METHOD FOR YIELD AND APPLICATION OF COMBINED PROTEIN PREPARATION IN MEAT PRODUCTS MANUFACTURE

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ABSTRACT: The traditional methods for receiving of protein preparation is based on separately use of milk-protein concentrates and some blood components, which have been partially used in meat industry. Their disadvantage is , that the nutrition properties of animal blood are not used completely. Therefore a method is developed for rational utilization of whole animal blood, obtained for nutrition purposes, by creating a standartized combined protein preparation, that possesses all of essential aminoacids and is designed for food products manufacture with high nutrition value.

INTRODUCTION: The rational utilization of raw materials from animal origin and their complete processing have been always played a significant role. Because of this the problem for receiving and rational utilization of essential and high-nutrient proteins concerns the most significant strategic problems of meat industry development. Implementation of non-traditional protein sources is a problem, which solves many science-technical and social questions. The existing methods for receiving of protein preparation are based on separately use of milk-protein concentrates and some blood components, which have been partially used in meat industry. Their disadvantage is that the high nutrition properties of animal blood are not used completely. The objective of this study is to develop a method for rational utilization of whole animal blood, obtained for nutrition purposes by creating a standartized combined protein preparation (CPP), which possesses all essential aminoacids and is designed for meat products manufacture with high nutrition value.

MATERIALS AND METHODS: Our purpose was acchieved by the following way: the obtained animal blood, stabilized at the moment of obtaining with 0.24% sodium citrate in the form of 10% water solution, is mixed with CCP "Lactobel" in 1:3 ratio and is homogenized in microcutter, coloidal mill or homogenizer with 3.500-4000 x g/min to max temperature - 18°C, and receiving of homogeneous paste-like aggregation with light red to red colour, spreading consistency and protein content /NX6,25/ no more than 20%. At the processing of raw materials (per 100 kg product), the following consiquence was kept: in the cutter bowl were placed 5 kg preparation, which quantity replaced the same quantity beef in the product formulation, and 1/3 of the necessary quantity water or ice is added /10 kg/. After 5-6 x g at slow speed till receiving of homogeneous mass, the rest of beef is added, also pork, and the process of cuttering continues at fast speed according to the traditional technology, in order to receive a meat batter for perishable meat products. The formulation of this sausage, called "Beef sausage" - experimental and control - produced according to above mentioned technology, includes the following components:

"Beef sausage" (Control)		"Beef sausage" (Experimental)	
Beef - first quality	50 kg	Beef - first quality	45 kg
Pork - semifat	50 kg	Pork - semifat	50 kg
-	-	CPP	5 kg
Sodium chloride	2,5 kg	Sodium chloride	2,5 kg
Sodium nitrite	0.0007 kg	Sodium nitrite	0.0007kg
Sugar	0.100 kg	Sugar	0.100kg
Black pepper	0.200 kg	Black pepper	0.200kg
Red pepper	0.100 kg	Red pepper	0.100kg

The chemical composition of CPP is presented in table 1:

Table 1.-Chemical composition of CPP

PARAMETERS %					
Water		Protein		Fat	
$\bar{x}$	s.d.	$\bar{x}$	s.d.	$\bar{x}$	s.d.
70.02	0.05	28.18	0.04	1.72	0.02

The aminoacid composition of CPP /1 g per 100 g product, and 1 g per 100 g protein/, as well as the chemical score of every aminoacid show the greatest reserve of lysine, which is followed by aroma aminoacids, regarding the aminogram FAO-WHO /table 2/.

Table 2.-Aminoacid composition and chemical score of CPP

AMINOACID	PARAMETERS				
	g/100g product		g/100g protein		Chemical score
	$\bar{x}$	s.d.	$\bar{x}$	s.d.	$\bar{x}$
Lysine	1.84	0.56	6.53	0.16	118.7
Threonine	0.95	0.24	3.37	0.28	84.2
Valine	1.35	0.33	4.79	0.35	95.0
Cystine	traces		traces		-
Methionine + Cystine	0.42	0.18	1.49	0.15	42.5
Isoleucine	0.76	0.19	2.69	0.22	67.2
Leucine	2.26	0.26	8.02	0.24	114.6
Tyrosine	0.98	0.17	3.47	0.21	57.8
Phenylalanine	1.20	0.15	4.26	0.18	71.0
Tryptophan	0.41	0.12	1.45	0.17	145.0

From the analysis of results of aminoacid composition, according to parameter "chemical score", can be drawn the conclusion about the availability of high values aminoacid numbers, i.e. this concerns the complete biological product. CPP was experimented in a model sausage - "Beef sausage" with replacement of 5% beef with CPP in the main formulation. The chemical composition of control and experimental sausage is presented in

table 3.

Table 3.-Chemical composition of control and experimental sausage

Product	PARAMETERS %					
	Water		Protein		Fat	
	$\bar{x}$	s.d.	$\bar{x}$	s.d.	$\bar{x}$	s.d.
Control sausage	67.71	0.05	13.21	0.08	12.00	0.03
Experimental sausage	67.82	0.02	13.82	0.07	10.00	0.05

With use of CPP the protein content increases, respectively the fat content decreases in experimental sausage, according to the same parameters of control sausage, which can be seen in table 3. At the examinations of aminoacid composition of model sausage - "Beef sausage", produced with CPP, in 1 g per 100 g product and in one g per 100 g protein, the following results are received /table 4/:

Table 4

AMINOACID	PARAMETERS %					
	Control "Beef sausage"			Experimental "Beef sausage		
	g/100g protein		Chemical score	g/100g protein		Chemical score
	$\bar{x}$	s.d.		$\bar{x}$	s.d.	
Lysine	6.14	0.08	111.6	6.53	0.11	118.7
Threonine	3.19	0.07	79.7	3.61	0.10	90.2
Valine	-	-	-	-	-	-
Cystine		traces			traces	
Methionine	1.63	0.08	46.6	1.85	0.07	52.6
Isoleucine	2.95	0.05	73.7	3.23	0.07	80.6
Leucine	6.22	0.08	88.8	6.31	0.05	90.1
Tyrosine	5.68	0.14	94.6	6.07	0.07	101.2
Tryptophan	1.16	0.07	114.0	1.46	0.08	146.1

CONCLUSIONS: A method is developed for receiving of protein preparation for nutrition purposes with high biological value and total protein according to Kjeldahl, no less than 20%. The CPP replaces 5% of main raw materials /beef-first quality/ in its use at equivalent quantity. By the free meat raw material /non-fat meat/ a regulation of protein balance is acchieved, which gives us foundations and stimulus for its application to the most of existing, as well as newly developed meat products.