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THE EFFECT OF DIFFERENT HERBS ON THE SENSORY CHARACTERISTICS OF FRANKFURTER SAUSAGE

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Abstract

This study aims to explore the use of skim milk as fat replacer and at what level must use to replace pork fat in frankfurter sausage product. Emulsified frankfurter products are higher in fat than whole muscle fresh or cured products. Most cooked and smoked frankfurters may contain up to 30% fat but the industry average is approximately 20% (Keeton, 1994). In conventional frankfurters, animal fat is an essential ingredient representing 20–25% of overall composition. Animal fat is considered as rich in saturated fatty acids with negative effect on human health. From a nutritional point of view, it is of interest to reduce this high levels of lipids, but the elimination or reduction of fat reduces sensory quality in the final product, in particular affecting its texture (Ordonez et al., 2001).

The study is delimited only to the effect of different herbs on the sensory characteristics of frankfurter sausage with the following parameters that will be using such as saltiness and folding test and the influence of the five herbs/spices to be added [white pepper, basil, dill, rosemary and citron pepper].

Keywords: skim milk, frankfurter sausage, herbs, Southern Mindanao

INTRODUCTION

Health organizations all over the world have promoted lower intake of total dietary fat, saturated fatty acids and cholesterol and increasing the consumption of complex carbohydrates as a means of preventing cardiovascular heart disease. Recommended diet is one in which no more than 30% of the calories are supplied by fat. Studies have shown that reductions in fat intake can result in a 10% reduction of the risk for heart disease and if persons who are overweight lose weight in addition to modifying their diet, they can lower their risk for cardiovascular heart disease by 20% (Giese, 1992). With the increased interest in reducing the ingestion of fat, low-fat

products are being developed, as they are perceived as healthier (Grigelmo-Miguel et al., 1999).

Emulsified frankfurter products are higher in fat than whole muscle fresh or cured products. Most cooked and smoked frankfurters may contain up to 30% fat but the industry average is approximately 20% (Keeton, 1994). In conventional frankfurters, animal fat is an essential ingredient representing 20–25% of overall composition. Animal fat is considered as rich in saturated fatty acids with negative effect on human health. From a nutritional point of view, it is of interest to reduce this high levels of lipids, but the elimination or reduction of fat reduces sensory quality in the final

product, in particular affecting its texture (Ordonez et al., 2001).

Fat replacements or substitutes are ingredients that contribute a minimum of calories to formulated meats and dramatically alter flavor, juiciness, mouth-feel, viscosity or other sensory and processing properties. Many substitutes are used for partial replacement of the fat and can be categorized as: leaner meats (fat-reduced beef, partially defatted chopped beef/pork, mechanically separated or deboned beef/pork/poultry/turkey, added water), protein-based substitutes (blood plasma, egg proteins, milk caseinates, non-fat dried milk, oat bran, soy protein flour/concentrates/isolates, surimi, vital wheat gluten, wheat proteins, whey proteins), carbohydrate substitutes (fibres, cellulose, starches, maltodextrins, dextrins, hydrocolloids or gums) and synthetic compounds (Polydxtrose Olestra or sucrose polyester) (Keeton, 1994).

Several studies have reported attempts to restore juiciness, flavors and mouth-feel that are lost when fat is removed, and have used functional additives in conjunction with the addition of water. Among such additives are starch, dietary fibers, soy and milk proteins, various gums, carrageenan and egg solids (Foegedıng & Ramsey, 1986; Lin

et al., 1988; Claus et al., 1990; Claus & Hunt, 1991; Giese, 1992; Troutt et al., 1992; Dexter et al., 1993; Keeton, 1996; Chang & Carpenter, 1997; Crehan et al., 2000; Luruen˜ a-Martı´nez et al., 2000; Pappa et al., 2000; Garcı´a et al., 2002).

Objectives of the study

The objectives of the study are as follows:

1. To evaluate the influence of the addition of herbs on the sensory characteristics of frankfurter sausage in terms of texture, color, taste, aftertaste, saltiness; and folding test.
2. To determine the marketability of frankfurter sausage with herbs using the monadic test.

METHODS

Experimental Design

The study was carried – out with six treatments and was conducted with 30 members of the panel of tasters. The test ingredients used and the formulation of each treatment was presented in Table 1. The members of the panel of tasters were invited faculty members and students of the Department of Animal Science of the College of Agriculture of the University of Southern Mindanao. The treatments were as follows:

Treatment 1—white pepper

Treatment 2-- basil

Treatment 3-- dill

Treatment 4-- rosemary

Treatment 5—citron pepper

Table 1. Treatments and formulation of batters

Ingredients	A	B	C	D	E	F

Beef (g)	700	700	700	700	700	700
Pork (g)	300	300	300	300	300	300
Skim milk (cup)	1/2	1/2	1/2	1/2	1/2	1/2
Accord (tsp)	1/2	1/2	1/2	1/2	1/2	1/2
Carageenan (tsp)	1/2	1/2	1/2	1/2	1/2	1/2
Salt (tbsp)	1/2	1/2	1/2	1/2	1/2	1 1/2
Garlic (tsp)	1/2	1/2	1/2	1/2	1/2	1/2
Prague powder (tsp)	1	1	1	1	1	1
Brown sugar (tbsp)	8	8	8	8	8	8
Black pepper (pinch only in all treatments)						
White pepper (tbsp)	1					
Basil (tbsp)		1				
Dill (tbsp)			1			
Rosemary (tbsp)				1		
Citron-pepper (tbsp)					1	

Preparation of Frankfurters

Frankfurter sausage was prepared at the meat processing laboratory of the Department of Animal Science. Fresh boneless beef and lean pork cuts from the shoulder were used as raw materials. The beef were trimmed of visible fat and were minced through a 3-mm plate using a Mado mincer MEW 5102 (Domhan, Germany). Pork with fat was also minced. The meat was weighed, and packed separately.

The common ingredients used per kg of batter were skim milk, carageenan and accord, table salt, curing salt and black pepper.. The meat and ingredients were mixed in 5-kg batches prior to stuffing. Total mixing time was 10– 15 min and the final temperature of batter was 10.0– 12.3 ^{0}C. Prepared frankfurter mixture were stuffed using a stuffer (Handtmann, VF100/240, Biberach, Germany) into 14-mm diameter casings. The frankfurters were hung, were smoked and were steamed for 30 minutes. After steaming, the sausages were cooled and fried in little oil until golden brown prior to evaluation.

Folding test

The folding test is a simple and fast method to measure the quality of gel springiness in frankfurters. The test was carried out according to Lanier (1992). Test specimens were prepared by cutting cooked frankfurters into 3 mm thickness. They were held between the thumb and the forefinger in order to observe the way they break and then evaluated according to the following score: 1 for breaks by finger pressure; 2 for cracks immediately when folded into half; 3 for cracks gradually when folded into half; 4 for no cracks shown after folding in half and 5 for no cracks shown after folding twice.

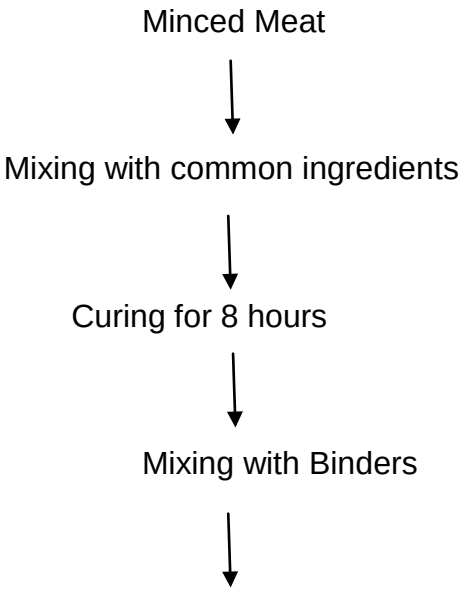

Figure 1: Flowchart in the making of frankfurter sausage

Sensory analysis

A sensory panel were asked to evaluate the effect of reducing salt and addition of herbs on sensory properties of frankfurters. The Thirty panelists from faculty members and students of the Department of Animal Science were invited to evaluate the frankfurter sausages. Before presentation to the panel, the samples were cooked. After cooking, the samples were coded using letters and were randomly presented to the panelists. The panelists were asked to evaluate texture, color, taste, and aftertaste of the samples using a 9 point hedonic scale as follows:

9 – Like extremely
8 – like very much
7 - Like moderately
6 – Like slightly
5 – Neither like nor dislike
4 – dislike slightly
3 – dislike moderately
2 – dislike very much
1 – dislike extremely

For saltiness of the product, a 5 point hedonic scale will be used as follows:

5 – extremely salty

4 – Very salty

3 – Moderately salty

2 - Slightly salty

1 – Not salty

Statistical Analysis

Data were analyzed using the Friedman Test used usually to detect differences in treatments across attempts.

RESULTS AND DISCUSSIONS

Appendix Table 1. Texture rating on the sensory characteristics of Frankfurter Sausage with different herbs. University of Southern Mindanao, Kabacan, Cotabato.

Parameter	Treatments T1 T2 T3 T4 T5	Control	SED	Stg.
Texture	7.24 6.38 6.66 7.21 7.17	6.93		**

Texture

Treatment B (basil) got the lowest mean value of 6.38, followed by treatment B (dill) having a mean value of 6.66 then treatment F (no enhancement) got a mean value of 6.93, treatment E (citron pepper) with a mean value of 7.21 and with the highest mean value was achieved in treatment A (white pepper) respectively.

Analysis of variance revealed a highly significant result on its texture as one of the sensory characteristics of frankfurter sausage with different herbs enhancement such as white pepper, basil, dill, rosemary, and citron pepper which therefore implies that the enhancement gave a highly significant variations in terms of texture considering the proper mixture and application of herbs/spices used in the study.

Appendix Table 2. Color rating on the sensory characteristics of Frankfurter Sausage with different herbs. University of Southern Mindanao, Kabacan, Cotabato. .

Parameter	Treatments T1 T2 T3 T4 T5	Control	SED	Stg.
Color	7.31 6.17 6.76 7.24 7.21	6.90		**

Color

Color as one of the sensory characteristics for frankfurter sausage gave a highly significant variations among treatment means as revealed in the analysis of variance in table 1. Treatment B got the lowest mean value of 6.17 followed by treatment C (dill), treatment F (control) , treatment E (citron pepper), treatment D (rosemary), treatment A (white pepper) having a mean value of 6.76, 6.90, 7.21, 7.24, and 7.31 respectively with treatment the control got the highest mean value.

Based on the analysis of variance the color parameters reveled a highly significant result among treatment means as shown in the analysis which implies further that enhancement of herbs/spices to the batter of carabeef for frankfurter sausage showed great differences among different enhancement. With its uniform fire cooking mode, with uniform time of cooking and with pepper dosage of enhancement. Thus, boosting the highly significant difference.

Appendix Table 3. Taste rating on the sensory characteristics of Frankfurter Sausage with different herbs. University of Southern Mindanao, Kabacan, Cotabato. .

Parameter	Treatments T1 T2 T3 T4 T5	Control	SED	Stg.

Taste	6.90 5.62 6.72 5.93 6.86	7.44		**

Taste

Table 3 present the taste preference of the panelists for frankfurter sausage, Treatment B (basil) got the lowest mean value of 5.62 then followed by treatment D (rosemary)0 with a mean value of 5.93, then treatment C (dill), treatment E (citron pepper), then treatment A (white pepper), then treatment F (control) with a mean values of 6.72, 6.86, 6.90, 7.44, respectively, treatment F (control or no enhancement) got the highest mean value of 7.44 thus gave a highly significant result in the analysis of variance. This implies that frankfurter sausage with different enhancement such as white pepper, basil, dill, rosemary, and citron pepper gave a great differences in terms of the taste considering the proper management practices tendered by the researcher.

Appendix Table 4. After taste rating on the sensory characteristics of Frankfurter Sausage with different herbs. University of Southern Mindanao, Kabacan, Cotabato. 2013 .

Parameter	Treatments T1 T2 T3 T4 T5	Control	SED	Stg.
After Taste	7.00 6.17 6.90 6.17 7.03	7.45		**

After taste

Appendix Table 4 present the result of after taste for the enhanced and not enhanced frankfurter sausage. Treatment B (basil) yield the lowest mean value of 6.17, followed by treatment D (rosemary), then treatment C (dill) then treatment A (white pepper) then treatment E (citron pepper) having a mean values of 6.17, 6.90, 7,00, 7.03 respectively. Treatment F (control) got the highest mean value of 7.45 among treatment means.

Analysis of variance showed a highly significant result which implies that frankfurter sausage on its after taste sensory characteristics yield a highly significant variation thus proved by the ANOVA.

Appendix Table 5. Summary ratings on the sensory characteristics of Frankfurter Sausage with different herbs. University of Southern Mindanao, Kabacan, Cotabato. 2013

	PARAMETERS			
TREATMENTS	Texture	Color	Taste	Aftertaste
White Pepper	7.24^{ab}	7.31^{a}	6.90^{ab}	7.00^{ab}
Basil	6.38^{c}	6.17^{d}	5.62^{d}	6.17^{c}
Dill	6.66^{bc}	6.76^{cd}	6.72^{bc}	6.90^{ab}
Rosemary	7.21^{ab}	7.24^{ab}	5.93^{cd}	6.17^{bc}
Citron Pepper	7.17^{ab}	7.21^{ab}	6.86^{ab}	7.03^{a}
Without Herb (Control)	6.93^{a}	6.90^{bc}	7.44^{a}	7.45^{a}
Significance	**	**	**	**

NOTATION; means having a common letters are not significant with each other.

** means with highly significant result [FRIEDMAN TEST ANOVA] .

Appendix Table 6. Rating on the saltiness of Frankfurter Sausage with different herbs. University of Southern Mindanao, Kabacan, Cotabato. 2013 .

Parameter	Treatments T1 T2 T3 T4 T5	Control	SED	Stg.

Saltiness	2.28 2.28 2.38 2.52 2.45	2.21		ns

Table 2 presents the rating on the saltiness and folding test on frankfurter sausage with different herbs.

Saltiness

Treatment F (control) and treatment A (white pepper) got the lowest mean value of 2.21 and 2.28, followed by treatment B (basil) with a mean value of 2.28, followed by treatment C (dill) with a mean value of 2.38, then treatment E (citron pepper) with a mean value of 2.45.The highest mean value was taken in treatment D (rosemary) with a mean value of 2.52.

Analysis of variance showed a no significant result among treatment means which implies that addition of herbs and spices did not alter the saltiness of frankfurter sausage as revealed in the analysis of variance and was proved by the fact that the reduction of salt to beef has no effect to the saltiness.

Appendix Table 7. Ratings on the folding test of Frankfurter Sausage with different herbs. University of Southern Mindanao, Kabacan, Cotabato. 2013 .

Parameter	Treatments T1 T2 T3 T4 T5	Control	SED	Stg.
Folding Test	2.10 2.38 2.59 2.48 2.52	3.34		**

Folding test

Folding test present in table 2, Treatment A (white pepper) got the lowest mean value of 2.10, followed by treatment B with a mean value of 2.38, then followed by

treatment D (rosemary) with a mean value of 2.48, then treatment E (citron pepper), treatment5 C (dill) with a mean value of 2.52 and 2.59 respectively. The highest mean value was achieved in treatment F (control) with 3.34.

Analysis of variance revealed a highly significant result among treatment means which implies that enhancement of white pepper, basil, dill, rosemary and citron pepper to beef greatly alter the folding test of frankfurter sausage hence, the effect.

Appendix Table 8**.** Summary ratings of saltiness and folding test of Frankfurter Sausage with different herbs. University of Southern Mindanao, Kabacan, Cotabato. 2013 **.**

	PARAMETERS	
TREATMENTS	Saltiness	Folding Test
White Pepper	2.28	2.10^{c}
Basil	2.28	2.38^{bc}
Dill	2.38	2.59^{b}
Rosemary	2.52	2.48^{bc}
Citron Pepper	2.45	2.52^{bc}
Without Herb (Control)	2.21	3.34^{a}
Fc		
Significance	ns	**

B: Folding Test Scores
1- for breaks by finger pressure
2- for cracks immediately when folded into half
3- for cracks gradually when folded into half
4- for no cracks shown after folding in half
5- for no cracks shown after folding twice

NOTATION; Means having common letters are comparable with each other.

** meaning with highly significant results among treatment means.

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