

A study into the process of finely dispersed meat-&-bone pastes preparation

BELYAYEV M.I., TCHEREVKO A.I., SALAVATULINA R.M.*, SPIRINA E.T* and VINOKUROV G.A.**
The Kharkov Catering Institute, Kharkov, USSR

*The All-Union Meat Research Institute, Moscow, USSR

**The Kharkov Meat Packing plant, Kharkov, USSR

MDM is complexly analyzed. It is found that when beef and pork bones are pressed by the press hydrosystem 15-28 MPa, MDM composition is characterized by the following parameters (Table 1)

Parameters	Beef Bone	Pork Bone
Total moisture	56,05 ÷ 58,31	51,00 ÷ 52,30
Fat content, %	26,0 - 29,80	25,60 ÷ 26,90
Protein content, %	9,90 ÷ 12,50	10,10 ÷ 12,30
Ash content, %	5,22 ÷ 6,55	6,70 ÷ 7,30
Bone inclusions content, %	0,40 ÷ 1,12	0,6 ÷ 0,79

The decisive factor for the MDM quality estimation and its functional technological properties is their size rather than the total content of bone inclusions.

Fractional (size) composition of MDM bone inclusions is studied experimentally in two aspects

The first aspect. The threshold of perceptibility of bone inclusions size in sausages and

ground meat products is determined. It was found that the 0.1 - 50 mm particles were non-

detectable in products organoleptically and do not reduce the organoleptical parameters of

the product quality. When the size of bone inclusions, added to sausages and ground meat

products, increase over 50 mm, their organoleptical parameters reduce considerably because

of the appeared "sandy" taste.

The second aspect. The ratio of groups of fractions (I - to 50 mm and II over 50 mm), contained in MDM is determined (Table 2)

Group of inclusions	Pressure in press hydrosystem, MPa						
	Bone inclusions group content, %						
	15	18	20	22	25	26	28
Bone inclusions are non-detectable	87,3	87,7	92,2	92,6	57,7	79,6	86,4
Bone inclusions are detectable organoleptically	12,7	12,3	7,8	7,4	42,3	20,4	13,6

The analysis of the data given in Table 2 allowed to determine that presence of bone inclusions from group II (over 50 mm) in MDM do not permit its utilization for the production of sausages and ground meat products. The results got allow to give foundations for the necessity of finely dispersed MDM grinding.

The main constructive and operation characteristics of the apparatus for re-grinding of bone inclusions, contained in MDM down to 50 mm, are scientifically based.

A re-grinder of bone inclusions has been designed and commercially implemented. The design of the re-grinder is recognized as an invention. It consists of two grinding blocks. The

first block includes a cutting pair knife - grille where the initial grinding of bone inclusions and cutting of long fibre structures of muscular and connective tissues take place.

The second block is two conjugated cones: mobile and immobile, between which grinding of bone inclusions with the formation of finely dispersed meat-&-bone pastes take place.

The parameters of the re-grinder operation are studied experimentally (Table 3).

A number of rotor rounds, round/min	Bone inclusions content, %			Temperature of MDM Production at the outlet from vity, kg/hr the grinder
	From 1 to 16 mm	From 16 to 50 mm	From 50 to 300 mm	
400	70,4	20,7	8,9	17
300	73,9	20,2	5,9	14,3
200	83,7	12,8	3,5	13,0
100	89,7	9,7	0,6	11,2
90	97,1	2,9	-	10
80	97,2	2,8	-	9

The analysis of data given in Table 3 allows to note that the best re-grinder operation parameters are provided at the speed of rotation of 80-90 rounds/min when there are no MDM bone inclusions over 50 mm in size, the temperature of MDM increases by 0.5-1°C in comparison with the initial temperature and the productivity is provided.

The process of finely dispersed meat-&-bone pastes preparation consists of producing MDM by presses and its further re-grinding by the re-grinder designed.

Finely dispersed meat-&-bone pastes allow to replace 15-25 % of meat in sausages and ground

meat products. The quality of sausages and ground meat products with finely dispersed meat-&-bone pastes does not really differ from the quality of control products prepared without MDM.

... "Zaplat", Moscow, 1953

Among the meat products used are in special demand. These must be of high taste qualities. For a long time production of the best parts of young animals (usually pigs) carcasses are used. But in recent years the industrial development has acquired the production of lean beef, lamb, poultry meat. It became possible due to improvements in the technology of development of rather effective technical facilities able to improve the taste qualities of meat especially meat palatability and tenderness. However, in many cases the taste qualities of beef, lamb or poultry legs are markedly worse than those of pork ones. Pork contains less connective tissue, whose proteins are more labile, as compared with those in the connective tissues of beef or lamb; the pork also contains more intramuscular fat that gives the specific taste of meat, their tenderness and juiciness.

Experiments show, using meat with higher fat content for the manufacture of direct stuffing of fat into the muscle tissue has no positive technological effects or has as during smoking or smoking this fat is oxidized forming the objectionable aroma. Large fat quantities forced result in the unpleasant taste of fat. These disadvantages may be avoided by adding fat in the form of a stable protein-fat emulsion. For preparation such an emulsion of "oil-in-water" type rendered calcium or pork fat or vegetable oil, stabilizers sodium caseinate, soluble soy protein, edible gelatin and naturally obtained chicken egg yolk used. The emulsions were prepared using an experimental hydrodynamic mill and a laboratory mixer provided at the Institute of Meat Technology of USSR U.S.S.R. In all cases for preparing emulsions mechanically dispersed poultry meat was used, which results in a comparatively high viscosity, it was impossible to determine the emulsion stability as a inverse value of the sedimentation $V \cdot t$, where V is the sedimentation rate of a definite volume of

emulsion of the system, since there was no fat separation at room temperature and at 70°C before the beginning of emulsion absorption. That's why the emulsion stability was studied by heating it in test tubes 4 cm in diameter and 100-120 cm long, in a water bath at 85°C for 30 min. The emulsion stability was characterized by 50% fat and stability was determined by a certain weight of fat separated, assuming that each fat gram corresponds to 100% stable emulsion.

Level and quality have were prepared. The emulsions included beef or pork ground through a sieve with 0.5 mm diameter holes or non-ground venison or rabbit ground in a mill (80-90) and water which contained 20 g of mechanically dispersed meat, 20 g of mechanically dispersed fat, 2 g of sodium caseinate, 20 g of water. Beef and emulsions were pre-salted.

Tempering purposes have been used that not only have been prepared. The emulsions were prepared using the same conditions as the control emulsion. The emulsion stability was studied at 85°C for 30 min (control). The emulsion stability was studied at 85°C for 30 min (control). The emulsion stability was studied at 85°C for 30 min (control). The emulsion stability was studied at 85°C for 30 min (control).

It was found that the stability of emulsions prepared with different stabilizers, protein depends on protein and fat content, and different fat content being a necessary condition for preparing the most stable emulsions with different protein content.

It was shown that stability of emulsions containing 20 g of mechanically dispersed meat, 20 g of dispersed fat, 20 g of sodium caseinate, 20 g of water is higher than that of emulsions containing 20 g of dispersed meat, 20 g of dispersed fat, 20 g of sodium caseinate, 20 g of water. It was shown that the stability of emulsions containing 20 g of dispersed meat, 20 g of dispersed fat, 20 g of sodium caseinate, 20 g of water is higher than that of emulsions containing 20 g of dispersed meat, 20 g of dispersed fat, 20 g of sodium caseinate, 20 g of water.

It is known that salt has a beneficial effect on the emulsion. However, in emulsions the influence of the salt content on the stability of emulsion is rather weak. The influence of the salt content on the stability of emulsion is rather weak. The influence of the salt content on the stability of emulsion is rather weak.

The high content of mechanically dispersed meat in the emulsion has a very strong effect on the stability of emulsion. The high content of mechanically dispersed meat in the emulsion has a very strong effect on the stability of emulsion. The high content of mechanically dispersed meat in the emulsion has a very strong effect on the stability of emulsion.

The emulsion stability was studied at 85°C for 30 min (control). The emulsion stability was studied at 85°C for 30 min (control). The emulsion stability was studied at 85°C for 30 min (control). The emulsion stability was studied at 85°C for 30 min (control).

The emulsion stability was studied at 85°C for 30 min (control). The emulsion stability was studied at 85°C for 30 min (control). The emulsion stability was studied at 85°C for 30 min (control). The emulsion stability was studied at 85°C for 30 min (control).