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**ENERGY-SAVING
HEAT
TECHNOLOGIES
FOR
OBTAINING SOY
BASED
PLANT
POWDERS**

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ЕНЕРГООЩАДНІ
ТЕПЛОТЕХНОЛОГІЇ
ОТРИМАННЯ
РОСЛИННИХ
ПОРОШКІВ
НА ОСНОВІ
СОІ

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«UKRAINIAN SCIENTIFIC BOOK
IN A FOREIGN LANGUAGE»*

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The monograph is devoted to solving the problem of energy-saving and development of resource-saving heat technology for processing soybeans and their mixtures with carotene-containing raw materials on functional phytoestrogenic food powders. The paper considers modern research and methods of processing phytoestrogenic raw materials. The study of heat and mass transfer processes during convective drying and the study of thermophysical and physicochemical properties of phytoestrogenic raw materials and its protein-carotene mixtures are presented. Innovative heat technology for the production of phytoestrogenic powders based on soybeans, recommended for use in the pharmaceutical, dairy and food industries, has been developed.

The monograph is intended for employees of the food industry, students of higher educational institutions, masters and graduate students of engineering and technical specialties.

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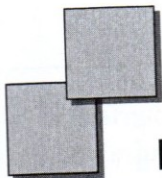
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INTRODUCTION

Outdated technologies used in the drying process lead to irrational use and high energy consumption and cause an increase in energy consumption. This brings the issue of energy saving and energy efficiency to one of the most important tasks to be solved. In current conditions, these issues are an integral part of the problem of ecology. Ukraine, having a unique environment for Europe, being fully supplied with natural resources, is also one of the countries in the region where energy resources are used least efficiently.

One of the most relevant areas of research is the issue of energy efficiency of drying methods. Drying of plant materials is a thermal process during which the technological and biochemical properties of the material change. The application of process parameters that do not correspond to the properties of plant material leads not only to unnecessary energy costs, but also to deterioration of the quality characteristics of the final product.

A polluted environment directly affects the physical condition of the population. Poor nutrition, constant stress and a problematic ecology compose a complex that interacts daily with human immunity. The Ministry of Health of Ukraine reports: «The highest mortality rate in the world is caused by malnutrition. This figure is higher than due to smoking, high blood pressure and other risk factors. Therefore, food must have functional properties, and its processing should ensure maximum preservation of biologically active substances contained in it.

One of the processing methods is drying of vegetable raw materials. The problem of energy saving occupies a leading place in the drying process. In the food industry, drying is one of the ways to preserve plant raw materials, which allows one to extend the shelf life of products and preserve their quality characteristics and nutrients as long as possible. This is extremely positive in the case of canning (drying) of PPRMs with a high content of protein and fat, in particular soybeans. As recently predicted, the growth of protein deficit in Ukraine is becoming more common. It is noted that soy products are able to compensate the lack of protein in the diet of people around the world.

It is known that soybeans contain antifeed components that interfere with the digestion of soy proteins. Therefore, there is a problem of their neutralization, which involves hydrothermal treatment of PPRMs. Existing techniques involve the use of high temperature and multi-hour treatments, which leads to high energy consumption. Consequently, there is a need to improve them.

At present, the most effective equipment for drying vegetable raw materials in the industry, are convective drying units, the advantages of which are in operational and structural simplicity.

In processing PPRMs, it is very important to properly perform their preliminary preparation for drying, during which there is a risk of abrupt changes in technological and biochemical properties of the material.

It is proved that appropriate vegetable raw materials require appropriate technological modes of previous preparing and drying. PPRMs especially need most accurate adherence to the technological mode of processing, because an improper mode can lead to oxidation of their lipids, which chain reaction can start the process of destruction of all biologically active substances contained in them.

Drying of PPRMs is a long process. Together with the stage of the previous preparing, the drying process has a high total energy consumption. Therefore, there is a need to intensify the process with the maximum reduction of drying time and the development and improvement of heat technologies for drying vegetable raw materials, which will allow processing products with minimal energy consumption, long shelf life and preservation of biologically active substances.

Монографія присвячена вирішенню проблеми енергозбереження та розробки ресурсоощадної теплотехнології переробки соєвих бобів та їх сумішей з каротиновмісною сировиною на функціональні фітоестрогенні харчові порошки. Розглянуто сучасні дослідження та способи переробки фітоестрогенної сировини. Представлено дослідження тепломасообмінних процесів під час конвективного сушіння та дослідження теплофізичних і фізико-хімічних властивостей фітоестрогенної сировини та її білково-каротинових сумішей. Розроблено інноваційну теплотехнологію отримання фітоестрогенних порошків на основі сої, що рекомендовано до використання у фармацевтичній, молочній та харчовій промисловостях.

Видання призначено для працівників підприємств харчової промисловості, студентів закладів вищої освіти, магістрів та аспірантів інженерно-технічних спеціальностей.

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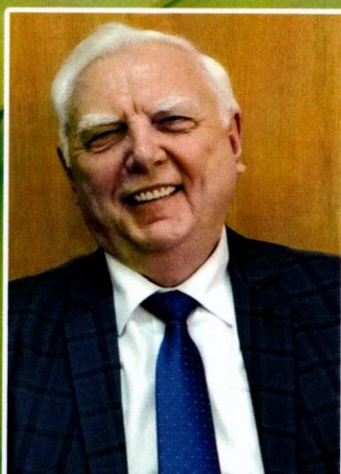
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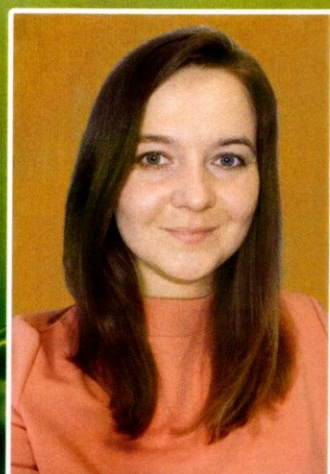
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