

## **RESEARCHES CONCERNING THE INFLUENCE OF VEGETAL PROTEIN SUPPLEMENTS PROPORTION ON COMPOSITION QUALITY IN THE MANUFACTURE OF ONE SEMI-SMOKED SAUSAGE**

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### **Abstract**

*The purpose of this performed research was to establish the influence of the usage proportion of protein supplements on the quality indicators of compositions meant for filling in the manufacture of one semi-smoked sausage assortment. Organoleptic and physical-chemical analyses were performed on the composition samples manufactured in three technological variants (for each case was used one processing recipe): using the manufacture technology without protein supplements (recipe A); using the manufacture technology with 3% vegetal protein supplements (recipe B) and 5% vegetal protein supplements (recipe C), where one part of animal raw material (meat, bacon) had been replaced with vegetal protein supplements (recipe B and C).*

**Keywords:** *composition meant for filling, protein supplements, usage proportion, manufacture recipe, raw material, physical-chemical quality indicators, semi-smoked sausage.*

### **Introduction**

As essential part of life, the protein is one of the food ingredients that will never be considered obsolete or out-of-date. In every industrial country where the primary source of protein was meat, the growing concern for health was attracted by the lower percent of fatness and cholesterol protein sources. Because the meat proteins are in low quantity on the world market and they are expensive, the only accessible proteins and with a good nutrition efficiency for the human body remain vegetable proteins, soy especially, which have a meat similarity amino acid content (Frokjaer, 1994; Godon, 1996; Mahmond, 1994).

*Researches Concerning the Influence of Vegetal Protein Supplements Proportion on Composition Quality in the Manufacture of one Semi-smoked Sausage*

The use of soy protein derivatives for the processing of meat products has spread on the national and international scale due to their technique-functional, nutritional and economical advantages.

### Experimental

Organoleptic and physical-chemical analyses were performed on ten semi-manufactured samples (minced and cured pork, minced and cured beef) and fifteen samples of composition for filling (five samples from the recipe A, five samples from the recipe B and five samples from the recipe C) manufactured through three studied technological variants (five samples from each recipe) according to table 1.

**Table 1.** Semi-manufactured products and composition for filling used for examination

Analyzed product	No. of samples
Cured pork (minced meat)	5
Cured integral beef (minced meat)	5
Composition for filling without vegetable protein supplements (recipe A)	5
Composition for filling with 3% vegetal protein supplements (recipe B)	5
Composition for filling with 5% vegetal protein supplements (recipe C)	5

The organoleptic exam consisted in the appraisal of some characteristics like the exterior and slice aspect, color, consistence and smell for the *semi-manufactured* product samples (minced and cured pork, minced and cured beef), the aspect, color, smell, taste, consistence for the *filling composition* (Laslo, 1997).

The physical-chemical exam consisted of indicators determination presented in table 2.

**Table 2.** The induced physical-chemical quality indicators:

Indicator	Method of examination
Water	Drying-over at 105 °C
Protein substances	Kjeldahl method ( $N_{total} \times 6.25$ )
Fat substances	Soxhlet extraction
Salt	Mohr method
Nitrite	Griess method
Collagen	Hidroxiprolin dosing

## Results and Discussions

The results of organoleptic and physical-chemical exam for semi-manufactured product samples (minced pork and beef) and composition for filling (samples from those three technological recipes) are presented in tables 3 and 4.

**Table 3.** Organoleptic properties of analyzed compositions

Sample/ recipe	Exterior aspect and color	Taste and smell	Color	Consistence	
Composition	Recipe A	Adhesive, homogenous and hard composition, consisted of fine minced meat with pieces of minced meat and 8 mm bacon	Salty taste and specific smell	Rosy-reddish dark	Plastic, hard
	Recipe B		Taste moderate salty and specific smell	Rosy-reddish light	Plastic-semi-hard
	Recipe C		Taste easily salty and some protein derivative smell	Rosy-reddish dull	Soft to semi-hard

**Table 4.** Physical-chemical quality indicators for raw material meat (minced meat) and composition samples (n=5)

Physical-chemical indicators	Minced		Composition		
	Beef	Pork	A	B	C
Water g %	72.54	61.31	60.46	62.40	63.56
Fat, g %	7.31	17.48	22.48	20.37	18.55
Protein substances, g %	19.69	17.24	14.15	14.19	14.23
NaCl, g %	2.57	2.46	2.34	2.16	2.05
NaNO <sub>2</sub> , mg /100 g	6.87	6.42	6.85	6.34	5.97
Dry substance, g %	27.46	38.69	39.54	37.60	36.44
Collagen, g %	2.68	2.67	2.04	2.02	1.98
Collagen / d. s., %	9.76	6.90	5.16	5.37	5.43
Collagen / protein, %	13.61	15.48	14.42	14.24	13.91

The physical-chemical analysis of the composition samples manufactured in the experimented technological variants highlighted the following aspects (Salagean, 2003):

*Researches Concerning the Influence of Vegetal Protein Supplements Proportion on Composition Quality in the Manufacture of one Semi-smoked Sausage*

*Water* content (g%) of the composition samples of the three manufacture recipes registers a decrease against the determined values for raw material meat (72.54 for cured minced beef and 61.31 for cured minced pork) till values about 60.46 (recipe A), 62.40 (recipe B), respectively 63.56 (recipe C); the increase of water content from the composition of recipe A to the composition of recipe B and C is due to the hydration water for the vegetal protein supplements which are used

*Fat* content (g%) registers a decrease from recipe A (22.48) to recipe C (18.55), due to the substitution of raw material by vegetal protein supplements

*Protein substances* content (g%) registers an increase from recipe A (14.15) to recipe C (14.23), due to protein contribution of the vegetal protein supplements which is higher than protein content of the replaced meat

*NaCl* content (g%) registers a decrease from recipe A (2.34) to recipe C (2.05), due to hydration water for the vegetal protein supplements

*NaNO<sub>2</sub>* content (mg /100 g) registers a decrease from recipe A (6.85) to recipe C (5.97), being directly proportional correlated with the meat quantity from respective recipe (which decrease from recipe A to recipe C) and inversely proportional with the vegetal protein supplements and their hydration water (with increase from recipe A to recipe C)

*Dry substances* quantity (g%) registers a decrease from recipe A (39.54) to recipe C (36.44), sequel of contribution of hydration water for the vegetal protein supplements which are used

*Collagen* content (g%) registers a decrease from recipe A (2.04) to recipe C (1.98) due to meat substitution by the vegetal protein supplements which are used

The *collagen / dry substance* ratio (g%) registers an increase from recipe A (5.16) to recipe C (5.43), due to the decrease of the dry substance content correlated with the increase of hydration water content for the vegetal protein supplements

The *collagen / protein* ratio (g%) registers a decrease from recipe A (14.42) to recipe C (13.91) sequel of the collagen quantity decrease correlated with protein quantity increase

## Conclusions

The following conclusions ensue after the physicochemical examinations regarding the quality of compositions manufactured through those three studied technological variants:

- The *exterior aspect* of the composition samples doesn't present differences from one technological recipe to another, being in accordance with the standards (SP-C-401-95)

- The *taste, smell, color* and *consistence* are influenced by the vegetable protein supplements thus: the salty *taste* is diminished through protein derivative addition in bigger quantity from a recipe to another (at the processing recipe establishment regarding the used salt quantity it's necessary to take into account the quantity of protein supplements), the *smell* of protein derivative becomes perceptible with the increase of protein supplement quantity, the *color* of composition is lighter using protein supplements, the *consistence* is reduced by exceeding the protein supplements usage

- The *water* content (g%) of composition samples registers a decrease against the determined average values for meat-raw material

- The *water* content is directly proportional correlated with proportion of vegetal protein supplements by their hydration water

- The *fat* content (g%) is in reverse order correlated with proportion of the vegetal supplements due to their lower content in fat against raw material fat content (which is higher)

- *Protein substance* content (g%) is directly proportional correlated with proportion of the vegetal supplements sequel of protein contribution of the vegetal protein supplements which is higher than the protein content of the substituted meat

- *NaCl* (g%) and *NaNO<sub>2</sub>* (mg /100 g) content is in reverse order correlated with proportion of the vegetal supplements by the increase of hydration water content for the vegetal protein supplements and decrease of the meat quantity

- *Dry substance* quantity (g %) is in reverse order correlated with the proportion of the vegetal protein supplements by their hydration water

- *Collagen* content (g%) is in reverse order correlated with the proportion of vegetal supplements due to the meat substitution

*Researches Concerning the Influence of Vegetal Protein Supplements Proportion on Composition Quality in the Manufacture of one Semi-smoked Sausage*

- *Collagen / dry substance* ratio (g%) is directly proportional correlated with proportion of vegetal protein supplements by decreasing of dry substance quantity correlated with the increase of water content, realizing a concentration of collagen into dried substance
- The *collagen / protein* ratio (g%) is in reverse order correlated with proportion of the vegetal protein supplements due to the collagen quantity decrease correlated with the protein quantity increase
- At the elaboration of the technological recipes for meat foodstuffs manufacture it is necessary to take into account that some organoleptic characteristics of composition (taste, smell and consistence) are affected by the proportion of the protein supplements which are used in manufacture so that it is paramount to respect the established recipes
- In according to these researches we can recommend for the manufacture of semi-smoked sausage the recipe with 3% vegetal protein supplements due to chemical-physical advantages, the organoleptic characteristics being insignificantly affected

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