

**ACCEPTABILITY AND SHELF LIFE OF INSTANT
“GINATAANG DARAG” NATIVE CHICKEN
TREATED WITH DIFFERENT NATURAL
FOOD PRESERVATIVES**

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ABSTRACT

This study was conducted to determine which of the natural food preservatives could lengthen the shelf life and acceptability of instant “ginataang manok”. The preservatives used were Vit C, Vit E, and salt. Freshly cooked ginataang manok was prepared as a basis for comparison. The treatments were laid out in a completely randomized design replicated thrice. Five female staff from HRD and the same number of male professors from the College of Engineering of CPU were requested to evaluate the products for ten weeks. Results showed that instant “ginataang manok” treated with Vit C had significantly ($p < 0.01$) the lowest shrinkage after pressure-cooking while those with salt had significantly ($p < 0.01$) the highest meat to bone ratio. The processed product with Vit E had the lowest ($p < 0.01$) percent moisture extracted after oven drying. Processed products can be stored under room temperature for ten weeks. The appearance, color, odor, flavor, texture, and over-all acceptability of processed products with different natural preservatives were liked moderately by the majority of the taste panelists. Those treated with salt were P2.00 lower in production cost than those in the other treatments.

INTRODUCTION

Many of our old time delicacies like “linagpang manok,” “ginataang manok,” “tinolang manok,” and the like made of Darag native chicken were commonly cooked in the rural areas. Darag native chicken is predominant in Region VI and it had amino acids that contribute to its distinctive taste. One can taste these foods when they go on vacation to their respective provinces. However, it could not be stored longer because it is easily spoiled. Some Filipinos who migrated to other countries or places reminisce the taste of these foods. These old time delicacies can be brought to other places by proper preservation without using hazardous preservatives. The busy life in work and limitation on knowledge in preparing the delicacies can be a hindrance. Therefore, one way of doing this is through the processing of instant food.

Many studies were conducted in processing native chicken into tocino, ham, and chorizo. These processed products were preserved using “salitre” which lengthen the shelf life and enhances the flavor. However, frequent eating of products preserved with this substance may cause illness (Refuerzo, 2002; Wikipedia, 2006). There were 41 second year high school students of the Pines City National High School Quezon Hill Annex poisoned by eating processed meat treated with salitre (Sun Star, 2002). On the other hand, the use of butylated hydroxyanisole (BHA) was reported to cause cancer (tumor) in animals such as tumor in the forestomach of rodents and liver of fish (US FDA, 2006). Sodium nitrate used in preserving ham, bacon, and sausages is banned in Norway and Germany because it can cause stomach cancer (Freedomyou, 2006). Excessive use of monosodium glutamate can cause shortness of breath, chest pain, irregular or rapid heartbeat, vomiting, and many others as reported by Food Democracy (2006). It is suggested that using or eating food with the said preservatives should be minimized or totally eradicated to prevent the ill effects.

These scenarios have prompted some researchers to conduct studies related to the use of natural preservatives such as Vitamin E, ascorbic acid, vinegar, salt, and a lot more (Schanauser, 2004; Gravlin, 2005; Lecos, 1984; Berry, 2005; Dreamworld, 2005). Vitamin E also known as Alpha-tocopherol is used as anti-oxidant since 1949 in bakery products, breakfast cereals, beverages, poultry products, soups, and infant formulas. It prevents the fats and oil of the mentioned products from becoming rancid; however, when it was used in dog

food it spoiled faster than those with butylated hydroxyanisole (BHA). The same property was also observed among ascorbic acids. Vitamin E and ascorbic acid are two of the most common natural preservatives used in preserving dog food but neither is as effective as the artificial preservatives. Vinegar serves as a natural preservative and flavoring agent for the food industry. It contains a combination of subtle flavor components and nutrients, which enhance many other flavors in the products. Natural vinegar also stops bad smell, which brings sanitary benefits.

The use of natural preservatives such as salt and vinegar is common when preparing native chicken delicacies. Vinegar gets rid of the musky odor and lengthens the shelf life of food, whereas, the salt used to give flavor. Traditional native chicken dishes like “tinolang manok” and “binakol” use the salt and vinegar to enhance the flavor and for “adobo” these lengthen the shelf life for several days. These delicacies are common in the rural areas but are seldom found in urban areas besides being expensive. So far, no studies yet had been conducted to make these native delicacies into a ready-to-cook preparation. It is in this premise that this study was conducted.

Objectives of the Study

This study aims to determine which of the natural food preservatives can lengthen the shelf life and acceptability of instant “ginataang manok. Specifically, this study like to determine the perceived differences in terms of shelf life, appearance, color, odor, flavor, texture, and over-all acceptability of processed native chicken.

Significance of the Study

The results of this study will be beneficial to the native chicken processors, animal science students, food nutritionists, researchers, raisers, and consumers as to the innovation of preserving the ready-to-cook Instant Ginataang Manok. Study findings will open the opportunity on the first-time-ever ready to cook native chicken dish among the public. This will also serve as reference for future studies. It will also motivate native chicken raisers to raise more native chicken to cope with the increase in the demand.

Time and place of Study

This study was conducted from January until May of 2006. Processing and packing were done at the Central Philippine University College of Agriculture Laboratory Room, Jaro, Iloilo City while the tasting evaluations were conducted at the CPU University Research Center War Room, Franklin Hall, Jaro, Iloilo City.

METHODOLOGY

Experimental Treatments and Design

The preservatives used for processing instant “ginataang manok” were 500mg Ascorbic acid (Vit C), 500mg Vitamin E, and ordinary table salt. Freshly cooked “ginataang manok” was also prepared as basis for comparison. The treatments were laid out in a completely randomized design with three observations each.

Processing

Only meat of 15 hens of Darag plumage, weighing between 1100 to 1300 grams and aging six to seven months native chicken mongrels were used in this study. The meat with bones from all parts except for the “adidas” were cut into 100 gram slices each then pressure cooked at 35-40 psi for 10 minutes. Three tablets of 500 mg generic ascorbic acid were used for every kilo of meat during the pressure-cooking. The same amount was used for Vitamin E but for ordinary table salt, three tablespoons were used. Other ingredients used during pressure-cooking were four leaves of fresh lemon grass, 10 grams of chopped onion, and 10 grams of macerated garlic. These were mixed together with three cups of water for every kilo of meat. The pressure-cooking was done separately for each treatment to avoid contamination.

After pressure-cooking, all the meat were separated from the bones. The shredded meat from the different body parts was mixed homogenously. This was oven-dried at 150°C for about an hour and a half. It was left for five minutes in the oven to cool then was packed directly at 20 grams each in a 0.007mm transparent high-density

polyethylene (HDPE) plastic and sealed using an electric sealer. The seasonings included five milliliters of olive oil, two grams iodized salt, half teaspoon of powdered garlic, and ten grams powdered coco milk. Each seasoning was packed in HDPE plastic and sealed. Shredded meat and respective seasonings were packed together in a sachet. These were stored under room temperature.

Data Collected and Tasting Evaluation Procedure

Different shredded meat characteristics were gathered and used as basis in the costing of the final products. The following data were collected to determine the meat characteristics:

1. Fresh weight and weight after pressure-cooking were determined by weighing the meat before and after pressure-cooking.
2. Shrinkage percentage. This was computed by dividing the weight after pressure-cooking by the weight before cooking. Then the quotient was multiplied by 100.

$$\% \text{ Shrinkage} = \left(\frac{\text{wt after pressure-cooking}}{\text{wt before pressure-cooking}} \right) \times 100$$

3. Meat percentage was computed by dividing the weight of the meat by the total weight of meat and bone before shredding then multiply the quotient by 100.

4. Bone percentage was calculated by dividing the weight of the bone by the total weight of the bone and meat before shredding.

5. Meat and bone ratio were determined by dividing the weight of the meat to the weight of the bone.

$$\text{Meat to bone ratio} = \frac{\text{weight of the meat}}{\text{weight of bone}}$$

6. Percentage of moisture extracted was computed by first before oven drying from the weight after oven drying, then, divided by the weight before oven drying times 100.

$$\% \text{ Moisture extracted} = \left(\frac{\text{wt before} - \text{wt after oven drying}}{\text{wt before oven drying}} \right) \times 100$$

Taste evaluations of processed products were done by five female staff members of the CPU Human Resource Department and five male faculty of the College of Engineering. They did the tasting evaluation for ten weeks to determine the acceptability and sensory shelf life of the products. Over-all acceptability, color, appearance, flavor, texture and odor were rated by the evaluators using a scale of 1 to 9 with 9 as extremely liked and 1 as extremely disliked. The shelf life testing employed the Weibull Hazard analysis test letting the evaluators to rate the product as acceptable or non-acceptable for further tasting evaluation. Proper procedure for tasting was discussed with the evaluators prior to actual test to eliminate biases in giving a rate.

Data Analysis and Presentations

The data on meat characteristics were analyzed using the analysis of variance for completely randomized design. Significant differences among the treatment means were further analyzed using the Duncan's multiple range test. Other data except for financial analysis were analyzed using percentages.

RESULTS AND DISCUSSIONS

Shredded Meat Characteristics

The results shown in Table 1 reveal that the meat of Darag native chicken treated with Vit C had the lowest shrinkage percentage (33.33%). Those treated with table salt had significantly ($p < 0.01$) the highest shrinkage of 41.67%. The salt treated meat had the highest ($p < 0.01$) meat to bone ratio of 2.89 g of meat for every gram of bone. This was followed by meat treated with Vitamin C while those with Vitamin E got the lowest ratio of 2.48. Moisture extracted from the meat of Darag native chicken ranged from 57.83% to 65.67%.

Table 1. Shredded Native Chicken Meat Characteristics as Affected by Different Natural Preservatives in the Phases of Processing (mean only)

Meat Characteristics	Natural Preservatives		
	Vitamin C	Vitamin E	Rock Salt
Fresh wt (g)	1, 200	1, 200	1, 200
Wt after pressure cooked (g)	800 ^a	730 ^b	700 ^b
Shrinkage (%)	33.33 ^c	39.33 ^b	41.67 ^a
Bone (%)	26.67 ^b	28.67 ^a	25.67 ^c
Meat (%)	73.33 ^a	71.33 ^b	74.33 ^a
Meat & Bone Ratio	2.72 ^b	2.48 ^c	2.89 ^a
Wt of meat after oven-drying (g)	200.00 ^c	220.00 ^a	205.00 ^b
Moisture extracted (%)	65.67 ^a	57.83 ^c	60.67 ^b

^{ab} Treatment means in a row with the same letter superscript do not significantly differ at the 1% level of probability by Duncan's multiple range test

Sensory Shelf Life of Processed Products

The majority of the evaluators rated the odor, appearance, and taste of the processed products with Vit C, Vit E, and salt to be acceptable for the whole duration of evaluation (Table 2). This means that instant “ginataang manok” with natural preservatives were suited for consumption up to ten weeks after processing (WAP). The product with Vit C was considered by a few of the evaluators as not acceptable for further testing because they detected rancidity on it. Only a few of the evaluators considered the processed products as non-acceptable. This implied that the natural preservatives helped to lengthen the shelf life of processed products and support the results of studies conducted by Schanauzer (2004), Gravlin (2005), Lecos (1984), Berry (2005), and Dreamworld (2005).

Table 2. Weibull Hazard Analysis of the Processed Products for Weekly Tasting Evaluation (Shelf life).

Week After Processing	With Vit C		With Vit E		With Salt	
	Acceptable	Non – acceptable	Acceptable	Non – acceptable	Acceptable	Non – acceptable
	----- % of Evaluators -----					
1.00	81.82	11.12	100.00	-	100.00	-
2.00	100.00	-	100.00	-	81.82	18.18
3.00	87.50	12.50	100.00	-	75.00	25.00
4.00	88.88	11.12	88.88	11.12	100.00	-
5.00	90.91	9.09	72.73	27.27	81.82	18.18
7.00	87.50	12.50	100.00	-	100.00	-
8.00	88.88	11.12	77.78	22.22	88.88	11.12
9.00	88.88	11.12	100.00	-	100.00	-
10.00	100.00	-	100.00	-	100.00	-

Appearance Acceptability

As to the acceptability of the processed products in terms of appearance, results showed that most of the taste panelists liked moderately the appearance of processed products with Vitamin C, Vitamin E, and salt (Table 3). It was the fresh cooked ginataang manok that was liked very much by most of the taste panelists. However, there were some who disliked slightly to moderately all the processed products.

Table 3. Percentage Distribution of Evaluators Who Rated the Appearance of Instant “Ginata-ang Manok” - Summary Table

Preferences	Vitamin C	Vitamin E	Salt	Fresh Cooked
	----- % of Evaluators -----			
Disliked moderately	0.6	0.6	0	0
Disliked slightly	3.2	3.8	1.3	1.3
Neither liked nor disliked	13.3	11.4	10.1	0
Liked slightly	26.6	24.1	32.3	11.4
Liked moderately	42.4	46.2	39.9	29.7
Liked very much	12.7	12.7	14.6	43.0
Liked extremely	1.3	1.3	1.9	14.6
Total	100.0	100.0	100.0	100.0

Acceptability of Color

Most of the taste panelists liked moderately to liked very much the color of freshly cooked “ginataang manok” (Table 4) while some (10.8%) liked it extremely. Processed products with Vit C, Vit E, and salt were liked slightly to moderately by most of the taste panelists. Few of the panelists disliked slightly to moderately the color of processed products. None of the panelists rated the fresh cooked chicken as disliked slightly and disliked moderately indicating that they liked the color.

Table 4. Percentage Distribution of Evaluators Who Rated the Color of Instant “Ginata-ang Manok” - Summary Table

Preferences	Vitamin C	Vitamin E	Salt	Fresh Cooked
	----- % of Evaluators -----			
Disliked moderately	0	1.3	0	0
Disliked slightly	1.9	2.5	1.3	0
Neither liked nor disliked	12.7	9.5	11.4	2.5
Liked slightly	30.4	27.2	23.4	11.4
Liked moderately	43.7	39.2	48.7	33.5
Liked very much	10.1	18.4	13.3	41.8
Liked extremely	1.3	1.9	1.9	10.8
Total	100.0	100.0	100.0	100.0

Acceptability of Odor

Most of the panelists liked moderately to liked extremely the odor of freshly cooked “ginataang manok” (Table 5). However, more than 40% of the taste panelists liked moderately the odor of processed products with Vitamin E and salt. Most of them liked slightly to liked moderately the odor of instant “ginataang manok” with Vitamin C. Few of the taste panelists liked extremely the odor of the processed products with natural preservatives. This demonstrates that Vitamin E and salt did not greatly affect the odor of processed products than those treated with Vitamin C.

Table 5. Percentage Distribution of Evaluators Who Rated the Odor of Instant “Ginata-ang Manok” - Summary Table

Preferences	Vitamin C	Vitamin E	Salt	Fresh Cooked
	----- % of Evaluators -----			
Disliked very much	0	0	0.6	0
Disliked moderately	1.9	2.5	1.3	1.3
Disliked slightly	4.4	7.0	5.7	1.3
Neither liked nor disliked	12.0	9.5	12.0	1.9
Liked slightly	37.3	27.2	23.4	17.1
Liked moderately	32.9	40.5	41.8	28.5
Liked very much	10.8	12.7	14.6	39.2
Liked extremely	0.6	0.6	0.6	10.8
Total	100.0	100.0	100.0	100.0

Acceptability of Flavor

Data in Table 6 show the preferences of taste evaluators when it comes to the flavor of “ginataang manok”. Most of the evaluators liked very much the taste of freshly cooked “ginataang manok”, whereas, the instant “ginataang manok” with Vit C, Vit E, and salt were liked slightly to liked moderately by most of the evaluators. However, there were 20.9% of the panelists who liked very much the flavor of instant “ginataang manok” treated with salt. This means that the use of Vit C and Vit E did not enhance the flavor of processed products.

Table 6. Percentage Distribution of Evaluators Who Rated the Flavor of Instant “Ginata-ang Manok” - Summary Table

Preferences	Vitamin C	Vitamin E	Salt	Fresh Cooked
	----- % of Evaluators -----			
Disliked very much	0.6	0	0	0.6
Disliked moderately	1.3	3.2	1.9	0.6
Disliked slightly	9.5	10.1	5.1	1.9
Neither liked nor disliked	20.9	13.9	11.4	3.2
Liked slightly	29.7	27.8	24.1	12.0
Liked moderately	26.6	28.5	34.8	24.7
Liked very much	10.8	15.8	20.9	39.2
Liked extremely	0.6	0.6	1.9	17.7
Total	100.0	100.0	100.0	100.0

Acceptability of Texture

When the evaluators were asked to rate the acceptability of the texture of instant “ginataang manok”, most of them indicated that they liked very much to liked extremely the fresh cooked product. On the other hand, most of the evaluators only liked slightly to moderately the product treated with Vitamin C, Vitamin E, and salt. However, none of the evaluators disliked very much the texture of processed products, which entail that the natural preservatives slightly enhanced it as compared to freshly cooked. These results are shown in Table 7.

Table 7. Percentage Distribution of Evaluators Who Rated the Texture of Instant “Ginata-ang Manok” - Summary Table

Preferences	Vitamin C	Vitamin E	Salt	Fresh Cooked
	----- % of Evaluators -----			
Disliked very much	0	0	0	0.6
Disliked moderately	1.9	0.6	1.3	1.3
Disliked slightly	8.9	5.7	5.1	0.6
Neither liked nor disliked	20.9	15.8	17.1	1.9
Liked slightly	34.8	33.5	31.0	16.5
Liked moderately	25.9	29.1	34.2	25.9
Liked very much	7.0	15.2	10.1	38.6
Liked extremely	0.6	0.6	1.3	14.6
Total	100.0	100.0	100.0	100.0

Over-all Acceptability of Instant “Ginataang Manok”

The over-all acceptability of the processed products compared with freshly cooked “ginataang manok” is presented in Table 8. It was found that most of the evaluators liked moderately both the freshly cooked instant “ginataang manok” and those with natural preservatives. More than 10% of the evaluators liked very much the freshly cooked instant “ginataang manok” and the one with salt. This reveals that the used of salt alone as preservatives to instant “ginataang manok” can be done. None of the taste evaluators disliked very much the processed products with natural preservatives.

Table 8. Percentage Distribution of Evaluators Who Rated the Over-all Acceptability of Instant “Ginataang Manok” - Summary Table

Preferences	Vitamin C	Vitamin E	Salt	Fresh Cooked
	----- % of Evaluators -----			
Disliked very much	0	0	0	0.7
Disliked moderately	0	1.3	1.5	0.7
Disliked slightly	7.6	3.8	1.5	2.2
Neither liked nor disliked	20.9	9.5	12.5	6.6
Liked slightly	31.0	25.9	25.7	27.2
Liked moderately	34.8	35.4	44.9	45.6
Liked very much	5.1	9.5	12.5	16.9
Liked extremely	0.6	0.6	1.5	0.7
Total	100.0	100.0	100.0	100.0

Production Cost and Other Possible Income

The salt treated instant “ginataang manok” incurred a processing cost per pack of P30.79 while the Vit E treated and Vit C treated products marked P33.29 and P33.96, respectively (Table 9). Other income that can be derived from instant “ginataang manok” are the sales coming from the liver, gizzard, head, adidas, and small intestines (isaw). This can be sold or processed into other delicacies. The blood, bones and feather can be used as animal feeds. Rejected visceral organs can be fed to fishes, e.g. hito and others. If these are allocated a price, there will be another form of profit or these can be priced to reduce the processing cost of instant “ginataang manok”.

Table 9. Production Cost of Instant “Ginataang Manok” with Vit C, Vit E, and Salt

Particulars	With Vitamin C	With Vitamin E	With Salt
Ingredients	----- ₱ -----		
Dressed Darag native chicken (1.20 kg)		194.00	
Garlic (cloves) (6 cloves)		3.00	
Lemon grass (8 leaves)		0.50	
Onion (10 g)		0.50	
Salt (6 tbs)		2.00	
Water (1.8 li)		2.50	
Preservatives	12.00	30.00	
Other cost			
Electric		10.00	
LPG		6.00	
Depreciation (equipments)		1.50	
Labor		50.00	
Plastic packs		5.00	
Total	287.00	305.00	275.00
Number of pack produced @ 20 g each	11	12	12
Price per pack of shredded meat	26.09	25.42	22.92
Seasoning per pack			
Garlic (powdered) (1/4 teaspoon)		1.50	
Olive oil (10 ml)		1.80	
Powdered coco-gata		4.57	
Final cost per pack	33.96	33.29	30.79

Discussion

The findings of this study support the results of the investigations of Schanauzer (2004), Gravlin (2005), Lecos (1984), Berry (2005), and Dreamworld (2005) on the use of Salt, Vitamin E, and Ascorbic Acid as natural preservatives specifically on poultry products. It prevented the spoilage of the Instant “Ginataang Manok” for ten successive weeks after processing. The use of table salt solely could prevent the spoilage, whereas, the adding of Vitamin E and ascorbic acid increased the cost of processing. Acceptance of processed product in terms of appearance, color, odor, texture, flavor, and over-all acceptability was liked moderately. Further study should be made to increase the level of acceptance among the taste evaluators. Since no study yet was conducted in the processing of Instant

“Ginataang Manok,” the findings on these parameters will serve as baseline for future studies.

The results further implied that the use of salt as natural preservative to process products similar to this study can help in the prevention of food poisoning and other ill effects of synthetic preservatives as reported by Refuerzo (2002), Wikipedia (2006), Sun Star (2002), US FDA (2006), Freedomyou (2006), and Food Democracy (2006). The findings will open the opportunity on the use of natural preservatives like the table salt on the processing of native chicken convenient food products for a cheaper cost. It will help produce safer native chicken products.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings of this study, the instant ginataang Darag native chicken meat treated with natural preservatives can be stored under room temperature and will not deteriorate for ten weeks after processing. Instant “ginataang manok” treated with salt had the highest shrinkage after pressure-cooking and the highest meat to bone ratio. Vitamin C treated meat had the highest moisture extracted ($P < 0.1$). The appearance, color, odor, flavor, texture, and over-all acceptability of processed products with different natural preservatives were like moderately by most of the taste panelists. Based on the aforementioned conclusions, it is recommended that further study should be conducted to enhance the quality of instant “ginataang manok” before it will be introduced in the market. Exploration on the possible usage of dried shredded meat on different dishes and possible processing of these in making of high protein snacks as replacement for junk foods are also recommended.

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