CONSUMER ACCEPTABILITY OF BANANA BLOSSOM SISIG

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Abstract

This study assessed the consumer acceptability of banana blossom "sisig" at Isabela State University, Echague, Isabela, Philippines for the School Year 2011-2012. The study used a descriptive form of research which described the level of evaluations of the tasters on the banana blossom "sisig" in terms of variables such as appearance, color, texture, aroma, presentation, and taste. In analyzing the data gathered the 9-point hedonic scale was used. Evaluation of the product was done when respondents are grouped by their profile. The data taken from the evaluations were analyzed using frequency counts and percentages, means, t-test and Analysis of Variance. The highlight of the study were as follows: a) the sensory evaluation of the respondents in all the variables ranges from "like very much" to "like extremely" regardless of any profile variable; b) the respondents' category influences their evaluations in taste but has nothing to do on the rest of the variables; c) the profiles of the respondents do not affect their evaluations in the different variables; d) there is a positive Return on Investment in the commercialization of banana blossom sisig. Based on result of the study it revealed that the appearance and taste is "like extremely" and the color, texture, aroma as well as presentation is "like very much" by the tasters.

Keywords: *acceptability, sisig, sensory evaluation, tasters, hedonic scale.*

Rationale

Musa, a plant genus of extraordinary significance to human societies, produces the fourth most important food in the world today after rice, wheat, and maize (Scot C. et al. 2006). Musa species attained a position of central importance within Pacific societies: the plant is a source of food, beverages, fermentable sugars, medicines, flavourings, cooked foods, silage, fragrance, rope, corsage, garlands, shelter, clothing, smoking material, and numerous ceremonial and religious uses.

Banana is considered as the fourth largest horticultural crop in the world with an estimated production of 64.6 million metric T as of 2000. It is widely grown in countries in Africa, Asia, Europe, Oceana, Latin America, and the Caribbean (ISAAA, 2001). India is reported as the largest producer of banana, accounting for about 21% of total world production in 2000.

As a tropical country, the Philippines grow an abundant variety of fruit crops primarily for local consumption and export market. Banana is considered as the most

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important fruit crop in the country in terms of volume of production and export earnings. In 1998, the country's share to total world production reached a record high of 6%.

The Philippine banana industry contributes significantly to the agriculture sector and the economy in general. Banana production is a source of income and employment in the countryside with more than 5.6 million smallholder farmers dependent on it (Horwood C. (2006). In 2000, the banana sector contributed about 7% to the total value of production in agriculture. Banana is also one of the country's top export earners. Banana (*Musa* sp.) is grown in all regions of the Philippines throughout the year. It was described by Worobetz, K. (2000), the first botanist in the Philippines, as variety compressa. In Indonesia as Pisang Kepok, in Malaysia as Pisang Nipah, and in Thailand as Kluai Hin. Saba is the type cultivar of edible and cultivated Musa balbisiana species (Valmayor et al. 2002).The banana bud or flower or blossom is a component in the inflorescence of the banana plant. The male and female flowers of the plant are both present but come out of the plant separately. The female flowers are the first to come out which then develops into fruits. The first 5-15 basal nodes or hands produce female flowers and the upper digital nodes produce male flowers (Del Rosario1990 as cited by Villa 1993).Banana is grown commercially for its fruits. The various parts of the plant other than the fruit are also used for food, packaging, and other purposes. Banana bud (bracts and flowers), one of its parts, is eaten as boiled vegetable and is also used as an ingredient in an assortment of cuisines (Villa 1993).Banana bud or inflorescence is one of the most important parts of the banana plant. Aside from its being a mere ingredient in vegetable preparations, it is also processed and exported as canned banana bud (De Vera 1992).

Banana blossom is often consumed as a vegetable in many Asian countries such as Sri Lanka, Malaysia, Indonesia and the Philippines. In Sri Lanka more than 32 million banana bunches are produced annually. Banana blossom is a popular dish in Sri Lankan cuisines. It is consumed as a curry as well as a boiled or deep fried salad with rice and wheat bread. Banana blossom is generally valued as a fiber-rich source. Dietary fiber has demonstrated its benefits in health and disease prevention in medical nutrition therapy (Chandalia et al. 2000). Along with dietary fibers, proteins and unsaturated fatty acids, banana flowers are also rich in vitamin E and flavonoids (Glenn K. (2011) . Banana flowers, similarly to the fruits are an excellent source of potassium, plus the Vitamin's A, C and E. According to research at the Chinese Academy of Tropical Agricultural Sciences

(2009) which studied the flowers of *musa paradisiaca,* banana flowers have tremendous nutritional value. It is a good source of fiber and protein. The flowers contain a class of phytochemicals known as saponins. Saponins lower LDL ,or bad cholesterol, boost our immunity against infection and are thought to inhibit the growth of cancer cells. They also have antioxidant activity and so can reduce our risk of chronic disease such as cardiovascular disease. Banana flowers are also an excellent source of flavonoids. These phytochemicals found in many plant based foods help prevent damage to DNA cells by neutralizing free radicals. They also help lower cholesterol, anti-inflammatory, anticancer and anti-aging.

Although the banana blossom is highly valued for its fiber content and medicinal value, consumption may be constricted due to lack of knowledge on its preparation; hence, menu from banana blossom is limited as salad and as ingredients in other menus. It is for this reason that this research be conducted to evaluate the acceptability of banana blossom-based sisig which is a delicious but low cost food.

Objectives of the Study

The research assessed the acceptability of banana-based sisig recipe to the respondents along the different research parameters.

Specifically, the research envisions to shed light to the following objectives:

1. Determine the profile of respondents in terms of:

1.1. civil status

1.2. ethnicity

1.3. household size

1.4. highest educational attainment

2. Determine the level of acceptability of the banana-based sisig recipe to the respondents along the following:

2.1. appearance

2.2. color

2.3. texture

2.4. aroma

2.5. food presentation

2.6. taste

3. Assess the shelf life of banana-based sisig recipe.

4. Evaluate the Return on Investment (ROI) of banana-based sisig recipe?

5. Determine the existence of significant differences on the evaluation of the taster respondents along the different parameters on the product when they are grouped by profile?

Conceptual Framework

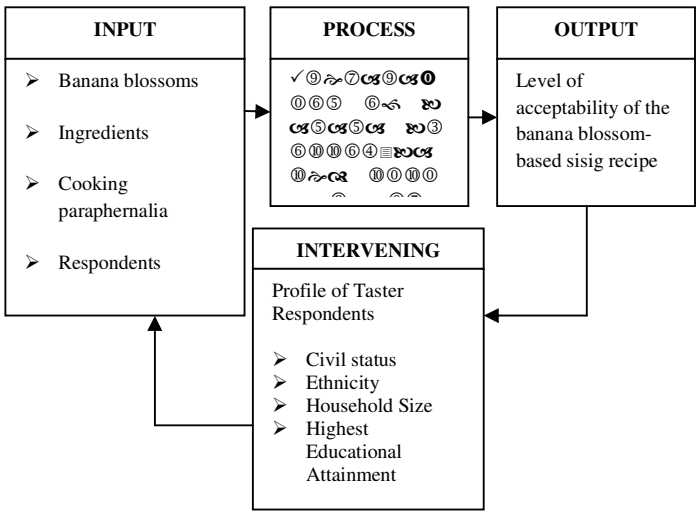

Figure. 1. Conceptual Framework Showing the Relationships of Civil Status, Ethnicity, Household size, and Highest Educational Attainment

Methodology

Research Design

The study is a descriptive form of research. It describes the present phenomena underlying the sensory evaluation by the 90 respondents on banana blossom-based sisig recipe in terms of the following parameters: appearance; color; texture; aroma, taste; and shelf life. Other variables to be described will be the profile of the evaluators. The affective and analytical test evaluations will be employed in this research.

Materials Used

A. Materials

The materials used in cooking the banana blossom-based sisig recipe are as follows:

Stove	Measuring spoons
Mixing bowl	Plates
Casserole	Preserving jars
Knife	Wooden laddles
Chopping board	Strainer
Measuring cups	Labels

B. Ingredients

Ingredients	Measurement
Banana blossom	2 cups (chopped)
Coconut powder	1 cup
Onion	½ Cup
Ginger	¼ Cup
Calamansi	¼ Cup
Salt	2 tbsp

Preparation of Banana Blossom

Banana blossoms from Saba variety with tightly packed bracts were chosen. The tough outer layers were removed until the pale pink leaves will appear which are tender and edible. The edible bracts removed were immediately submerged in water with brine solution until it is oxidized to avoid discolorations. This process of removing the leaves, then the smaller fronds wass repeated until the leaves became too small to peel. At this point, just chop off whatever remains of the stem, and slice or dice the smaller leaves and small heart at the center. The fronds and bracts submerged in hot water were chopped before it is squeezed to remove the bitter taste and pongy smell.

The preparation process is illustrated below:

Selection of quality materials
↓
Washing and trimming
↓
Slicing: soaking in brine
↓
Boiling
↓
Squeezing
↓
Adding Ingredients
↓
Packing in containers
↓
Sterilizing/processing
↓
Sealing/Labelling

Criteria in the Selection of Respondents

Selection of respondents is crucial in the research since the precision of evaluation lie in the type of taster. In the selection of taster, the following criteria were followed:

1) The tasters must not be smokers
2) The tasters must not be chewing gums, mints and must not eat candies at least 2 hours prior to the evaluation.
3) They must not have artificial teeth
4) They must not be using strong perfumes and smelling spicy ingredients prior to evaluation

Sensory Evaluation of the Finished Product

They assessed the samples of banana blossom-based sisig recipe based on taste, color, texture, aroma, appearance and presentation, using the 9-point hedonic scale. Before the evaluation, the researcher ensured that the principles in sensory evaluation of food will be followed. The panel of tasters underwent a short briefing regarding the research and the instructions on how to go about with the sensory evaluation. The score card where indicated their evaluations were explained to them.

The hedonic scale below was used in the evaluation:

Numeric Value	Scale	Description
9	8.51-9.0	Like extremely
8	7.51-8.50	Like very much
7	6.51-7.50	Like moderately
6	5.51-6.50	Like slightly
5	4.51-5.50	Indifferently
4	3.51-4.50	Dislike slightly
3	2.51-3.50	Dislike moderately
2	1.51-2.50	Dislike very much
1	1.00-1.50	Dislike extremely

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Statistical Tools Used

The data were analysed using the following statistics:

1. Frequency Counts and Percentages. These will be used to describe the profile of the respondents.
2. Mean. This will be used to describe the sensory evaluations of the dish.
3. T-test. This will be used to determine existence of significant differences on the sensory evaluations of the respondents when they are grouped by gender and civil status.
4. ANOVA. This will be used to determine significant differences on the sensory evaluations of respondents when they are grouped by age, ethnicity, household size, and educational attainment.

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

The following presents the results and discussion of the study in the following order: profile of the respondents, sensory evaluation of the banana blossom “sisig”, when respondents are grouped by profile, and Return on Investment.

Table 1. Profile of Respondents

Gender	Students		Faculty		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Male	20	31.25	11	42.31	31	34.44
Female	44	68.75	15	57.69	59	65.55
Total	64	100.00	26	100.00	90	100.00
Civil status						
Single	63	98.44	7	26.92	70	77.07
Married	1	1.56	18	69.23	19	21.10
Widow/er	0	0	1	3.85	1	1.10
Total	64	100.00	26	100.00	90	100.00
Ethnic Affiliations						
Ilocano	41	64.06	14	53.84	55	61.10
Tagalog	19	29.69	3	11.54	22	24.40
Yogad	0	0	5	19.23	5	5.50
Ifugao	1	1.56	1	3.85	2	2.20
Ibanag	3	4.69	2	7.69	5	5.50
Waray	0	0	1	3.85	1	1.10
Total	64	100.00	26	100.00	90	100.00
Household Size						
2-4	19	29.69	7	26.92	26	28.80
5-8	44	68.75	19	73.08	63	70.00
9-more	1	1.56	0	0	1	1.10
Total	64	100.00	26	100.00	90	100.00
Highest Educational Attainment						
College Level	64	100.00	0	0	64	71.10
BS degree Holder	0	0	2	7.69	2	2.20
Master Degree Holder	0	0	16	61.54	16	17.70
Doctorate Degree Holder	0	0	8	30.77	8	8.80
Total	64	100.00	26	100.00	90	100.00

The table shows that majority of the student respondents are females, single, Ilocanos, and belong to household size of 5-8 members. For the teacher respondents, majority are females, married, Ilocanos and they also belong to household size of 5 to 8 members.

Sensory Evaluation

Table 2. Sensory Evaluation According to Appearance

Appearance	Student (n-64)		Faculty(n-26)		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Dislike slightly	1	1.56	0	0	1	1.10
Indifferent	1	1.56	0	0	1	1.10
Like slightly	6	9.38	0	0	6	6.70
Like moderately	23	35.94	9	34.62	32	35.60
Like very much	21	32.81	14	53.84	35	38.90
Like extremely	12	18.75	3	11.54	15	16.70
Weighted Mean	7.53	LVM	7.76	LVM	7.64	LVM

Majority of the respondents “like very much” the appearance of the banana blossom “sisig” while there are 25.60 percent of the respondents who “like moderately” the appearance. There are 16.70 percent who “like extremely” the appearance.

Table 3. Sensory Evaluation According to Color

Color	Student		Faculty		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Indifferently	2	3.13	0	0	2	2.20
Like slightly	4	6.25	1	3.85	5	5.60
Like moderately	18	28.13	8	30.77	26	28.90
Like very much	27	42.18	15	57.69	42	46.70
Like extremely	13	20.31	2	7.69	15	16.70
Total	64	100.00	26	100.00	90	100.00

Majority of the respondents “like very much” the color of banana blossom “sisig”. There are however 28.90 percent who “like moderately” the color, while 16.70 percent “like the color extremely”.

Table 4. Sensory Evaluation According to Texture

Texture	Student		Faculty		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Dislike Slightly	1	1.56	0	0	1	1.10
Indifferently	2	3.13	0	0	2	2.20
Like slightly	3	4.68	0	0	3	3.30
Like moderately	17	26.56	7	26.93	24	26.70
Like very much	26	40.63	16	61.54	42	46.70
Like extremely	15	23.44	3	11.53	18	20.00
Total	64	100.00	26	100.00	90	100.00

Majority of the respondents “like very much” the texture of banana blossom “sisig”. There are 26.70 percent who like “moderately” the texture while 20.00 percent “like extremely” the texture of the product.

Table 4. Sensory Evaluation According to Taste

Taste	Student		Faculty		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Dislike slightly	1	1.56	0	0	1	1.10
Like moderately	4	6.25	2	7.69	6	6.70
Like very much	21	32.81	20	76.92	41	45.60
Like extremely	38	59.38	4	15.38	42	46.70
Total	64	100.00	26	100.00	90	100.00

Most of the respondents “like extremely” the taste of the banana blossom “sisig”, while 45.60 percent of the respondents “like the product very much”.

Table 5. Sensory Evaluation According to Aroma

Aroma	Student		Faculty		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Like slightly	4	6.25	0	0	4	4.40
Like moderately	11	17.19	5	19.23	16	17.80
Like very much	23	35.94	18	69.23	41	45.60
Like extremely	26	40.62	3	11.53	29	32.20
Total	64	100.00	26	100.00	90	100.00

Majority of the respondents “like very much” the aroma of the banana blossom “sisig” while32.20 percent “like extremely” the aroma of the banana blossom “sisig”. There are however 17.80 percent who “like moderately” the aroma of the product.

Table 6. Sensory Evaluation According to Presentation

Appearance	Student		Faculty		Total	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Dislike slightly	1	1.56	0	0	1	1.10
Indifferently	1	1.56	0	0	1	1.10
Like slightly	7	10.94	0	0	7	7.70
Like moderately	16	25.00	7	26.92	23	25.60
Like very much	20	31.25	17	65.38	37	41.10
Like extremely	19	29.69	2	7.69	21	23.30
Total	64	100.00	26	100.00	90	100.00

Majority of the respondents “like very much” the presentation of the banana blossom “sisig”. There are 25.60 percent of the respondents who “like moderately” the presentation while 23.30 percent “like extremely” the presentation of the product.

Table 7. Summary of Mean Evaluations of Respondents along the Different Parameters

Parameters	Student		Faculty		t-test	p-value
	Mean	Description	Mean	Description		
Appearance	7.53	LVM	7.76	LVM	-1.070	.288
Color	7.70	LVM	7.69	LVM	.052	.959
Texture	7.71	LVM	7.84	LVM	-.566	.573
Aroma	8.10	LVM	7.92	LVM	.969	.335
Presentation	7.71	LVM	7.80	LVM	-.376	.708
Taste	8.46	LVM	8.07	LVM	2.240	.028

The summary of evaluations show that both group of respondents have the same evaluation described as “like very much” in all the sensory evaluations, although the highest mean perceptions by the students and teachers is on aroma with 8.10 by the students while 7.92 by the teachers.

The mean evaluations of the students are 8.46 while 8.07 by faculty but both means are described as “like very much”. This implies that both groups of respondents have mean perceptions described as “like very much”.

The t-test on the differences in evaluations by the students and the teachers shows no significant differences. This leads to the acceptance of the null hypothesis which states that there are no significant differences in their sensory evaluations. This implies that the type of respondents do not affect their sensory evaluations.

Sensory Evaluation when Grouped by Profile

Both genders “like very much” the color, texture, aroma, presentation and taste while the male respondents “like moderately” the appearance.

The respondents who are separated, “like extremely” the appearance while the widow/ers “like extremely” the texture, aroma, and taste. The rest of the civil status groups “like very much” the appearance, color, texture, aroma and taste of banana blossom “sisig”.

The Ifugaos “like slightly” the color, texture and presentation, while they “like moderately” the aroma. All the ethnic groups “like very much” the appearance and taste of the banana blossom “sisig”.

The respondents with 5 to 8 household size “like moderately” the appearance while the respondents who belong to 9 or more household size “like moderately” the color and aroma while all the groups “like very much” the texture, presentation and taste.

The respondents with doctorate degree “like moderately” the color and presentation while all the groups “like very much” the appearance, texture, aroma, and taste of the banana blossom “sisig”.

Return on Investment

Table 15. Return on Investment of Banana Blossom "Sisig"

A. INPUT	Unit Price
1 Medium size banana blossom	P10.00
1 pc coconut	15.00
3 pcs onions	5.00
1 pc. Small size ginger	2.00
4 pcs. Calamansi	3.00
2 tbsp salt	0.50
3 pcs. Small preserving jars	9.00
LPG	5.00
Total	P49.50
B. OUTPUT	
3 jars banana blossom sisig (200gms @20.00/each)	P60.00
C. NET INCOME (B-A)	P10.50
D. RETRUN ON INVESTMENT (Net Income/gross Expenses)	21.21%

The table contains information on the return on investment of 1 medium size banana blossom which produces 3 jars with 200 g of finished product. If the price per jar is sold at 20 pesos, it will generate an ROI of 21.21%.

Summary, Conclusions And Recommendations

Summary

This study aimed to find out the acceptability of banana blossom in the preparation of "sisig" conducted in December 2011 at the Cafeteria of the College of Teacher Education at the Isabela State University, Echague, Isabela Philippines. Specifically, the study aimed to: determine the acceptability of banana blossom "sisig" in terms of appearance, color, texture, aroma, taste and food presentation; determine the relationship on the level of evaluation of the respondents to some selected variables such as gender, civil status, ethnic affiliation, household size and educational attainment; evaluate the return on investment (ROI) of banana blossom "sisig".

Conclusions

Based from the findings of the study, the following conclusions are drawn:

1. The sensory evaluations of the respondents in the different variables range from "like very much" to "like extremely".

2. The respondents' category influences their evaluations in taste but has nothing to do on the rest of the variables.
3. The profiles of the respondents do not affect their evaluations in the different variables.
4. There is a positive Return on Investment in the commercialization of banana blossom "sisig".

Recommendations

Based from the findings and conclusions of the study, the following recommendations are drawn:

1. The banana blossom "sisig" is accepted to the tasters but there is still a need to improve not only the taste but also the color, the appearance and texture since there are many respondents who evaluated the variables as "like moderately".
2. If the banana blossom "sisig" is to be commercialized, the taste preferences of the ethnic groups who will be the potential consumers be studied in order to make adjustments to suit their taste preference as it came out in the study that the Ifugaos vary in their evaluation.
3. The type of respondents affects their evaluations in taste. If the product be commercialized, there is also a need to consider the type of consumers whether they are students or teachers. Other researchers should further conduct future research to validate the difference in preferences of students and teachers on the taste of the product.

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