

RESEARCHES CONCERNING THE INFLUENCE OF THE VEGETAL PROTEIN SUPPLEMENTS PROPORTION ON THE MICROBIOLOGICAL QUALITY OF THE COMPOSITION AT THE MANUFACTURE OF ONE SEMI-SMOKED SAUSAGE ASSORTMENT

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Abstract

The purpose of this performed research was to establish the influence of the usage proportion of vegetal protein supplements on the microbiological quality indicators of compositions meant for filling in the manufacture of one semi-smoked sausage assortment. Microbiological 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), 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). The hygienic quality of the compositions was influenced both by the microbiological load and the usage proportion of the protein supplements in the manufacture technological recipes.

Keywords: *sausage composition, vegetal protein supplements, usage proportion, manufacture recipe, microbiological quality indicators.*

Introduction

The microbiological analysis is part of the quality control in the food industry but at the same time an essential factor in defending the public health. All in all, one can understand the necessity of the complex microbiological exam in all production phases, starting from obtaining the raw material in the slaughtering units and ending with the delivery of the finished products. In this context, the bacteriological

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exam is an important factor in obtaining superior quality products in terms of hygiene.

Experimental

Microbiological analyses were performed on fifteen composition samples manufactured in three technological variants, for each case being used one processing recipe (according to table 1): without vegetal protein supplements (recipe A); with 3% vegetal protein supplements (recipe B); with 5% vegetal protein supplements (recipe C). In B and C recipes, one part of animal raw material (meat, bacon) had been replaced with vegetal protein supplements.

Table 1. The samples of the sausage composition used for examination

Analysed product	No. of the examined samples
Sausage composition from recipe A	5
Sausage composition from recipe B	5
Sausage composition from recipe C	5

Bacteriologic examination consisted in determination of the indicators presented in table 2.

Results and Discussions

The results of microbiological exam (table 3) highlighted the following aspects:

✓ The analysed samples are in accordance with O.M.S. 975/1998 requirements in the case of some parameters like: *Salmonella* /25 g (absent), *coaguloso-positive Staphylococcus*/g (10 maximum) and *coliform bacteria* /g product (1000 maximum)

✓ There were no values exceeding the maximum admitted in the case of *Escherichia coli* /g product (100 maximum) that indicate a close observance of the hygiene norms through the technological operations until the filling operation

✓ One can observe values over the maximum admitted by the same O.M.S. in the case of *Bacillus cereus* (10 maximum) and *sulphite-reducing Clostridium* (100 maximum) germs count, which are over the admitted values in the case of B and C recipes (higher value in the case of the composition manufactured according to C recipe comparatively to that manufactured according to B recipe, proportionally with the usage ratio of the vegetal protein supplement) of one manufactured batch (20% from analysed samples); this may be explained by a significant contamination with this germs of the textured protein concentrate used at the manufacturing of these compositions

Table 2. The bacteriological indicators

Bacteriological indicators	Methods of determination
Coliform bacteria count and presence of the E. coli / 1 g product	On BBLV culture medium, incubation at 37°C (for coliform bacteria) and passage on Levine medium at 37°C for 24-48 hours, with confirmation at 45°C (for E. coli). SR ISO 5541/1, SR ISO 5541/2 STAS 6349/4 (Bacterial count). SR ISO 11866, STAS 6349/4 (Escherichia coli count)
Presence of Salmonella bacteria / 25 g product	Sowing on preenrichment medium (tampon peptone water) and enrichment (selenit-cistin and Rappaport-Vasiliadis) and passage (on Edel and Kampelmacher medium and Istrati-Maitert medium) and biochemical and serologic confirmation / SR ISO 6785, STAS 6349/11
Coagulazo-positive Staphylococcus count	Sowings on liquid Chapman medium or Giloti Cantoni medium and passage on the Chapman solid medium or Baird-Parker selective mediums - STAS 6349/12
Sulphite-reducing anaerobic bacteria (<i>Clostridium perfringens</i> pathogenic germs) at 44 °C / 1 g product	Sowings from 10 ⁻¹ ...10 ⁻³ dilutions in sodium sulphite and ferrous sulphate medium, incubation 5 days at 44°C - STAS 6349/10
Bacillus cereus pathogenic germs count	Identification of typical colonies on selective medium MYP (agar with egg yolk and polymixin) - STAS ISO 7932/1997

Conclusions

The protein supplements used in the manufacturing technology of this semi-smoke sausage assortment have influenced the hygienic quality of compositions both through their microbiological charge level and the usage ratio in fabrication recipes, cumulated with the raw material microbiological charge.

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Tabel 3. The hygienic quality microbiological indicators of the salami compositions manufactured in those three experimental variants

Bach	Recipe	NBC / g product		E. coli/ g product		Salmonella / 25 g		Coagulazo-positive Staphylococcus /g product		Sulphite-reducing Clostridium / g product		Bacillus cereus	
		Obtained	Maximum admitted	Obtained	Maximum admitted	Obtained	Maximum admitted	Obtained	Maximum admitted	Obtained	Maximum admitted	Obtained	Maximum admitted
1	A	300	1000	45	100	abs.	abs.	9	10	35	100	abs.	10
	B	350		35		abs.		7		44		abs.	
	C	250		20		abs.		6		23		2	
2	A	110	1000	11	100	abs.	abs.	4	10	15	100	abs.	10
	B	90		15		abs.		3		12		2	
	C	16		11		abs.		3		30		4	
3	A	400	1000	11	100	abs.	abs.	7	10	96	100	abs.	10
	B	300		11		abs.		4		129		12	
	C	200		15		abs.		7		134		14	
4	A	25	1000	abs.	100	abs.	abs.	4	10	16	100	abs.	10
	B	65		abs.		abs.		7		21		abs.	
	C	30		abs.		abs.		9		22		1	
5	A	650	1000	75	100	abs.	abs.	9	10	8	100	abs.	10
	B	750		45		abs.		6		9		abs.	
	C	200		90		abs.		6		12		abs.	

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