties from 16.08 % observed from the patties with no oyster mushroom to 9.48% observed from the patties with oyster mushroom added at the level of 100g/kg meat and to 6.12% observed from the patties with oyster mushroom added at the of level of 200g/kg meat. (Oyster mushroom has significant antioxidant that causes a decrease of crude fat in the processed patties). The result is advantageous to the consumers of today as most of them prefer to eat processed products with low fat.

Table 8. Composition of meat patties by treatment

NUTRIENT CONTENT	PATTY WITH 0g of OYSTER MUSHROOM	PATTY WITH 100g of OYSTER MUSHROOM	PATTY WITH 200g of OYSTER MUSHROOM
Ash, %	2.00	1.70	2.17
Carbohydrates, %	6.58	8.38	12.00
Crude Fat, %	16.08	9.48	6.12
Crude protein, %	14.24	14.62	13.78
Moisture, %	61.10	65.81	65.93
Energy, Kcal	228.00	177 .00	158.00



## SUMMARY, CONCLUSION AND RECOMMENDATION

### Summary

This study was conducted at the Meat Processing Laboratory Room, Department of Animal Science under the College of Agriculture, Benguet State University, La Trinidad, Benguet. The study was conducted to determine the acceptability of duck meat as meat patty extended with oyster mushroom, in terms of appearance, tenderness, juiciness, flavor and the overall acceptability of the patty, to determine the total cost of processing duck meat into patties extended with oyster mushroom, and to determine the nutrient composition of meat patties extended with oyster mushroom.

Sensory evaluation showed that all treatments had the same ratings in terms of appearance, juiciness and flavor. However, in terms of tenderness and the overall acceptability, it was observed that the processed patties extended with oyster mushroom at the level of 100g-200g/kg meat obtained better ratings. Patties extended with oyster mushroom were more tender and were liked very much by the members of the panel of tasters. The patties with no oyster mushroom were rated moderately tender and were liked moderately by the members of the panel of tasters.

Higher costs of production were realized from the patties extended with oyster mushroom compared by the patties not extended with oyster mushroom. However, more patties were produced because of the extender so that the additional patties produced can offset the increase in the cost of production. If the cost of production is in terms of per patty produced, the cost per patty is lower in the patties extended with oyster mushroom compared to those with no oyster mushroom.



Finally, in terms of nutrient composition, the results show that the oyster mushroom when added into the patties, did not greatly affect the ash and the protein contents of patties produced but had greatly reduced their crude fat contents. However, this result is inconclusive as the nutrient composition analysis was not replicated.

### Conclusion

Based on the results on the of the study, it is therefore concluded that duck meat patties may be extended with oyster mushroom at the level of 100-200g/kg meat to improve the tenderness and the overall acceptability of the product. It is also concluded that because of the additional patties produced, lower costs of production for every patty produced is realized when using oyster mushrooms as extenders. Furthermore, though there is a great reduction in crude fat content realized from the patties extended with oyster mushroom, this finding is inconclusive as the nutrient composition analysis was not replicated.

### Recommendation

Based on the results of the study, it is recommended that oyster mushroom may be used as extenders in making meat patties at the level of 100-200g/kg meat. However, it is recommend that further studies be conducted to subject the patties to nutrition facts but these should be replicated for more conclusive results.



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