

NEW APPROACHES TO DEVELOPING OF PROCESSING TECHNOLOGIES OF SECONDARY  
COLLAGEN-BEARING SOURCE MATERIALS OF MEAT & POULTRY INDUSTRY.

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The outlook for development and ecology of meat branch of industry depends upon the rational use of all reserves of secondary protein materials mostly inherent in collagen-bearing scraps of hide and entrails, meat, trimmings, cracklings, low-valued substances of P category products of slaughter and of poultling processing-heads, legs, stomachs, skin and their derivatives. However, the microstructure of components of tissues & substances, biological & functional characteristics have not been adequately explored. There is no scientifically justified methods of purposefull transformation of difficult for assimilation substrates in order to produce biologically full value products and cleaned ingredients with given characteristics. The methods of processing technology and use of the secondary raw materials of granger's cattle & poultry processing call for further investigations & elaboration. The aim of the work is a complex investigation of characteristics, systematization and evaluation of perspectives of rational and maximum use of the secondary collagen-bearing raws of meat & poultry processing industry for food purposes.

Materials and methods of investigation.

The source materials were obtained in the process of industrial handling of cattle & poultry on the meat-packing plant & on the poultry-processing plant of the town of Voronezh. Fatty acid composition of the secondary products of slaughter & of processing cattle & poultry was determined with gas chromatograph GS-14B produced by SHIMADZU, the data received was processed by a computer using the method of internal normalization. A correlation of peaks was made basing on individual methyl fatty acids. Lipids were extracted from the specimens by the Fotch procedure/1/. Histo-morphological investigations were made with use of methods of electron microscopy /2/. The level of innocuousness of the source material was valued by the presence of ions of heavy metals, nitrates and chloro-organic pesticides. The ions of heavy metals were explored with atomic adsorption spectrograph in accordance with recommendations to the units, nitrates-with nintrometer NM-0,0002. The specimens for analysis of chloro-organic pesticides were prepared in respect /3/ to the method SHS2 on the gas chromatograph.

Results and Descussions.

The analysis of the chemical structure & content of protein fractions in the wastes of catter & poultry /4/ industrial processing prove that the source materials are rich in protein & fat which content meets the requirements of food organic source material.

The wastes of meat industry are in polyunsaturated fatty acids, which are essential components of food, possess vitamin activity, realize an essential regulator function & structural function in formation of cellular membranes. It has been found, (table 1), that the great part of fatty acids which enter into the composition of free glyceride consists of five acids: palmitic, palmit-oleic, oleic, linolic & stearic. Myristic & linoleic, margenic & other acids could be found in smaller quantities. The presence of linolic & linoleic acids in the source material as a food unit is especially important because they can not be synthesized in a human body. The presence of polyunsaturated acids in the examined source materials in combination with proteins yields a high food value to the source materials.

On the basis of carried out histo-morphological investigations we can make a conclusion that the secondary products of slaughter and processing poultry and wastes of hide source materials, entrails source materials, trimmings of the meat have a high content of collagen fractions and one of the most interest for extracting & cleansing collagens and creating collagen substances on this base for producing covers, pollicles, food additives, special & medicine preparations.

Searching for promising ways of use of collagen-bearing source materials for food purposes can't be carried out without estimation of the level of innocuousness of the source materials. Innocuousness was measured by the presence of nitrates, ions of the heavy metals, chloro-organic pesticides. It was found that content of unhealthy components & toxins in the examined source materials does not exceed by their content the level of PDK and is on the level in the meat of poultry & slaughtered animals.

The whole complex of value of content of summary proteins and their qualitative & quantative structure, of the relation between protein and fat /4/, of peculiarities of micro-structure, of indexes of biological value gives us an opportunity to form the groups of wastes according to their preferential use for food purposes as food additives of different purposes, edible pollicles, food covers and moulding materials in the technology of meat products.

The source materials of little value which contains fibrillas of collagen and quite high content of fat (cracklings, wastes of poultry processing) can be successfully used for producing food additives for force-meat after heat & moisture treatment and organic hydrolysis of protein fractions with specific ferments.

Wastes of hide source materials, entrails materials, trimmings of meat in the sausage, tin & can production can be an additional source of materials for producing edible covers & pollicles on the basis of fermentation of material characteristics by ferment preparations of microbic origin of proteolytic & lypolitic effect.

Development & introduction of promising ways of use of the secondary meat source materials gives the opportunity to solve the problems of the deficit in natural and artificial sausage covers, of economy of 10-20% of the basic source material, in the production of force-meat of increasing biological value, quality & trade appearance of goods, development of variety of

goods, including the range of products with special & dietic characteristics, improvement of ecological conditions of good production.

Conclusion:

Basing on the carried out complex investigations of the source materials the groups of collagen-bearing wastes of meat & poultry processing industry according to the preferential possibilities of promising use for food production purposes were formed as below:  
 1: For use in force-meat as food additives enriched with products of collagen degradation and polyunsaturated fatty acids.  
 2: For producing edible sausage covers, pollicles and food covers with use of innovative technologies based on fermentation of chemical structure & functional characteristics of source material.

Literature:

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4. Antipova L.V., Glotova I.A., Perepelkin V.U. Non-traditional types of source materials in the technology of sousage covers & pollicles / News of High Schools. Food Technology-1994, N1-2, p.14-18.

TABLE I

The mass production of fatty acids in some products of slaughter of cattle & poultry.

Acids	The mass production of acids in percents to mass of source materials.										
	Comb	Hide	Stomach	Legs	Entra-ils	Pig's maws	Beef fibres	Collagen mass on the basis of pig's maw	Collagen mass on the basis of fibres & tendons	Skin bone	Poultry meat
Myristic	0,65	0,94	1,21	1,02	0,78	0,34	0,73	0,46	1,25	0,37	0,10
Palmitic	24,02	30,6	30,69	19,75	25,96	14,37	8,90	11,70	20,03	4,85	26,00
Palmitoleic	7,41	8,09	6,26	21,12	3,42	0,96	1,03	1,36	2,30	0,92	-----
Stearic	1,47	5,00	4,14	0,60	4,06	10,76	6,48	11,80	13,05	4,53	6,00
Oleic	37,60	38,12	30,14	41,22	44,89	21,92	14,89	27,44	40,33	11,5	40,00
Linoleic	26,40	14,0	17,53	13,53	13,47	5,30	0,67	1,73	0,11	1,03	21,00
Linoleic	0,36	0,42	0,30	0,20	0,25	-----	-----	-----	-----	-----	-----
Margaric	-----	-----	-----	-----	-----	0,33	0,50	0,77	1,05	0,40	-----
Arachidonic	-----	-----	-----	-----	-----	-----	0,74	0,36	0,13	0,76	-----
Other acids	2,09	2,68	9,70	2,60	6,17	6,20	2,00	14,76	1,09	3,12	9,30