POSSIBILITIES OF USING WOOL BY-PRODUCTS IN THE MANUFACTURE OF SAUSAGE PRODUCTS.

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Summary:Wool by-products are known to contain a singnificant amount of proteins, fats, and minerals. However, they are used only in the manufacture of liver sausages and souses as there is no acceptable technology of preliminary preparation of raw materials.

The suggested technology of protein mix preparation notable for availability of raw materials and simplicity takes into account structural properties and composition of such a mix.

Materials and methods: Beef and pig feet, broth,blood, salt and fat were used for preparation of protein mix.Feed were thoroughly washed, cooked and cooled.Meat was deboned, comminuted on a minser and cutter with adding broth, blood, fat and salt. We investigated physico-chemical, organoleptical, structural-mechanical properties and microbiological characteristics of fresh sausage meat and those of finished products depending on the level of replacing meat by protein mix. 5, 10 and 15 % of protein mix equivalent in protein content were added to the precomminuted meat (beef, pork or horse meat) instead of some portion of muscle tissue.

Results: Adding protein mix to sausage meat changes its structural-mechanical properties. There was a significant increase of sausage meat adhesiveness on adding to it 5 and 10 %of such mix. A sharp lowering of that index was observed with increasing its contents. The results received conclusively prove that adhesive properties of meat combined systems derend not only on the amount of soluble proteins but also on macromolecules structure. Adhesive properties of sausage meat decrease under a high level of replacing meat on account of reducing a portion of myofibrillar proteins. Heat treatment changes muscle proteins influencing the qualitative characteristics of sausage meat containing protein mix. On studying water binding ability of sausage with different contents of connective tissue proteins, a higher level of that index was determined with increasing the content of protein mix. The results show that when protein mix having higher compared to connective tissue proteins stability to heat is added to sausage meat, a higher level of water binding ability is insured after heat treatment (table 1). Adding protein mix to sausage meat decreases the mechanical strength of sausage products. Increasing the partion of protein mix to a higher than optimum level rezults in structure loosening. It is confirmed by organoleptical indices. Samples with levels of meat replacement of 10 and 15 % have got the highest scores for their flavour quality and softness. As the biological value of meat products first of all depends on their amino acids composition the content of amino acids was determined in the samples of finished products (table 2). Taking into account the fact that availability of proteins peptide bonds to the action of proteolytic enzymes may be different we studied the attackability of proteins by enzymes in experimental and control samples of sausages. The results received prove that adding protein mix to sausage meat does not decrease the level of proteins proteolysis by pepsin and tripsin (table 2). Since adding protein mix shifts pH value of sausage meat to the alkali direction seedability of sausage meat and finished products was determined. The results show that in some cases an increase of total bacterial going to seed of sausage meat and finished product was revealed on using protein mix.On the basis of data received we may say that the use of protein mix influences adhesive-cohesive properties of sausage meat, water binding ability and firm-elastic-plastic properties. It also influences the output of finished products. The results of organoleptical indices evaluation, data on amino acids composition and digestibility of proteins in vitro indicate that adding protein mix in an optimum quantity (10-15 %) to sausage meat provides manufacture of rather high quality products.

Table 1

Indices	Structural-mechanical characteristics of sausage meat containing protein mix, the amount, %			
1. Water binding ability of sausage meat, %				
horse meat	70,49	71,42	72,65	72,30
beef	71,33	71,95	72,84	72,60
pork	68,90	69,95	70,34	71,35
2. Adhesiveness of sausage meat, Pa x 10				
horse meat	1,12	1,21	1,26	1,19
beef	1,06	1,16	1,21	1,26
pork	1,31	1,38	1,40	1,26
3. Water binding ability of sausage, %				
horse meat	54,51	55,04	57,75	57,35
beef	53,05	53,49	56,86	56,65
pork	55,41	56,45	[illegible]	[illegible]

Table 2

Amino acids	Amino acids composition of sausages, %							
	0		5		10		15	
	amino acids per 100g of protein	score %	amino acids per 100g of protein	score %	amino acids per 100g of protein	score %	amino acids per 100g of protein	score %
Valin	5,30	106,0	5,25	105,0	5,42	108,4	5,60	112,0
Lysin	8,00	145,5	8,30	151,2	8,32	151,4	8,25	150,0
Leucin	7,33	111,8	8,16	116,5	8,25	117,8	8,30	118,5
Ysoleucin	5,06	126,5	5,11	127,7	5,15	128,7	5,20	130,0
Treonin	3,66	91,5	3,76	94,0	3,85	96,2	3,86	111,8
Phenylalanin-thyrosin	7,20	120,0	7,42	120,3	3,26	137,0	8,20	136,0
Methyonin-cistin	3,02	86,3	3,08	88,2	2,95	84,5	2,68	76,6
Triptophan	1,03	103,0	1,01	101,0	1,05	105,0	1,01	101,0
The amount of amino acids:								
essential	41,0		41,09		42,25		43,65	
non-essential	58,58		57,65		57,01		57,32	
eq thyrosin per 1 g of solids	30,1		31,4		2[illegible]96		27,06	