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## Standardization And Commercialization Of Chevron Products

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**Fredisminda M. Dolojan\***

Quirino State University

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Prior to product development, researches were done to check different formulations of the three non-traditional chevon-based recipes that Filipinos have come to love. These are the grilled chevon with satay sauce, goat curry, and goat mini kebabs. The screening of recipes were conducted to establish healthy ingredients and procedures. Based on the initial small research on recipes and ingredients, cooking protocols for each of the recipes were established and sample products were cooked. These products were then subjected to sensory evaluation by a trained panel, who assessed overall acceptability using flavor, meat color and sauce, thickness of sauce, tenderness, general acceptability and other sensory qualities. The most acceptable recipes were utilized for production. The products were subjected to consumer testing. Hedonic Test of nine-point scale were used to determine the acceptability of the products in terms of color, taste and general acceptability. A five-point scale were used for tenderness, juiciness, spiciness and other attributes. Result showed that all the three introduced “variants” recipe received a fully acceptable descriptive result of evaluation with an average weighted mean of 4.25 for chevon curry, 4.36 for chevon satay and 4.25 for chevon minikebab. Across all ages, they rated the three recipes as fully acceptable. The three recipes are found to be profitable. All the three recipes gave a positive return of cash expenses of 36.22% for the curry, 30.82% for the goat satay and 17.92% for the goat minikebab.

Keywords: chevon, curry, satay, kebab, standardization, hedonic

### Introduction

In the Philippines, goat is traditionally sold and slaughtered on per head basis. The gains from the project *Value-adding of Goat Meat Products through Processing and Packaging* were attributed to the information generated on carcass yield of different breeds of goats, cutting scheme developed for chevon and development of chevon based canned and vacuum-packed products.

Production has been intensified in the past years to meet the market’s demand for meat in terms of quantity and quality. The project was also able to developed cutting scheme for chevon to produce prime cuts. This initiative paves the way to retailing of chevon and serves as an option for the current

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\*Corresponding author: Fredisminda M. Dolojan, **email:** fredisdolojan@yahoo.com

marketing system on per head basis of buying slaughter goat. Recognizing the importance of innovative food products today, the project was also able to developed processed chevon in cans highlighting native Filipino dishes. The said products are now ready to be commercialized under the brand name *Chevon Valley*.

Having all these accomplishments, product commercialization is seen to be necessary to benefit both the raisers and the product processors as the value of goat will increase. The scheme and processes developed need also to be disseminated to entrepreneurs to establish more enterprises. Thus, a processing building accredited by the government which will serve as venue for product commercialization and technology-transfer is required. These initiatives will ensure better market share for goat among other livestock commodity today.

Convenience or “ready-to-eat” food is well accepted by the consumers nowadays due to the busy lifestyle of people. Although this kind of food is known as “fast food”, its quality should not be taken for granted for health reasons. Chevon is known to be a lean meat with favorable nutritional qualities compared to any other meats. For this reason, developing “ready-to-eat” foods from chevon will provide healthy options for busy people, who want instant meals.

## **Objectives**

General: To develop more value-added chevon products for commercialization.

### ***Specific:***

1. To introduce and standardize chevon food products for wider market niche;
2. To determine the preferred recipe of the three “variant” chevon namely chevon curry, mini kebab and satay.
3. To determine appropriate packaging material for these chevon products

## **Review of Related Literature**

In the Philippines, goat is regarded as one of the most nutritious meat. The demand for this meat is increasing as shown in the increasing per capita consumption of chevon among Filipinos. With the output generated from the past projects implemented on chevon processing, product commercialization should take in place to give goat a better share in the market. Thus, an

accredited processing laboratory should be established to facilitate product commercialization and technology transfer among entrepreneurs..

### ***Building enhancement and accreditation***

The need for the processing building accredited by the NMIS to operate is necessary in the product promotion and commercialization. With an accredited processing building, the products produced are then certified to be safe for consumption and registered for trade in domestic and foreign markets. Moreover, this will also serve as venue for technology-transfer initiatives for entrepreneurs, capability building and model slaughtering and processing unit for goat in the country.

### ***Enterprise development and technology promotion for innovative food***

Value-adding is proven effective in commercialization of products of a certain commodity. In one way or the other, it also serves as a means to transfer the technology developed in a certain research endeavor, which will serve as a tool in the development of the industry concerned. As market niche will be unlocked, the producers are assured to have better market for the stocks produced. Today, innovative products have developed a big market either in domestic or international scene as consumers became more health conscious.

### ***Chevon as an Excellent Source of Lean Protein***

Chevon has great health advantages. Per 85 grams of cooked meat, chevon has about the same protein as beef and lamb but more than pork and chicken. However, chevon has only 2.6 grams of aft compared to 16 grams for beef and lamb, while pork has 24 grams. Chevon has less fat than chicken too. With 143 calories in 100 grams of cooked chevon, a very good choice for adding lean protein to a diet.

Study shows that pure breed and their upgrades are excellent source of chevon and thus economical to be raised and slaughtered for meat purposes. In terms of sensory evaluation, no variations between breeds in terms of the meat quality in color, flavor, tenderness and odor.

### ***Chevon Recipes***

In Indonesia curry is called kari or kare. The most common type of kari consumed is kariyam (chicken curry) and karikambing( goat meat curry). In

the Philippines meat used for curry includes beef, lamb and chicken ,chevon was never used as curry. Curry recipes is a foreign dish which was originated in India.

Traditional meat for kebab is lamb, this was mostly consumed in Mediterranean country by Persian people while Satay recipe is from Indonesia.

### **Methodology**

There were three phases used as a process flow in developing the chevon-based recipes. Phase I for the establishment of product recipe. Phase II for post sensory evaluation and Phase III for assessment of the implications of product attributes to product positioning

### ***Descriptive Equivalent of the Evaluation***

<b>Point Value</b>	<b>Range</b>	<b>Acceptability</b>
5	4.20 – 5.00	Fully accepted
4	3.40 – 4.19	Partially accepted
3	2.60 – 3.39	Moderately accepted
2	1.80 – 2.59	Less accepted
1	1.00 – 1.79	Not accepted

### ***Treatment of Data***

Frequency counts and weighted mean were used to calculate the descriptive evaluation of the respondents.

The following formula were used in computing the weighted mean:

$$M = \frac{\Sigma fx}{N}$$

Where: M = the weighted mean

$\Sigma fx$  = Summation of frequency multiplied by the point value

N = total frequency

### ***Chevon Recipe Development***

Establishment of process and formulation of chevon products in appropriate packaging materials such as chevon curry, chevonminikebabs, and chevon satay were conducted. Raw materials like meat cuts, other ingredients and spices were also identified. Each preparation and cooking method were standardized to arrive an acceptable product of consistent quality products. For this study, there were three (3) recipes that were developed which were evaluated for a sensory test to determine the most acceptable recipe for commercialization.

In the conduct of sensory evaluation for the formulated and standardized chevon products, trained panelist were tapped to determine the sensory qualities (descriptive and acceptability attributes). Among the parameters that were evaluated are taste, flavor, texture and after-taste of each product formulation. The results of the evaluation were used to further undertake improvement of the formulated products until an acceptable and desirable formulation were established.

### **Discussion of Results And Findings**

#### ***Verification of recipes-***

Three recipes of chevon curry ,chevon satay and chevon mini kebab were subjected for evaluation by trained panellist from Quirino State University and Don Mariano Memorial State University. Result showed in Table1 that the most preferred recipes of chevon curry coded CA3. As shown in the table below, the most preferred recipe for chevoncurry by the tasters is Curry C (CA3). Out of the 50 evaluators 60 % of them chose CA3 as the most preferred recipe of chevon curry.

**Table 1.** Summary on the preference evaluation for the Chevon curry

Treatments	Frequency	Percentage
Curry A(CA1)	11	22%
Curry B(CB2)	9	18%
Curry C (CA3)	28	60%

The most preferred recipe of chevon satay from the three samples of choices was the recipe coded with SB2 As shown in table 2, 46 percent of the fifty tasters preferred Satay B (SB2) over satay A (SA1) and Satay C(SC3) recipes they tasted.

**Table 2.** Summary on the preference evaluation for the Chevon Satay

Treatments	Frequency	Percentage
Satay A(SA1)	15	30%
Satay B(SB2)	23	46%
SatayC (SC3)	12	24%

For the three choices presented for the kebab recipe, the evaluators preferred the sample coded with KA2 ( an Iranian kebab). As shown in table 3, out of the three choices of kebab recipe, the most preferred by the evaluators is kebab B (KA2), 50% of them chose this recipe which was regarded also as the final recipe to be further evaluated with its packaging materials.

**Table 3.** Summary on the preference evaluation for the Chevon Mini Kebab

Treatments	Frequency	Percentage
Kebab A(KA1)	12	24%
Kebab B(KA2)	25	50%
Kebab C (KA3)	13	26%

### ***Finalization and evaluation of recipes.***

The most preferred recipes of these chevon curry, kebab and satay were used for further sensory evaluation by trained panel of evaluators for the assessment of the overall acceptability for flavour, meat color, sauce thickness and tenderness of the meat. This will be done with the packaging material to be used for these convenient foods.

### ***Establishment of cooking/processing scheme.***

From the finalized recipe, proper cooking procedure were set. The best cooking methods were already established for the three recipes of chevon. For Curry, it is baking, for kebab its broiling and for satay its sautéing combined with simmering with peanut sauce.

### ***Sensory evaluation for acceptability.***

The initial sensory evaluation done with the different sets of recipe of the three chevon “ variants” recipe were conducted since these are not the traditional recipe of goat meat that we usually prepare and eat to suit for the Filipino taste. The final recipe were packed in a microwavable packaging material and subjected to sensory evaluation from the panel of tasters both from

the Quirino State University and Isabela State University. The group used stand-up pouch for packaging material for these recipes of chevon. Another set of sensory evaluation were conducted again after packaging, and they were subjected to commercial sterility test. The products were subjected to consumer testing during techno fair exhibits where these products were displayed and presented.

**Table 4.** Acceptability taste test for the three variants recipe of chevon

<b>Variants recipe</b>	<b>Acceptability</b>	<b>Weighted mean</b>
Chevon curry	Fully acceptable	4.25
Chevon Satay	Fully acceptable	4.36
Chevonminikebab	Fully acceptable	4.25

The three final recipe of the three variants chevon food product were subjected for further sensory evaluation for all groups of tasters, these are children (7-12), adolescent (13-19), and adult (20-60). Result as indicated at the above table (table 4) that all the three introduced “variants” recipe received a fully acceptable descriptive result of evaluation with an average weighted mean of 4.25 for chevon curry, 4.36 for chevon satay and 4.25 for chevonminikebab. Across all ages, they rated the three recipes as fully acceptable.

#### ***Sensory Panel evaluation.***

The different attributes that were associated on the chevon curry product-color of the meat is 80% brick red and for the sauce is 80% light yellow to brown; with 25% sweetness while saltiness is 15%; its is quite spicy (15%) and a dominant curry flavor (80%) with 75% coconut milk flavor; texture is 70% hard; 70% tough ; 50% tooth packing and 150% viscous; for cohesiveness and juiciness it was 60%; oiliness is 75% while moisture absorption is 100%.

For Chevon satay, panel of evaluators identified the following sensory attributes, 80% light brown color for the sauce and 80% brown color for the meat; with 15% sweetness while 25% saltiness; spiciness is 20%; oiliness is 10%; 80% peanut flavor; for the texture – it was adjudged 80% hard, with 75% roughness; 20% juiciness , 80% toothpacking and with 100% moisture absorption.

Chevonminikebab was evaluated by the panel of evaluators with 80% brown for the color of the meat; 10% sweet, 20% salty for spiciness its 10%; texture: hardness is 80% while roughness is 75% and , 80% toothpacking, 20% juiciness and with 100% moisture absorption.

**Packaging Material.**

Aluminum stand up pouches were used as packaging materials for curry and satay while poly ethylene nylon bag was used in minikebab. (Figure 1)



**Figure 1.** Chevon products with their packaging material.

Heat penetration tests were conducted on the above products packed in stand-up pouch (SUP) in water retort with overpressure. Process calculations were done on the resulting heat penetration data. Ph of the product is  $\geq 6.0$  which is considered as low-acid food. Stand –up pouch, laminate of PET ( 12 micron)/foil (7 micron)/Nylon (15 micron)/retort CPP (60 micron)/ 100mm x150mmx64mm (LxWxT). Calculated processing schedule for chevon curry and satay in 85 grams stand-up pouch at retort temperature of 240 °F (115.6°C) and assumed  $F_{250}$  or  $F_0$  value of 6.0 minutes. (Table5 and 6).

**Table 5.** Thermal processing schedule for curry

Initial temperature(IT)*	Minimum Processing Time at 240 °F (115.6°C) (minutes)
80°F(26.7 °C)	45
100°F(37.8°C)	44
120°F(48.9°C)	43
140°F(60.0°C)	42
160°F(71.1°C)	40

\*Temperature of the food before thermal processing

**Table 6.** Thermal processing schedule for satay

Initial temperature(IT)*	Minimum Processing Time at 240 °F (115.6°C) (minutes)
80°F(26.7 °C)	56
100°F(37.8°C)	55
120°F(48.9°C)	53
140°F(60.0°C)	52
160°F(71.1°C)	49

\*Temperature of the food before thermal processing

***Proximate Analysis.***

Moisture and ash content for chevon curry and satay were analyzed using gravimetric method. Samples were accurately weighed and were placed in aluminum dish and dried at 105 °C in an oven for 1 hour. The dish with residue were weighed to determine weight loss as moisture . As shown in table 7, moisture content for curry is 64.47g/100g while satay has 53.51g/100g and kebab has 62.84g/100g moisture content. For the ash analysis, suitable amount of sample were charred on a hotplate and burned to ash in a muffle furnace at 550°C±1°C until the residue is white or nearly white. Ash content for curry is 2.22g/100g while 2.64g/100g for satay and 1.70/100g for kebab. Crude protein content was determined using block digest/ steam distillation method, a suitable amount of the sample were digested at 410°C with sulfuric acid using copper sulfate –potassium sulfate as catalyst. The digested samples were diluted with water and 40% sodium hydroxide were added to liberate ammonia and subsequently steam distilled using Kjeltex Distilling apparatus. The liberated ammonia were collected in boric acid receiver solution then titrated with standard acid giving an amount of 11.89g/100 crude protein for curry while 16.94g/100g for satay and 32.66g/100g for kebab. Total fat content was determined using Soxhlet extraction for 4 hours at solvent condensation 5-6 drops, curry total fat content is 13.96g/100g while satay is 17.56g/100g and kebab is 1.68g/100g (table 5). For carbohydrates, curry has 7.47g/100g while satay has 9.35g/100 and kebab has 1.12g/100g carbohydrates which was determined by computation, 100 carbohydrates computed minus the sum of total fat, crude protein, ash and moisture.

For sodium content, curry has 0.34g/100g while satay has 0.53g/100g and kebab has 0.45g/100g this was determined by getting suitable amount of sample then charred on a hot plate and burned to ash in a muffle furnace at 550°C±1°C until the residue is white or nearly white then ash is dissolved in diluted acid and using atomic absorption spectrophotometer sodium was determined.

**Table 7.** Proximate analysis for chevon curry and satay

Parameter	Chevon Curry g/100g	Chevon satay g/100g	Chevon kebab g/100g
Moisture	64.47	53.51	62.84
Ash	2.22	2.64	1.70
Crude protein	11.89	16.94	32.66
Total fat	13.95	17.58	1.68
Carbohydrates	7.47	9.35	1.12
Sodium	0.34	0.53	.45

### ***For Microbial analysis.***

Big differences for the microbial analysis result was due to non subjection for water retort method as a final processing for the recipe with its standout pouch aluminum packaging material for the chevon satay. Pour plate count method with decimal dilution of  $10^1$ - $10^4$  were done for detecting bacterial count such as *E. Coli* and salmonella. In detecting salmonella presence, streak plating method was also done.

### ***Profitability Test .***

Using the cost and return test for profitability, these three recipes are found to be profitable. All the three recipes gave a positive return of cash expenses of 36.22% for the curry, 30.82% for the goat satay and 17.92% for the chevonminikebab.

### ***Summary***

In the development of the three variants recipes for chevon the following undertakings were done:

1. Three recipes of chevon curry, chevon satay and chevon mini kebab were subjected for evaluation for acceptability test. The most acceptable recipes were again subjected for final evaluation by the trained sensory panel of evaluators .
2. Establishment of processing scheme from the finalized recipe and proper cooking procedure were set for the three variants recipes
3. Sensory evaluation by trained panel of evaluators to determine sensory attributes of the products and compare to the set of standard score for sensory evaluation
4. Proximate and microbial analysis were done at the Regional Standards and Testing Laboratory of the Department of Science & Technology

### **Conclusion**

The three variants recipe of chevon namely goat or chevon curry, goat or chevon satay with peanut sauce and goat or chevonminikebab were all rated fully acceptable by the panel of tasters or evaluators. Though these were all new introduced recipes on goat it gained positive acceptance of the group of

evaluators used in this study. Chevon curry, Chevon satay and chevonminikebab are additional options cooking recipes for goat aside from the usual recipes we know and we usually eat such as pinapaitan, kaldereta, kilawin and the like. For cost and return analysis the result showed a positive net income or Return of cash expenses for all the three recipes produced.

### **Recommendation**

The results of the analyses conducted should be indicated in the labels for each product developed. The information generated should be highlighted in each product prior to its commercialization which are all needed to capture bigger markets.

To facilitate proper technology utilization and commercialization, intellectual property application should be facilitated. Patent utility models for the protocols developed in the production of convenient products should be applied.

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