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ORGANALEPTIC CHARACTERISTICS, SHELF LIFE AND MICROBIAL QUALITY OF CORNED CARABEEF

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Abstract: *In this study, the organaleptic characteristics, shelf life and microbial quality of corned carabeef, an alternative and cheaper product compared to corned beef were investigated. The flavour, texture and appearance of developed corned carabeef were compared to three commercial corned beef brands through blind testing. The microbial content was determined at ,the Department of science and Technology Laboratory. The shelf life of corned carabeef was three days from preparation time when kept at normal room temperature. Laboratory test showed that the developed corned carabeef was found to contain 3.0 Most Probable Number/gram(MPN/g) in terms of E-coli, and 500 Colony Forming Unit per gram(CFU/g) for aerobic plate count. Likewise salmonella was found to be absent at 25g sample, yeast and moulds count was 500CFU/g and it does not contain S. aureus this implies that the developed corned carabeef is satisfactory and acceptable for human consumption. Organoleptic testing revealed that corned carabeef had the best flavour, texture and appearance compared to the three brands of corned beef. It cost PhP230.30 to produce 1.25kg corned carabeef from 1kg of raw meat product. The results of the study suggest that corned carabeef can be used as a cheaper alternative to commercial corned beef.*

Key Words: *Corned Carabeef, Shelf life,Microbial Quality, Organaleptic characteristics, meat product*

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INTRODUCTION

The Cagayan State University is a community of food- lovers, eaters, critiques and cooks. From this community comes the flare for the production of a new recipe that utilizes the love for carabeef. With the tripling population of the Cagayan State University from 2004 to 2012, much can be said about the great possibility of creating new recipe of carabeef.

Two of the thrusts of the University are along research and extension via production. These thrusts are means of reaching out to fellow Filipinos/Cagayanos, who are idle or not so busy in their lives, unemployed, underemployed, or even employed, by inculcating in them the value of using their time productively. This project would capture their interest in money making without need of spending too much. This study will become a legacy of the university in its attempt to help address the pressing problems of the country on poverty alleviation.

The foregoing premises inspired the researcher to develop a new recipe of corned carabeef. The research hopes to produce corned carabeef recipe which will in the future be commercially produced.

This study aimed to develop and evaluate corned carabeef recipe. Specifically, the research:

1. employed a series of formative evaluation of developed corned carabeef recipes based on flavour, texture, and appearance;
2. compared the developed corned carabeef with (3) commercial corned beefs brands in terms of flavour, texture and appearance and
3. determined the shelf life, microbes present and economic cost of the developed corned carabeef.

LITERATURE REVIEW

Although the practice of curing beef was found locally in many cultures, the industrial production of corned carabeef started in the English Industrial Revolution. Irish corned beef was used and traded extensively from the 17th century to the mid 19th century for English civilian consumption and as provisions for the British naval fleets and North American armies due to its non-perishable nature. [The product was also traded to French for use in Caribbean sugar plantations as sustenance for the colonist and the slave labourers. The 17th century English and Irish Industrial processes for corned beef did not distinguished between different cuts of beef beyond the tough and undesirable parts such as the beef necks and

shanks. Rather the grading was done by the weight of the cattle into “small beef”, “cargo beef” and “best mess beef”, the former being the worst and the latter the best.] Much of the undesirable portions and lower grades were traded to the French, while better parts were saved for English consumption or shipped to English colonies.

It is widely known staple among Filipinos most especially in urban areas. Due to American influence and possibly a product of surplus trade during and after occupation, corned beef is considered as favourite complement to rice at any time of the day most especially during the breakfast. As such, being a perennial commodity among Filipino groceries and home due also to its affordability, it has also become an offshoot of tapsilog, a popular modern Filipino dish, being coined as cornsilog from corned of the original name suffix- silog which is a portmanteau of sinangag (a type of garlic rice) and itlog or egg in Tagalog. Nowadays, corned beef in the form of cornsilog is served (particularly during breakfast hours) even in the fast food chains and other restaurants across the Philippines such as Jollibee, Chowking and local McDonald’s.

Products derived from carabaos are numerous and comparable to cattle. The utilization and evaluation of carabeef and its comminuted products have shown that its end products are par or even better than other animals. The sensory evaluation tests between carabeef and beef show that reared under the same plane of nutrition and slaughtered at the same age, both have indistinguishable eating qualities. Physical and Chemical Characteristics of Carabeef.

Although consumers have prejudices to carabeef, the meat will still constitute a considerable portion of our meat supply because of its food value. It was reported that the lean muscle from the carabeef had the same protein, fat, minerals and water content as beef.

Carabeef from relativity young and fattened animals have the same eating quality as beef. They should therefore command the same price in the red meat market.

Physical and Chemical Composition of Beef and Carabeef Muscle

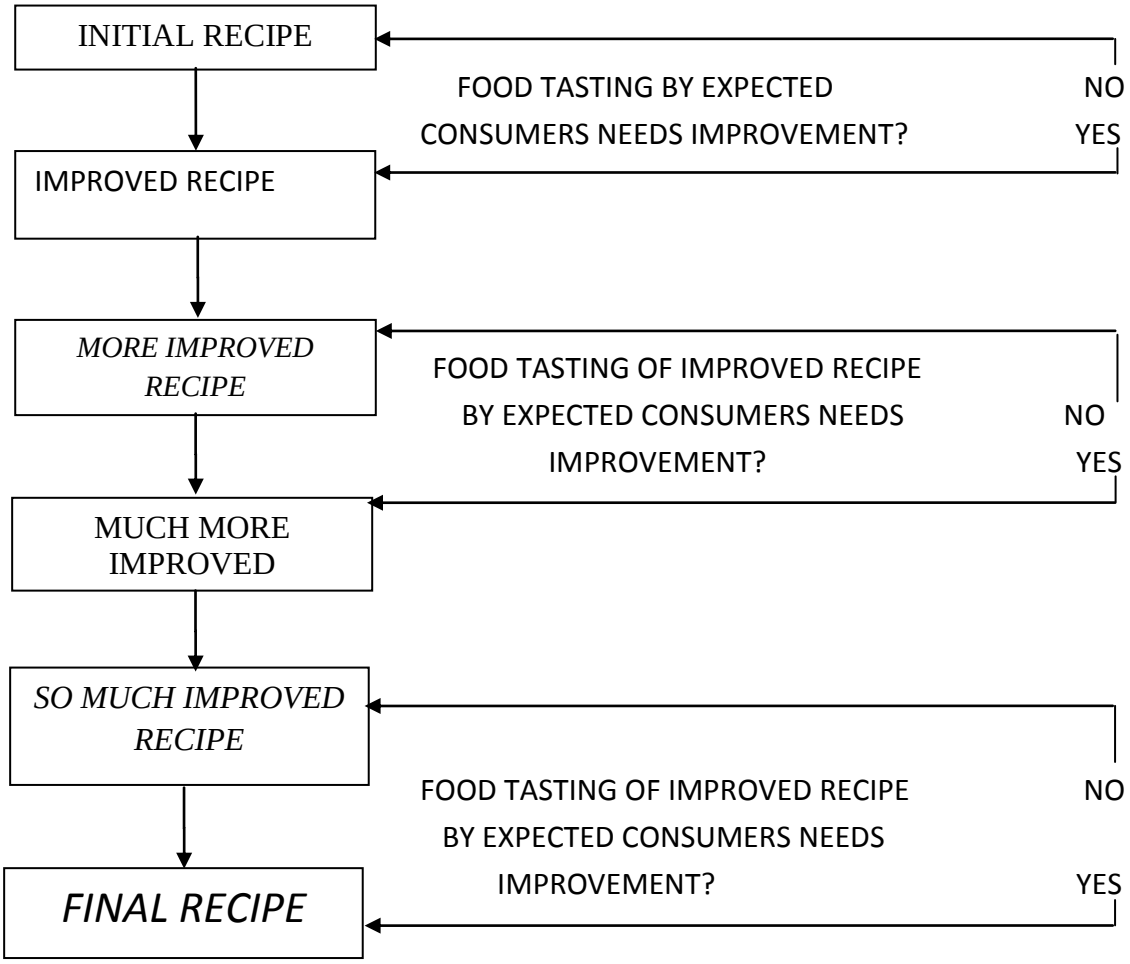
Parameter%	Beef	Carabeef
pH	5.46	5.42
WHC	2.35	2.39
Moisture	76.62	76.63
Protein	19.93	19.39
Ash	1.10	1.08
Ether Extract (fat)	1.07	.84

METHODOLOGY

The research employed a two- stage research process. The first stage was the, **development of corned carabeef** and the second stage was the, **evaluation of corned carabeef developed.**

DEVELOPMENT OF CORNED CARABEEF

The flow chart below shows the flow of activities underwent by the researcher in the development of corned carabeef.



Initially three recipes of corned carabeef were produced. Among the three recipes, one was chosen from the food experts. Using the questionnaire as the tool in evaluating the products, the food tasters judged the recipes as to their flavour, texture and appearance. From the result of the tasting and evaluation done, the initial corned beef recipe was finally developed. This was subjected for evaluation by a group of evaluators. Their comments on flavour, texture and appearance were used by the researcher to improve the recipe. The

initial corned beef recipe developed was tasted by the group of evaluators. The researcher improved the corned carabeef recipe based on the analysis of the product on the flavour, texture and appearance. Another evaluation was done in order to come up with the final recipe.

EVALUATION OF CORNED CARABEEF

When the final recipe was finally developed, it was evaluated in terms of the following food quality indicators flavour, texture and appearance. The evaluation of the corned carabeef developed was done by comparing it with three commercial brands in terms of flavour, texture and appearance.

RESEARCH DESIGN

In the recipe evaluation stage, the descriptive-comparative design was employed. The evaluation of the judges on the flavour, texture and appearance of the recipe developed and the three brands were described. The evaluators' mean ratings on the four recipes in terms of flavour, texture and appearance were likewise compared.

RESEARCH INSTRUMENT

1. Evaluation Sheet

Quality Scoring sheets were used in the study to evaluate the corned carabeef recipes in terms of flavour, texture, and appearance. The scoring sheets made use of the scaled response mode in eliciting response of evaluators.

Scoring for flavour, texture, and appearance made use of the following Likert scale:

	FLAVOUR	TEXTURE	APPEARANCE
5	Very Good	Very Good	Very Good
4	Good	Good	Good
3	Moderate	Moderate	Moderate
2	Fair	Fair	Fair
1	Poor	Poor	Poor

2. Department of Science and Technology (DOST) Laboratory Equipment

Microbial content and shelf life were tested at the Department of Science and Technology Laboratory.

SOURCES OF DATA

The evaluators of the study were 5 faculty members from different colleges of Carig Campus. They were requested to evaluate the four corned beef recipes (3 popular brands and the developed corned carabeef recipe) in terms of flavour, texture and appearance.

DATA GATHERING PROCEDURES

Coding Sample Containers

Sample containers for each judge were coded with 3 digit random number. Ink markers used to mark containers of corned carabeef served to all the judges shall be odorless.

Setting up Trays and Serving

The trays were set up and samples were served according to the order of serving as indicated on the master sheet. The score sheet was placed on the tray with the samples. Each tray was provided with a glass of water which the judges drank before each sample was evaluated. Before the sample recipes were presented to each judge for tasting and evaluation they were given some important reminders. Each judge was advised not to interact communicate in any way to other judges. This was done to avoid biases and to minimize each judge to influence each other's evaluation. Each judge was instructed to rinse his mouth in order to judge each succeeding sample accurately without the influence of the taste of previous samples tasted.

The order of recipes for each judge to evaluate was determined by using the table of random number permutation. The accomplished master sheet is shown. Table 1 shows the layout of random assignment of judges in evaluating the corned carabeef recipe and the order of serving the recipes.

As shown from the table, recipe D was first served to judge 1. This was followed by recipes A, B and C. The order of recipes served and evaluated by judges 2 to 5 are also provided in the same table.

Table 1. Order of Samples for Evaluators in the Four Treatments

JUDGE NO.	TREATMENTS/ SAMPLE IDENTIFICATION			
	A	B	C	D
1	593^{2}	103^{3}	864^{4}	950^{1}
2	168^{3}	924^{1}	156^{2}	716^{4}
3	405^{2}	751^{4}	803^{1}	574^{3}
4	735^{4}	259^{3}	783^{2}	345^{1}
5	832^{3}	769^{2}	370^{4}	837^{1}

A=Brand 5 B=Developed Corned Carabeef C=Brand 7 D=Brand C

STATISTICAL ANALYSIS OF DATA

The mean was used to describe the assessment of judges on the texture, flavor and appearance of corned beefs. The following arbitrary scale was used to describe the judges,

mean evaluation. 1-1.79 Poor, 1.80-2.59 Fair, 2.60-3.39- Moderate, 3.40-4.19- Good and 4.2 – 5.0- Very Good.

The F test was used to determine significant differences in the evaluation of Judges on the quality of the corned beef recipes.

Descriptive statistics such as mean and frequency counts were used to describe the microbial content and shelf life of the developed corned carabeef.

RESULTS

The corned beef recipes were evaluated in terms of quality indicators such as flavour, texture and appearance. There is a significant difference in the assessment of evaluators on the quality of the corned beef recipes as shown by the F ratio of 0 .084 with an associated probability of .02. Recipe A is significantly different recipe D with F ratio of 10.3 and a probability of .02. Recipe B is significantly better in quality than recipe D with F ratio of 7.32 with a probability of .04.Based on laboratory test, the corned carabeef recipe contain 3.o MPN/g of E-coli, 3.0 MPN/g of total fecal coliform, 500CFU/g aerobic Plate Count, 0 S-aureus, 500 CFU/g of yeast and molds and Salmonella is absent at 25g sample.The shelf life of the corned carabeef is 3 days when kept at normal room temperature and 18 weeks when kept in the refrigerator at 0 – 4C. It costs P230.30 to produce corned carabeef from 1kg raw meat.

DISCUSSIONS

Table 2.Evaluation of Judges on the Flavour, Texture and Appearance of the Four Recipes

Indicators of Quality	Recipe A	Recipe B	Recipe C	Recipe D
Appearance	4.4	4.6	3.6	4
Texture	3.6	4.8	3.4	3.8
Flavour	3.6	4.6	3	3
Weighted Mean	3.9 (G)	4.7(V G)	3.35 (M)	3.45(VG)

Table 2 above shows the overall evaluation of judges on the Appearance, Flavor and Texture of recipes A, B, C and D. Data reveal that the appearance, texture and flavor of recipe A has a mean of 3.9. (Good). Recipes B, C and D were evaluated with a mean evaluation rating of 4.7 (Very Good), 3.35 (Moderate) and 3.45 (very Good).

Table 2. Result of the Comparison (ANOVA) of the 5 judges judgement on the Four Recipes of corned beefs using the quality rating scale.

Source of Variance	df	Sum of Squares (SS)	Mean Square(MS)	F ratio	Probability
Between groups	3	.56	.19	.84	.02
Within groups	16	3.52	.22		
Total	19	4.07			

Mean Evaluations: A= 3.67 B= 3.6 C= 3.67 D= 3.27

Pairs Compared	F -ratio	Prob
A vs B	1.406	.374
A vs C	2.97	.16
A vs D	10.3*	.02
B vs C	2.112	.243
B vs D	7.32*	.04
C vs D	3.47	.127

There is a significant difference in the assessment of judges on the overall quality of the four recipes evaluated. This is shown by the F ratio of .84 with an associated probability of .02. The table reveals that recipes A and B are significantly better than recipe D as shown by the F ratios of 10.3 and 7.32 with associated probabilities of .02 and .04 respectively.

The data on the table and the general reactions imply that in the research process, Recipe B which is the originally improved recipe for commercialization exudes the specific and overall qualities of the commonly accepted recipes of corned beef. Hence, it can be concluded that the Recipe B or the newly developed corned beef recipe is a recipe which is comparable to the commercially accepted recipes of corned beef. It means to show that the recipe developed by the researcher is suitable for patenting and packaging.

Microbiology Laboratory Test

Laboratory Analysis conducted at the DOST - Regional Science Testing Laboratory.

Table 3. Microbial Content of the Developed Corned Carabeef Recipe

Microorganisms	Lab. Test Results
E Coli	**3.0 MPN/g**
Total Fecal Coliform	**3.0 MPN/g**
Aerobic Plate Count	**500 CFU/g**
Salmonella	**Absent at 25g sample**
S. Aurens	**0**
Yeast and Molds Count	**500 CFU/g**

The table vividly reveals the result of microbiology laboratory test. E Coli test registered a less than 3.0 Most Probable Number per gram(MPN/g); total fecal coliform registered a less

than 3.0 Most Probable Number per gram; while the aerobic plate count registered a less than 500 Colony Forming Units per gram (CFU/g). This implies that the product is free or negative from the three mentioned microorganisms.

Furthermore, the product is free from salmonella, S. Aureus , yeast and mold counts since the test registered a less than 500 Colony Forming Units per gram(CFU/g). Generally, the product is satisfactory and acceptable for human consumption

Shelf Life of Corned Carabeef Developed

The researcher made use of 2 methods of testing the shelf life of the corned carabeef developed. First, sensory evaluation at room temperature accomplishing the table below;

Table 4. Shelf Life Test (Sensory Evaluation)

Temperature	No. of Days	Observation (Sensory)
Normal Room Temperature	Day 1	The product is presented in a poly-ethylene package where flavour, texture and appearance is very acceptable
	Day 2	The product was still good as of day 1
	Day 3	A disagreeable flavour and aroma was observed though there was no change on the appearance.
Controlled Temperature (0° C-4° C) or Freezer	day 1	The product was freshly produced with appetizing flavour, texture and appearance.
	After 7 days	Observed to be in good condition.
	after 2 weeks	Appeared to be in good flavour, texture and appearance.
	Until the 18^{th} week	Still the product is in good flavour, texture and appearance.

Under controlled temperature, the researcher stored the corned carabeef in the freezer in April, 2012 and observed on the product every week thereafter.Flavor, texture and appearance were observed and tasted to be in good condition.

Economic Cost

Table 5. Cost of Materials in the Developed of Corned Carabeef from 1kg. Raw meat

INGREDIENTS	WEIGHT	COST
Lean Carabeef w/ fat	1 kg (1000 g)	P180.00
Table salt	1 teaspoon (5g)	.05 cents
Prague powder	1 teaspoon (5g)	.05 cents
Refined sugar	2tablespoon (30g)	1.00
Phosphate	1 teaspoon (5g)	.50

INGREDIENTS	WEIGHT	COST
Red food color	A dash (0.5g)	.05 cents
Ascorbic acid	1 teaspoon (5g)	.05 cents
All spice	1 teaspoon (5g)	.50
Oregano fresh leaves(chopped & squeezed juice)	3tablespoons (45g)	.05 cents
Garlic(chopped)	2tablespoon (30g)	1.00
Black pepper	1 pack (1.25g)	1.00
Beef cubes	2 pcs. cube (5g)	5.00
Monosodium glutamate	1/8 teaspoon (0.5g)	.05 cents
Cumin powder	1 teaspoon (5g)	.50
Oil	¼ cup (60g)	5.00
Carrageenan	1 teaspoon (5g)	.50
Labor cost		35.00
TOTAL		**P230.30**

CONCLUSIONS

The researcher concludes that:

- It is possible to develop corned carabeef.
- The corned carabeef is comparable to the popular brands of corned beef.
- The developed corned carabeef is safe for consumption within 3 days.

RECOMMENDATIONS

The researcher recommends that:

1. Further recipes on carabeef should be developed.
2. The recipe developed should be submitted for patenting and packaging to Department of Science and Technology.

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