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"Наукові здобутки молоді –
вирішенню проблем
харчування людства у ХХІ
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91st International scientific conference of young scientist and students "Youth scientific achievement to the 21st century nutrition problem solution", April, 7–11, 2025. Book of abstract. Part 3. NUFT, Kyiv.

The publication contains materials of 91th International scientific conference of young scientists and students "Youth scientific achievements to the 21st century Nutrition problem solution".

It was considered the problems of improving existing and creating new energy and resource saving technologies for food production based on modern physical and chemical methods, the use of unconventional raw materials, modern technological and energy saving equipment, improve of efficiency of the enterprises, and also the students research work results for improve quality training of future professionals of the food industry.

The publication is intended for young scientists and researchers who are engaged in definite problems in the food science and industry.

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Матеріали 91-ї Міжнародної наукової конференції молодих учених, аспірантів і студентів "Наукові здобутки молоді – вирішенню проблем харчування людства у XXI столітті", 7–11 квітня 2025 р. – Київ: НУХТ, 2025. – Ч.3. – 508 с.

Видання містить матеріали 91-ї Міжнародної наукової конференції молодих учених, аспірантів і студентів "Наукові здобутки молоді – вирішенню проблем харчування людства у XXI столітті".

Розглянуто проблеми удосконалення існуючих та створення нових енерго-та ресурсощадних технологій для виробництва харчових продуктів на основі сучасних фізико-хімічних методів, використання нетрадиційної сировини, новітнього технологічного та енергозберігаючого обладнання, підвищення ефективності діяльності підприємств, а також результати науково-дослідних робіт студентів з метою підвищення якості підготовки майбутніх фахівців харчової промисловості.

Розраховано на молодих науковців і дослідників, які займаються означеними проблемами у харчовій науці та промисловості.

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25. Plant-Based Products Technologies: Innovations and Future Trends

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Introduction. The rising demand for healthy food has fueled innovation in plant-based product technologies, aiming to mimic the sensory experience and nutrition of animal products.

Materials and methods. During the research a number of scientific publications on the scientific issues, materials of periodicals, Internet resources were studied and analyzed.

Results. Advanced techniques enable the extraction and purification of high-quality plant proteins from various sources, including legumes, soy, peas, and wheat. In a supercritical state, CO₂ has high solvating power, allowing it to extract specific compounds from plant materials with high selectivity and efficiency.

Innovative fermentation techniques using microorganisms like yeast and fungi can produce high-value proteins with desirable functional properties, such as meat-like texture and flavor.

Technologies such as extrusion, spinning, and shearing can transform plant proteins into various formats, such as fibers, chunks, and flakes, resembling the texture of meat and dairy products.

Plant-based extracts, herbs, spices, and natural flavoring compounds can be used to create authentic and appealing flavors in plant-based products.

Enzymes can be used to modify the flavor profile of plant proteins by breaking down bitter peptides and enhancing desirable flavors. Enzymes can target specific changes in the protein structure, leading to improved solubility, emulsification, foaming, and textural properties.

Controlled Maillard reaction (non-enzymatic browning reaction) can be used to develop savory flavors and mimic the browning characteristics of meat products.

Structuring and blending of plant-based oils, such as coconut oil, palm oil, and shea butter, can create alternatives to animal-based fats with similar melting properties and mouthfeel. Here are some technologies for that: high-pressure homogenization (HPH), microfluidization, membrane emulsification, and ultrasonication. Microencapsulation of fat replacers can improve their stability, flavor, and functionality in plant-based products. Types of microencapsulation techniques: spray-drying, coacervation, emulsion-based encapsulation.

There are two main approaches to obtain plant-based heme (novel ingredient): extraction from plants (Leghemoglobin) and microbial fermentation (primary method for obtaining commercially viable plant-based heme).

3D printing technology allows for the precise deposition of plant-based ingredients to create customized and intricate food structures, offering new possibilities for product design and innovation. It's one of the best technologies for producing plant-based meat.

Emerging technologies like cell-based agriculture enable the production of meat and dairy products directly from animal cells, offering a potential solution to the ethical and environmental concerns associated with conventional animal agriculture.

Conclusion. Advancements in plant-based product technologies are rapidly transforming the food industry, offering a wide range of innovative and sustainable alternatives to conventional animal-based products. These technological advancements have the potential to meet the growing demand for healthier, more sustainable, and ethical food.