

TRENDS IN SCIENTIFIC RESEARCH IN THE FIELD OF MEAT IN RUSSIA

Irina Tchernukha, Olga Lugar

The All-Russian Meat Research Institute named after V.M.Gorbatov, ul. Talalikhina 26, 109316, Moscow, Russia

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Objective:

Analysis of state of the market for meat in RF and its relationship with the structure of scientific research in the field of meat processing; description, systematization and analysis of the current directions of scientific research in Russia in the years 1996-1999, as well as identification of the priorities and prediction of trends of development of scientific interests for the first decade of XXI century.

Methods:

Analysis of development trends of meat industry was carried out on the basis of subsystem of the "Analysis of trends of development of research directions" by the method of scientific metric method of analysis on 8 main directions - (1) high quality meat raw materials; (2) highly-mechanized and robotic systems of slaughter and primary processing of animals; (3) rational use of raw materials and new generation of general purpose meat products; (4) multifunctional ingredients for production of foods; (5) curative-preventive and special products; (6) meat products with long storage times; (7) child nutrition foods and (8) waste meat materials - involving 49 scientific terms and definitions: [1] growing of animals, [2] feeding and meat quality, [3] classification of animals, [4] influence of breed on quality, [5] pre-slaughter handling and quality; [6] classification of carcasses; [7] gene engineering (theory, practice, ethics), [8] biochemistry of meat; [9] muscle fibers and quality of meat; [10] PSE meat; [11] DFD meat; [12] RSE meat; [13] connective tissue and its quality; [14] meat color; [15] meat tenderness; [16] fatty acids; [17] storage and quality, packaging; [18] storage and safety; [19] storage and gas atmosphere; [20] microbiology; [21] pesticides and heavy metals; [22] production and meat quality; [23] pork; [24] beef, [25] mutton, [26] poultry; [27] other products; [28] new products, [29] "surimi" type products; [30] soya and other additives; [31] RACCP, [32] HACCP, [33] methods of investigations and instrumentation; [34] methods of prediction of raw materials quality; [35] methods of prediction of products quality; [36] automation and robotization of dressing; [37] automation and mechanization of technological processes, [38] modelling of processes, [39] refrigeration; [40] energy-saving technologies; [41] meat wastes; [42] wasteless production; [43] ecology and water treatment; [44] marketing, management, logistics and consumer preferences, [45] sanitary control and safety; [46] curative and disease-preventive products, [47] ethics of nutrition and vegetarianism; [48] legislation, taxation; [49] standardization, certification.

The general trends of meat research were determined on the basis of analysis of more than 300000 sources with the help of an expert system. The data obtained were superimposed on the results of the analysis of more than 3600 of scientific papers and materials of research workers from 41 countries of the world.

Results and discussion

One of the main factors influencing the meat industry development is the state and activity of the economics of the country, consumption volumes of meat products, specifics of consumer demand and of traditional tastes. Derangement of the domestic food market, hasty going away of the State from it led to abrupt reduction of domestic production of agricultural products.

The years 1996-1997 and the period prior to August 1998 were characterized with relatively stable economic situation in this country, high level of import both of the raw materials, food additives and ingredients, and of finished products. It should be noted, however, that mainly cheap raw materials were bought: having large content of fat and connective tissue and those after storage during rather large periods of time. Instability of market for meat raw materials, increase of the share of frozen meat for production purposes led Russian scientists to necessity to investigate biochemical processes in meat during freezing, long storage and thawing together with its safety control; to develop techniques for its preliminary treatment for further processing. Large cities that are rather in great quantity in Russia brought in about 60% of meat products from the whole share of the market and were largely depended on imported meat products. Meanwhile, according to data of experts, 48,4% of imported sausage products and 43.3% of imported canned meats were rejected because they did not meet the Russian quality standards. The problem of adulteration of meat products at that time became acute, and the development of methods of quality evaluation of meat raw materials and final products, including the adaptation of foreign instrumentation and development of own devices and instruments for analysis and control of quality characteristics and safety goes to the foreground. At that time a great deal of interest to the problems of forming of quality characteristics of meat raw materials was observed, and the methods for its prediction were being developed.

Crisis of 1998 strongly hit the economic conditions of the population, as a result of which the demand for meat products decreased by 30-40%. The demands of the market in more cheap products increased and these could be satisfied only by domestic enterprises. Russian products became more in demand, and import decreased. However, the prices for the Russian products during the whole period rose much slower, than for foreign ones, and on the whole increased less which enhanced the competitiveness of domestic meat products. In this period a number of research work devoted to the problems of quality, analysis of new food additives and ingredients for meat products being developed increased almost twofold. It should be noted that the main field of research at that period was the additives, improving functional properties of raw materials and final products and the methods of their incorporation into meat products. Soya protein preparations, their quality and functional properties and the doses to be used in meat products were the main objects of investigations of Russian scientists. For 2-3 years a large range of Russian competitive food

compositions and additives, protein vegetable preparations, including modified (extruded) ones made from peas, lentil and other leguminous appeared at domestic market.

At the end of 1998 there was a trend to the increase of Russian animal products production (due to high prices for foreign products), it was especially evident poultry production. As a result, local poultry processing enterprises provided their products to the domestic market, forcing out foreign poultry products from it. This situation gave impetus to Russian scientists to study the problems of growing and feeding of farm poultry, and to less extent – pigs and cattle.

It is interesting to note that up to the present time the work is being carried out in Russia on the development of feed additives from inedible slaughter products (blood, by-products). And this is in spite of the threat of bovine spongiform encephalopathy. The explanation to this – Russian standards require high temperature treatment (118-122°C) for not less than 45 minutes.

There was a great deal of interest to problems of storage and development of new packaging materials.

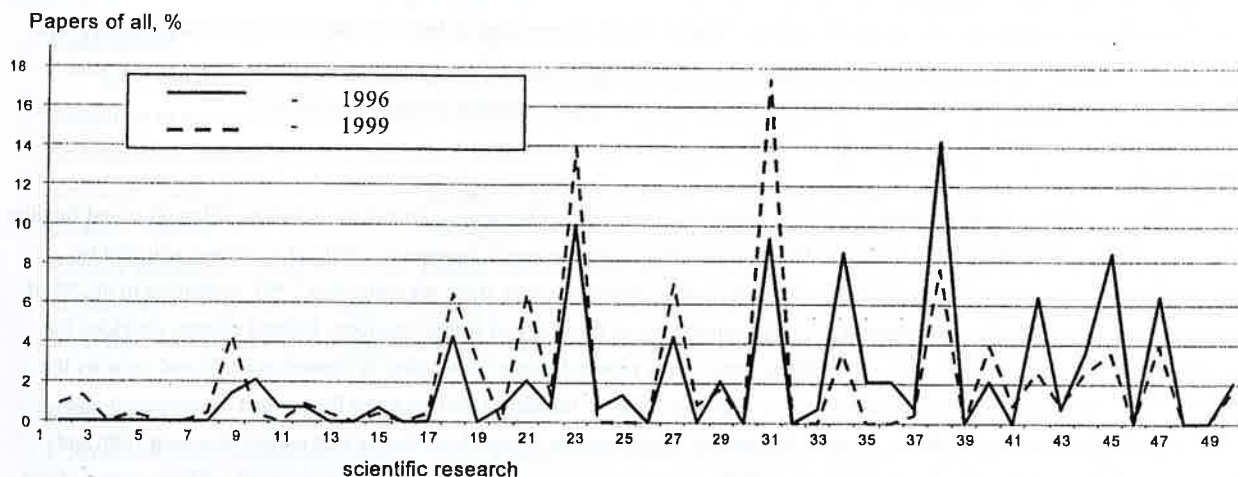
In general, it should be noted that socio-economic situation has had an impact on the field of research of Russian scientists, which primarily were directed to the development of meat products with different functional additives with the aim of cost reduction of final products, to the organization of marketing system and development of scientific bases of prediction of consumer demands - earlier, with planned economics, there had been no requirements in such investigations. At the same time one should note a high scientific potential in the field of development of functional products and processing of slaughterhouses wastes for food and feed materials.

Analysis of state of food engineering has shown backwardness of Russian developments, that were mainly aimed at automation and mechanization of individual stages of technological processes, while the leading foreign designers were creating fully automatic lines with the use of elements of robotic equipment. Unfortunately, backwardness of technical level of the domestic counterparts continues, which has a serious negative effect on competitiveness of Russian equipment and production cost of meat products manufactured in this country.

We compared the fields of scientific interests of Russia and countries of the world. There were not found a large amount of works devoted to the study of pre-slaughter handling of animals, slaughter, primary processing of the animals and the influence of these factors on quality of final products. It is explained by the absence of economical conditions for development of Russian animal husbandry during the indicated period. The Russian scientists more actively studied problems of storage and quality of meat raw materials and aspects of its safety, technologies of processing and obtaining of final products of guaranteed quality and safety, development of special food products, automation and mechanization of technological processes. While the efforts of foreign scientists were directed to revealing of life-time factors influencing the quality attributes of meat raw materials, their studying and predicting to provide high-quality raw materials to processors, development of objective methods of evaluation and a system of safety control of foods over the whole technological chain, evaluation of the meat composition and its influence on the health of humans, evaluation of safety of food additives and ingredients used in the meat industry.

However, the comparative analysis has shown that in the scientific development of such directions as creation of functional products (or curative-preventive foods according to Russian terms) Russian scientists have an obvious priority. This activity was originated in 1950s when creating the foods for cosmonauts. Based on it a methodology of curative-preventive nutrition has been developed, which is going on at the present time. Technogenic catastrophes that became more frequent in recent times, unfavorable ecological situation in a number of Russian regions, increase of the share of population with chronic diseases, obesity, cardiovascular metabolic diseases, etc. led the necessity of development of products containing ingredients capable to accumulate and remove harmful compounds from the organism, such as radionuclides, heavy metals and their salts, nitrosamines, toxins, etc. A wide range of meat-based curative-preventive products enriched with specific biocorrectors was developed for a wide circle of persons, primarily oncological patients, subjected to intensive radiation and chemical therapy, as well as for people who had suffered from radiation accidents or living at contaminated with radiation areas or in regions contaminated with genotoxic substances, inhibiting blood-forming and immune system. The investigations in this field are on the increase.

Trend of scientific interests in Russia for the period 1996 – 1999



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