

## EVALUATION OF GOOSE MEAT PRODUCTS

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**SUMMARY:** Average shear force value (3,9 kg) was lower in goose breast ham than in cured smoked pork loin (5,5 - 6,5 kg). The goose breast meat may be considered as tender (average shear force value: 5,2 kg). It was found that goose sausage of consistency similar to that of pork sausage were obtained when the same quantities of basic ingredients (water, fat and protein) were used and technological procedures employed were similar to those used in the manufacture of pork sausage. Goose meat products were darker than pork products. We attribute this difference mainly to the myoglobin contents of goose meat (myoglobin values ranged from 3,9 - 7 mg/g of tissue). Average cooking loss value of cured smoked pieces from breast were 33,6%. This could be explained by the dropping fat that is high in goose fattened in order to develop liver suitable for "foie gras". Sausages lost like weight than pork sausage. Sensory evaluation data revealed that "Choice" ham and "Mortara" sausage scored more for all the characteristics as compared to other tested products. The average scores of acceptability were 6,4 and 6,2 respectively. Other products scoring more than five points.

**INTRODUCTION:** Goose products are manufacture mainly during christmas due to traditional habits in some countries. However, goose meat production could provided an alternative market to broiler and turkey. In Cuba goose are force-feed and fattened in order to develop liver suitable for "foie-grass" and meat for the manufacture of a wide variety of smoked sausages and hams.

Goose meat products have grown significantly in popularity in recent years but literature about technological and quality characteristics have not been published.

The main objective of this work is to evaluate cooking losses, the consistency, color and sensory quality and acceptability of some products made from goose meat.

**MATERIALS AND METHODS:** Meat from geese of the Landes breed force-feed and fattened to produce fatty liver were used for this study. The following goose meat products were analyzed: "Mortara" sausage, "Choice" ham (filled in artificial casing and goose neck skin) Goose Breast ham, "chorizo" type sausage and Frankfurter-type sausage.

"Mortara" sausage is a traditional italian product made up of deboned goose and pork meat, half of which is emulsified with sodium caseinate, sodium tripolyphosphate, sodium chloride, goose fat ice and spices. The rest of the minced meat is blended with the emulsion and filled in casings. "Choice" ham was elaborated with deboned breast meat cut in pieces of 5 X 5 cm, after adding the brine one hour massaging was conducted in Cimber-Stal type A massager. This procedure was repeated twice every 24 h. 10% of the

batch was finely cut in the cutter and then mixed with the spices and filled.

Goose Breast Ham was produced by dip immersion process of the deboned breast meat, after molding it was wrapped in the skin and fasten with a string. The traditional technology was used for the production of chorizos and frankfurter sausages. The last one was produced from goose and pork meat in a 1:1 rate in order to avoid fat and gelatin leakage due to poultry meat low fat and water retention capacity. All products were smoked and cooked in a oven up to an internal temperature of 71°C with the same heat treatment used for similar pork products.

"Choice" ham, Breast Ham and "Mortara" Sausage and breast meat was tested using a Warner-Bratzler Shear Device mounted in an Instron Texture Machine at 10 cm/min speed and room temperature. The maximum shear force was obtained from the graphics as a measurement of the meat tenderness. A compression test was used to asses the texture profile of chorizo and frankfurter sausage at 20 cm/min speed and room temperature.

MOMCOLOR-D tristimulus colorimeter was used to make color measurements of the cut surface of the sausages and hams. The results were evaluated using Hunter system. The L, a, b values were calculated as described by Francis and Clydesdale (1975).

Sensory quality evaluation was carried out by a panel of ten trained members with seven point scale. The evaluated characteristics were: appearance, texture, flavor, juiciness, color and odor. Acceptability of goose meat products was evaluated by a group of consumers (200 people) with seven point hedonic scale. The sample scoring more than 5 points was judged as acceptable.

**RESULTS AND DISCUSSION:** Average cooking loss values for tested goose breast ham (Table 1) were high. This could be explained by the dropping fat due to subcutaneous fat content in forced-feed geese are higher than in boiler. On the other hand "Choice" ham and sausages showed cooking loss values (Table 1) similar to that of pork products. Higher marks were reported for chicken sausages (Whihiting et. al. 1981) and the semi-dried sausages (Niquitin et. al. 1983). The average values and standard deviations for shear forced parameter are given in table 2. It is noted that "Mortara" sausage showed a lower hardness than those of the hams. The results obtained are comparable to those reported previously for ground and emulsified meat sausage manufactured in our industry. The shear force values for "Choice" ham are similar to those reported for "Visking" pork ham -ranged from 2,3 to 2.9 kg- (de Hombre, 1980). Goose breast ham had soft consistency. Corresponding average shear force values were: 3,9 kg.

The texture profile parameter of chorizo and Frankfurter are present in Table 3. In comparison with other sausages hardness was considerably high in "chorizo", being at the same time, elastic and chewing. It is important to note that this values are into the

range of those reported for pork and beef "chorizo" type sausage (de Hombre, 1982).

Rheological characteristics of Frankfurter (Table 3) were similar to that reported by de Hombre (1982), in "El Parque" brand hot dog samples. Texture properties of frankfurter denoted that this product was relatively soft, breakable and slight elastic.

L, a, b values showed (Table 4) that the products elaborated with goose meat were more red and darker than those elaborated with chicken meat (Whiting et. al. 1981) and with pork meat (Stiebing et. al. 1980) due to goose meat color, which had average L value range from 31,9 to 32,8, average "a" value ranged from 9,2 to 13,3 and average "b" value ranged from 6,2 to 8,2. The total heme pigment content reported by Pikul et al. (1986) in goose meat sample (6,5 mg/g in breast and 3,9 mg/g in leg) was higher than those founded in chicken meat by these authors (0,49 mg/g in breast and 1.66 mg/g in leg) and higher than those reported by Whilaker et. al. (1977) in pork meat ( total heme pigment ranged from 1 to 4 mg/g).

These goose meat characteristics explains the results obtained in the present study.

Sensory evaluation data (Table 5) revealed that "Choice" ham and "Mortara" sausage scored more for all the characteristics as compared to other tested products and are acceptable to consumer groups. Average scored of acceptability on 7 points hedonic scale were: 6,4 and 6,2 respectively. Other products scoring more than 5 points for all sensory quality parameters and acceptability. All tested products were judged as acceptable, the typical flavour and color of goose meat hams and sausages did not have influence in deciding the overall acceptability.

**CONCLUSIONS:** Comminuted sausages produced from goose and pork meat in a 1:1 rate had similar consistency and yields to that reported in comminuted pork products when the same quantities of basic ingredients were used and technological procedures employed were similar to those used in the manufacture of pork products.

All goose meat tested products were judged as acceptable. Results obtained in the present study suggest that goose meat is a good material for the manufacture of a variety of meat products.

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Table 1 Average cooking loss values for tested goose meat products.

	Breast ham	"Choice" ham	"Chorizo" sausage	"Mortara" sausage	Frankfurter
Cooking loss %	33.6	5.9	24.1	7.8	7.4
Standard Deviation	5.7	0.5	2.3	0.8	0.7

Table 2 Average shear force values for goose breast meat, goose ham and "Mortara" sausage

	Breast meat	"Choice" ham	Breast ham	"Mortara" sausage
Shear force kg	5.2	2.3	3.9	1.0
Standard Deviation	0.5	0.1	0.2	0.2

Table 3 Average texture profile parameter for "chorizo" sausage and frankfurter.

	"Chorizo" sausage		Frankfurter	
	Average values	Standard deviation	Average values	Standard deviation
Hardness (kg)	24.5	2.6	8.1	0.7
Fracturability (kg)	-	-	4.6	0.1
Elasticity (mm)	8.8	0.1	7.2	0.1
Cohesiveness	0.28	0.01	0.15	0.01
Gumminess (kg)	6.8	0.1	1.5	0.1
Chewiness (kg.mm)	60.3	1.2	10.8	0.2

Table 4 Color of goose meat products.

		Breast ham	"Choice" ham	"Chorizo" sausage	"Mortara" sausage	Frankfurter
L	Mean	38.3	42.6	37.9	49.4	55.7
	S.D.	1.4	1.5	1.5	2.0	0.4
a	Mean	12.1	7.2	9.5	6.4	15.0
	S.D.	1.3	2.7	0.7	2.7	1.2
b	Mean	7.3	7.4	13.4	8.8	16.4
	S.D.	0.5	0.7	1.5	0.5	0.3

Mean: Average of three experiments in triplicate

Table 5 Sensory quality and acceptability of goose meat products.

		Breast ham	"Choice" ham	"Chorizo" sausage	"Mortara" sausage	Frankfurter
Appearance	Mean	5.5	6.2	5.5	6.9	5.8
	S.D.	0.4	0.5	0.6	0.4	0.5
Texture	Mean	5.8	6.5	5.7	6.7	5.7
	S.D.	0.6	0.8	0.4	0.2	0.7
Flavour	Mean	5.6	5.9	5.4	6.8	5.3
	S.D.	0.5	0.6	0.2	0.5	0.8
Juiciness	Mean	5.5	5.9	—	6.8	6.0
	S.D.	0.8	0.5	—	0.4	0.4
Color	Mean	5.6	6.0	5.3	6.5	5.3
	S.D.	0.6	0.7	0.5	0.2	0.5
Odor	Mean	5.5	5.9	5.5	6.5	5.4
	S.D.	0.2	0.3	0.6	0.2	0.2
Overall Acceptab.	Mean	5.6	6.2	5.5	6.4	5.4
	S.D.	1.0	1.0	1.1	0.8	1.5