

PERSPECTIVES OF PRODUCTION OF COMBINED PRODUCTS WITH PROLONGED STORAGE LIFE

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INTRODUCTION

The importance of meat industry is connected first of all with the provision of a human by animal proteins of high value. Special attention is given to products with prolonged storage life - canned meats are in the list of items produced.

Meat canning industry of Russia has a wide nomenclature but recently however the assortment is considerably reduced. At the same time one should note the little use of biologically active polyfunctional native additives which guarantee high biological value, quality and consumer characteristics and possess special action. It is of special importance to point out the actuality of combined products manufacture with disease-preventive and dietetic peculiarities.

There has been carried out successfully the study of complex and wasteless use of food proteins allowing to increase food resources on the account of meat change by raw materials of similar qualitative characteristics contributing to health maintenance [1, 2, 3]. It is known [1], that meat-vegetable canned products have some advantages being the products with prolonged storage life and enriched by biologically and physiologically active substances. They are characterised by high biological value and possess disease - preventive peculiarities, decreasing the risk of some diseases and first of all those connected with the dysfunction of digestive organs. The evident perspective has the vegetable raw material but its large volume, high humidity, short storage life give certain difficulties in the organisation of technological processes at canned meats enterprises.

The aim of this work is to develop combined canned meats on the basis of meat raw material, vegetable powders and protein preparation of lentil (PPL).

MATERIALS AND METHODS

The objects of study were minced meat cans produced by "Belmeat" corporation, beef meat of the 1st grade (according to standard 779-87), protein preparation of lentil (PPL) [4], vegetable powdered half-finished products (marrow-milk (PMMP), melon-milk (PMeMP), carrot-milk (PCMP), beet-milk (PBMP) beet-namorum (PBNP), developed at the Voronezh State Academy of Technology and produced at the Voronezh corporation "Confectioner" (Technical conditions 9164-001-2068102-94). Data of total chemical composition are given in table 1.

Mass share of components in the raw material, model minced meat and finished products have been determined according to standard techniques in accordance with recommendations [5]: moisture - by thermogravimetric method, fat - refractometrically, protein - photometrically with samples ashing by Kjeldahl method.

Protein digestibility by digestive ferments in vitro [5], products accumulation of proteins hydrolysis was determined by Lawry and expressed in conventional units (mkg of tyrosine in 1 cm³ of a sample) and by weighing residues of digestion.

Amino acid content of samples was determined with the help of chromatographic division of ninhydrine positive compounds on automatic analyser AAA-T339 (Chehia) according to device instruction.

Rheological indices according to methods [5].

RESULTS AND DISCUSSION

The choice of the raw materials components for canning was based on the well-known principle of the protein combination. PPL was probed in some technologies of meat products. It is characterized by a high level of protein, well-balanced amino acid content, good technological qualities [6].

New combined powders of vegetables made a good showing in confectionary industry, their chemical composition opening new possibilities in creation of disease-preventive products. Their compactness and storage life allow to organize technological production. Characteristic colour of some powders, e.g. beet-milk, opens possibilities for reducing sodium nitrite because they guarantee the formation of a required colouring of the finished products.

For the evaluation of technological qualities of combined minced meats for the following canning the 3-steps investigation has been carried out on model minced meats, composed on the basis of beef and PMMP. At the first step meat raw material was replaced by marrow-milk powder with mass share 5, 10, 15, 20, 25 %. The powder was brought in hydrated form in ratio half-finished product:water equal to 1:2. At such hydration the consistency is near to minced meat and the additive is easily mixed with the main raw material. Besides with the increase of mass share of marrow half-finished product the growth of water-binding (WBC) and fat holding (FHC) capacities up to 62,2 and 34,3 % respectively is observed.

PPL brought in hydrated form (water PPL ratio 1:4), mass share 5, 10, 15, 20 % increase considerably the adhesion properties.

Production technology of canned meats does not practically differ from the known analogues and includes chopping of meat on a chopper with holes diameter 2-3 mm, curing for 20 hours, rechopping with the addition of hydrated powders to minced meat, portioning into cans and sterilization during 85 min at 115 °C.

The production was carried out in can shop "Belmeat" corporation.

Degustation showed good consumer and qualitative characteristics. On the basis of canned meats chemical composition studies (tab. 2) and calculations carried out on these data finished products are characterized by low calorificity, meet the needs of well-balanced diet according fat-protein ratio (1:1), enriched by food additives, vitamins and hence possess preventive characteristics.

Study of amino acid composition (tab. 3) showed, that canned meats contain high share of essential amino acids, score some of them exceeding 100 %. During the experimental study it has been established, that the degree of digestibility of finished products is, %: "Aromatic" minced meat - 81,4, "Vostochnii" minced meat - 77,0, "Voronezh" minced meat - 83,0, "Gorodskoi" - 79,6, "Novinka" - 81,9. Thus, attackability of combined protein compositions in finished products is similar to beef of the highest grade.

Applied vegetable - milk powdered additives enrich products by vitamins which do not present in meat (or containing in small quantities) and macroelements (tab. 4).

CONCLUSION

Results of carried out laboratory studies and industrial tests of technologies of combined canned meats with the following quality evaluation of new items showed that the application of powders should be recognized as the perspective. Hydrated form of combined plant powders is compatible with the minced meat and adds the finished products juiciness, good consistency, palatability, colour and flavour. In case of use, it is possible to save 25 % of the main raw material, to obtain the product enriched by vitamins and food fibers to improve amino acid content of proteins. Finished products are consume characteristics, their production does not demand additional capital expenditures.

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Table 1

Characteristics of vegetable-milk half-finished products

Indices	PMMP	PMeMP	PCMP	PBMP	PBNP
Protein mass share, %	16,00	15,60	13,10	17,10	0,35
Fat mass share, %	12,00	14,20	0,60	13,60	0,35
Carbohydrate mass share, %	66,00	64,20	80,30	64,60	93,30
Moisture mass share, %	6,00	6,00	6,00	6,00	6,00
Energy value, kj	1822,00	1484,00	1322,00	1681,00	1610,39

Table 2

Chemical composition of canned meats

Canned meats, name	Mass share, %					
	moisture	protein	fat	carbohydrates	salt	ash
Minced meat "Aromatic"	66,57	13,22	10,58	6,95	1,29	2,68
Minced meat "Vostochny"	65,80	12,96	10,80	7,77	1,20	2,67
Minced meat "Voronezhky"	65,63	13,87	11,53	6,22	1,23	2,75
Minced meat "Gorodskoy"	65,27	12,65	11,74	7,80	1,22	2,54
Minced meat "Novinca"	65,41	13,31	11,17	6,26	1,24	2,61

Table 3

Amino acid content of canned meats and PPL, % to protein mass

Canned meats	Essential								Non-essential						
	tre	val	met+cys	iso	leu	phe+tyr	try	lys	asp	ser	glu	pro	gly	ala	arg
Minced meat "Aromatic"	3,00	3,36	3,14	3,32	6,46	10,02	1,01	8,95	5,90	5,34	13,22	7,10	6,88	9,02	11,90
Minced meat "Voronezhsky"	4,77	3,82	3,26	3,87	5,90	7,02	1,06	9,74	7,27	5,54	12,10	10,04	8,53	7,45	7,94
PPL	5,62	2,38	1,52	3,09	4,06	5,80	1,00	4,49	8,66	5,12	11,88	2,77	2,05	2,59	4,56

Table 4

Comparative characteristics of the chemical composition of raw materials

	Mass share of sugars, %					Vitamins, g/kg			Macroelements, g/kg				Microelements mg/kg			
	Reduced sugars	total sugars	glu-cose	fruc-tose	pec-tin	thiami-ne (B ₁)	riebofla-vin (B ₂)	β-car-o-tine	Na	K	Ca	Mg	Fe	Zn	Cu	Mn
PCMP	11,99	16,54	1,70	6,79	1,23	1,7500	0,0043	60,87	1,72	4,10	0,25	0,05	0,15	0,01	0,01	0,01
Beef meat	-	-	-	-	-	0,0006	0,0015	Traces of vit.A	0,65	3,16	0,12	0,22	19,40	2,07	0,96	0,29