

COMMINUTED PROCESSED MEAT PRODUCTS - "MINE" OF TECHNOLOGICAL PROBLEMS AND RESEARCH NEEDS

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Comminuted meat products are doubtlessly the most popular, nearly round the world widely consumed, processed meat items. Already, as long ago as 1963, according the statistic given by Peterson and Tressler /1/, the percentage of total available meat production which were processed into sausages in some countries was as high as 80% in Finland, near or above 50% in Sweden, USSR, Denmark and France, nearly 20% in USA but less than 0,02% in India and probably also in other developing countries in Asia, Africa and Latin America.

The phenomenon, worthwhile to be stressed, is the fact that contemporaneously practically speaking all sources of protein both animal and plant origin or their compositions could potentially be used as a raw materials for manufacturing of the comminuted meat products, although the animal origin proteins are doubtlessly playing the predominant role.

In fact, meat tissue of all species of domesticated and indomesticated animals - cattle and swine, sheep and goat, water buffalo, camel and reindeer, poultry, some species of wildlive including aquatic such as whale, fishes etc. could be and it is used for manufacturing of the comminuted meat products, mainly sausages of different types. In this connection, let me recall you, that in Japan during only one decade i.e. 1953-1963 the fish sausage industry increased its production capacities some 60 fold from 2000 m.t. to 118,000 m.t. respectively./2/

The fraction of processed meat products manufactured and consumed, including comminuted meat products, in relation to meat consumption per capita depends not only on availability of this kind of commodity, regional eating habits and consumers preferences, purchasing power and indispensable facilities required but to the large extend on a stage of development of a given country and its level of industrialization and food and meat sector development in particular, production know-how, research potential etc. If you agree with me that the problem as such is broad I am convinced that you also would be kind enough to accept my suggestion that we have to concentrate on more narrow problems which fall under the headline of the present session devoted to Physical and Chemical Structure of Emulsion Products. The review of the subject matter problems will be presented to you by our Rapporteur Mr. J. Schut therefore I do feel competent to introduce only a few matters of general type.

First of all let me stress that taking under consideration, far from being universally accepted knowledge and understanding with regard to the multi-disciplinary problems, both practical and scientific, involved and attributed to the comminuted meat products technology, the title of the present session is not fully adequate to the meaning required and which could deserve acceptance by researchers dealing with the subject matter.

In this connection I should like to refer to the terminology used in the title namely - "emulsion products" because, as it is stressed by Kotter /3/ such popularly used terminology, mainly but not only by American researchers, is narrowing the subject matter which no doubt is much more complex in comparison with simple understanding of the meaning attributed to the term - emulsion.

Controversially to the theory of mechanical fixing of the dispersed fat particles during manufacturing of comminuted meat products represented by Hamm /4/ as well as commenting on inexactness of generally used terms: "meat emulsion" and "emulsion sausages", Kotter /3/ is in this same time advocating and recommending much broader understanding of the processes and physico-chemical phenomena contributing and participating in processing of the comminuted meat products.

According Kotter /3/ understanding, technology of the comminuted sausages, for example Frankfurter type, is a complex system consisting of : genuine solution, gel solution, suspension, emulsion and foam formation of which are facilitated by actual characteristics of meat and fat tissue, ionic strength created by common salt, numbers of additives among others such as sele-

cted phosphates, types of machinery used for mincing, temperature control and aeration during comminution, considering only few of the long list of phenomena and technological operations involved and influencing and participating in the production process.

The above described standpoint with regard to the nature of comminuted meat products and phenomena which are ruling their technology had been presented, although from slightly another point of view which emphasized role of fat, by our colleagues from USSR during XIXth European Meeting of Meat Research Workers held in Paris in 1973 in paper by Gorbатов, Zayas, Sokolov and Janoushkin. /5/ Presented in their review and in other publications physico-chemical processes involved in preparation of comminuted meat products and conclusions made are indicating the complexity of the problem as such, the role playing by fat component in structure formation of comminuted meat products, the importance of selected rheological phenomena observed during processing of the meat products in mind etc. /5/, /6/, /7/, /8/, /9/, /10/, /11/. Secondly, we should agree with the fact that nowadays progress in research methodology, availability of equipment and chemicals and first of all well educated staff of research centres are facilitating required and demanded continuous enriching of our knowledge in field being under consideration during the present session. Our competence and knowledge is in progress, although still much research is needed in order to fulfill existing gaps both theoretical and practical. Bearing the above said in mind I should like to pinpoint a few problems which in my opinion deserve attention.

1. Growing demand for processed, highly nutritive proteineous products, mainly of animal origin with good palatability and attractive to consumers is facing increasing worldwide shortage of raw material needed. In order to fill up this discrepancy between supply and demand technologists and processors were forced to use plant origin meat extenders and substitutes as well as but to much less extend, meat analogues.

In this context the question could be raised as to whether we have already exhausted all possibilities in proper and acceptable use of all raw material originated from animal carcasses? Do there still exists improperly and/or unjustified utilization of raw materials which could potentially be used for manufacture food products for human beings instead for feedstuff? The answer in my opinion must be positive. One of the potential field where such raw materials could find outlet is production of comminuted meat products. I do not hesitate to say, that at present, are widely wasted such raw materials as: blood, meat left on bones after deboning, selected less valuable by-products or offals not commonly considered suitable for human being consumption i.e. lung and spleen, selective parts of digestive tract, connective tissue trimmings, pork skin etc. /12/, /13/.

The enlisted, far from being complete, raw materials deserve more attention. We all do recognize the restricted nourishing value and/or restricted functional properties but that mean that such kind of raw materials require intensive research aimed at upgrading their nutritive value and oriented toward finding methods which will improve their functional properties.

2. Much research is still needed in order to achieve a progress and better understanding of the physico-chemical processes and phenomena we are observing during manufacturing comminuted meat products. Our attention should be oriented toward such problems as: factors affecting solubility of meat tissue proteins, their extractability by mechanical and chemical means, colloid, emulsion and foam formation, properties and capacities, rheological properties of sausage mix, viscosity, stickiness, particles dispersity, structure strength and stability, coherency, binding capacity, prevention against coalescence or reaggregation, machinability and transportability, product yield etc. just to mention the most important and major area.

Existing and new findings should assist us in attempts to improve technology of comminuted meat products as well as should provide us with backgrounds on base of which means could be developed or established aimed at further mechanization, automation and objective in-process control methods and/or devices. Having in hands the last mentioned means technologist will then be able to steer /control/ the individual operations and a whole process including its automatization, and to take under control quality, technological, economic and commercial aspects.

3. Last but not least, attempts should be undertaken with regard to elaboration of the universally acceptable technical and technological terminology reflecting physico-chemical processes and phenomena related to comminuted meat products manufacturing and research involved. Such work, no doubt, is badly needed in order to achieve better understanding of growing amount of published data, their proper and univocal interpretation and good communication between researchers round the world. My feeling is that our forum is the only one which is competent and able to fulfill the task and therefore I do take the liberty to recommend that such an approach will be given required and desired consideration.

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