Збагачення традиційних видів консервної продукції біологічно активними речовинами надає готовій продукції необхідні властивості оздоровчого та профілактичного направлення для використання в харчуванні населення, що перебуває в екологічно несприятливих умовах, для різних вікових груп, у тому числі і для дітей.

Однак проблемою залишається збереження біологічно активних речовин при переробці рослинної сировини.

Так було запропоновано деякі технологічні прийоми та процеси, які направлені на збереження БАД в плодоовочевій сировині, а також запропоновано шляхи удосконалення технології виробництва соусів на основі овочів, плодів та ягід.

На сьогоднішній час соуси займають дуже важливе місце не тільки в українській кухні, але і в кухнях багатьох народів світу. Соуси збагачують смак багатьох страв, забезпечують їх БАЗ, підвищують органолептичні показники, надають особливий смак, аромат, соковитість. Завдяки наявності екстрактивних, ароматичних і смакових речовин, збуджують секрецію травних залоз, соуси сприяють кращому засвоєнню основних компонентів страв. Соуси використовують не тільки з м'ясними, рибними, овочевими стравами, а й зі солодкими стравами, десертами.

Удосконалення процесів виробництва соусів в першу чергу направлено на застосування принципів поєднання різних видів овочів, плодів, ягід з урахуванням загальної органолептичної оцінки і вмісту біологічно активних речовин необхідних для оздоровчого та профілактичного харчування, а також поєднання високотехнологічних прийомів та процесів, які направлені на збереження і збагачення БАР в плодово-овочевій сировині.

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FEATURES OF THE USE OF IR RADIATION IN THE TECHNOLOGY OF DRIED MEAT PRODUCTS

Poultry meat is a source of high quality animal protein, the production and processing of which makes a significant contribution to Ukraine’s food security. The growing level of production and consumption of poultry meat requires manufacturers to develop more modern and promising technological approaches, expanding the range and development of technologies of high

quality and nutritional value, resistant to bacterial spoilage during long-term storage.

In this direction, the production of dry meat products is promising, the technologies of which make it possible to obtain products with a high content of protein and mineral components while minimizing the destructive changes of biological components, which makes it possible to attribute them to products of increased nutritional value. Ready-to-eat dried ready-to-eat meat products have a long history and culture of consumption in different countries. The demand for these products is due to the possibility of storage under normal conditions, a high degree of culinary readiness, great possibilities in modifying the aromatic properties, as well as convenience in consumption, which is achieved by adjusting the shape and mass of the product, its pre-packing and packaging. The development of technologies for dry meat products is associated with the attraction of new types of meat, the development of innovative methods of drying and packaging products aimed at improving consumer properties and hygienic quality of products.

In the manufacture of dry meat products, the main technological stages are drying and heating. The purpose of heating the drying is to ensure the required lethality of microorganisms, and the drying is the stability of the product to microbial spoilage during storage [1].

The main factor that allows to control the microbiological purity and stability of the product is the water activity, which decreases during drying. This is the difference between dry meat products and dry canned or fermented products, for which stability is provided by a combination of lower pH and water activity. In turn, water activity affects the quality, safety, shelf life, texture and aromatic characteristics of food products.

Drying food is not only a complex thermal process, but also a technological process, on which the quality of the finished product largely depends. It can be performed in various ways, depending on the type of food raw materials and products, the method of heat supply, pressure during the drying process and other factors. Of undoubted interest is the drying of food by IR radiation, which is currently considered to be very relevant and most promising. IR heating has wide opportunities and is used for drying, blanching, pasteurization, sterilization, defrosting edible raw materials, as well as frying and grilling [2; 3].

IR electromagnetic radiation is a volumetric method of heat supply in which IR radiation is converted into heat without direct contact between the energy source and the product, while the energy carriers are electromagnetic oscillations that occur in the product. IR radiation is able to penetrate the product to a certain depth and affect the molecular structure, causing a rapid increase in temperature inside the product. The technological process of IR

drying is based on the fact that IR radiation of a wavelength of a certain length is absorbed by the water in the product, and the fabric of the product being dried is not absorbed by the fabric. Therefore, the removal of moisture occurs at a temperature of (40-60) °C, which allows to almost completely preserve the biologically active substances, vitamins, taste, natural color and flavor of the dried products.

When IR heating, short waves are absorbed by water, while long waves are absorbed by the surface of the product. It follows that when heating products of minimum thickness, drying is most effective at long-range wavelengths (25-100 μm), and for thicker pieces – at short-range wavelengths (0.75-3.0 μm). For drying thin layers it is very effective to use IR heating, in this case, the intensification of drying increases 1.5-2.0 times while reducing energy consumption by 1.5 times.

IR radiation should be considered not only as a method of intensive heat treatment, but also as a process of deep influence on the physicochemical and biological properties of the processed product. Analysis of the literature suggests that IR heating is used for drying various products, including biologically active components, as it helps to preserve the active components, causes inactivation of bacteria, spores, yeasts, molds, limits the action of enzymes that can cause oxidative damage to dry food. It is used for processing meat products, providing the possibility of obtaining large heat fluxes, uniform heating of raw materials, and lower energy costs [4; 5].

Of undoubted interest is the study of the combined effects of IR radiation with other types of finishes, in particular, IR drying in vacuum. In the absence of air and, accordingly, oxygen in the drying chamber, oxidation processes and the development of microorganisms that cause damage and accumulation of hazardous and toxic substances are minimized, and the product structure is improved. At the same time, analysis of the literature suggests that studies of IR heating of meat and meat products in vacuum to reduce the mass fraction of moisture are very limited, which indicates the relevance of work in this direction. This is all the more relevant with respect to dry meat products, the number of barriers in the technology of which is very limited. It is effective for meat products of small sizes, in particular, of small thickness. As for them, one should expect such a positive moment of IR vacuum drying as an exception to the anomalous temperature distribution. The anomalous distribution is due to the penetration of short-wave IR rays into the material and heat from the surface of the material to the environment. As a result, at some depth it is higher than on the surface of the material and significantly higher than inside it. It should be expected that with a small thickness characteristic of chips, this effect is practically excluded [6].

Thus, the collection and analysis of literature data allows to conclude about the relevance of research aimed at studying the effect of IR drying chips under vacuum on the quality, nutritional value and safety of the product in order to develop a new dry product technology.

References

1. Беляева, М.А. Многокритериальная оптимизация процессов тепловой обработки мясных полуфабрикатов при ИК-энергоподводе: автореф. дис. докт. техн. наук / М.А. Беляева. – Москва, 2009 – 41 с.

2. Патент 2183098 МПК7 A23L 1/312, A23B4 / 03 РФ Способ производства копченых сухих мясных продуктов из свиных ушей и хвостов / Антипова Л.В., Калачев А.А. Слюсарев М.И., Ушаков П.А., Парфенов А.В.; заявитель Воронежская государственная технологическая академия; заявл. 22.06.2000; опубл. 10.06.2002

3. Troy D. J. et al. Sustainable and consumer-friendly emerging technologies for application within the meat industry: An overview //Meat Science. – 2016. – V. 120. – P. 2-9.

4. Farkas J. Irradiation for better foods //Trends in food science & technology. – 2006. – V. 17. – №. 4. – P. 148-152.

5. Al-Bachir M., Mehio A. Irradiated luncheon meat: microbiological, chemical and sensory characteristics during storage //Food Chemistry. – 2001. – V. 75. – №. 2. – P. 169-175.

6. Nam K. C. et al. Effect of ionizing radiation on quality characteristics of vacuum-packaged normal, pale–soft–exudative, and dark–firm–dry pork // Innovative Food Science & Emerging Technologies. – 2002. – V 3. – №. 1. – P. 73-79.