

ОДЕСЬКА НАЦІОНАЛЬНА АКАДЕМІЯ  
ХАРЧОВИХ ТЕХНОЛОГІЙ

**ЗБІРНИК  
НАУКОВИХ ПРАЦЬ**  
*МОЛОДИХ УЧЕНИХ,  
АСПІРАНТІВ ТА СТУДЕНТІВ*



ОДЕСА  
2018

ББК 36.81 + 36.82  
УДК 663 / 664

Головний редактор, д-р техн. наук, проф.  
Заступник головного редактора, канд. техн. наук, доцент.  
Відповідальний редактор, д-р техн. наук, проф.

Б.В. Єгоров  
Н.М. Поварова  
Г.М. Станкевич

Редакційна колегія  
доктори наук, професори:

Р.В. Амбарцумянц, А.Т. Безусов, С.В. Бельтюкова,  
О.Г. Бурдо, Л.Г. Віннікова, О.І. Гапонюк,  
К.Г. Іоргачова, Л.В. Капрельянц, Б.В. Косой,  
С.В. Котлик, Г.В. Крусір, М.Р. Мардар, В.І. Мілованов,  
В.В. Немченко, Л.А. Осипова, О.І. Павлов,  
В.М. Плотніков, І.І. Савенко, О.Є. Сергєєва,  
Л.М. Тележенко, О.С. Тітлов, Н.А. Ткаченко,  
О.Б. Ткаченко, Г.М. Хмельнюк, В.А. Хобін, Н.К. Черно,  
О.О. Коваленко, Д.О. Жигунов

доктори наук:

**Одеська національна академія харчових технологій**  
Збірник наукових праць молодих учених, аспірантів та студентів  
Міністерство освіти і науки України. – Одеса: 2018. – 240 с.

Збірник опубліковано за рішенням вченої ради від 03.07.2018 р., протокол № 15  
За достовірність інформації відповідає автор публікації

РОЗДІЛ 1

**АКТУАЛЬНІ ПИТАННЯ ЗБЕРІГАННЯ  
ТА ТЕХНОЛОГІЇ ПЕРЕРОБКИ ЗЕРНА,  
ОВОЧІВ ТА ФРУКТІВ**

ter. An unpleasant feeling of the viscosity inside the macrosphere happened in case of the highest concentration of sodium alginate.

During the first 5 minutes interaction of sodium alginate with  $\text{CaCl}_2$  at the smallest concentration in the solution, the macrocapsule shell was thick, loose and quickly destroyed by mechanical influence. With prolongation of the gelation process and with increasing concentration of both reagents, the macrospheres' shell became stronger and denser. With a gradual increase in the concentration of  $\text{CaCl}_2$  in the solution, the macrospheres' shell acquired an unpleasant bitter taste. The thickness of the macrospheres' shells was between 1.04 mm and 3.17 mm.

Capsulated sweets with desirable organoleptic characteristics were obtained by mass fraction in solution: sodium alginate – 3.3%, sucrose – 33.3%, cocoa powder – 6.7%, calcium chloride – 5.0%. The recommended duration of the interaction of polysaccharide with calcium ions at a temperature of 50°C was 15 minutes. The calcium alginate macrospheric shell was strong, dense, about 1.5 mm thick. At the same time, 1 g of polysaccharide bound up to 22.0% of calcium ions.

So, macrospheres are obtained – sweets with calcium-alginate shells and liquid internal environment imitating the filling. Efficient conditions for obtaining alginate macrospheres are established. Spherical sweets are promising salutary food products, as they are sources of dietary fiber and high bioavailability of bioorganic calcium.

Supervisors – Candidate of Technical Sciences, PhD Gural L,  
Candidate of Technical Sciences Naumenko K.

## **OPTIMIZATION OF THE BAKERY PRODUCTS RECIPE BY USING HIGH-LEVEL PROTEIN CONTENT FLOUR**

**Viktoriia Holovniak, student of Master's degree program ONAFT  
Odessa National Academy of Food Technologies, Odessa**

The increasing consumption of sugars has resulted in several nutritional and medical problems, such as obesity, diabetes and cardiovascular diseases. Bakery products, from all types of foods, have one of the highest glycemic indexes, so it's hard to recommend them for daily intake, and especially for people, who has metabolic disorders or overweight.

The aim of this study to develop the technology of new food product, which will be one of several dietary baked goods with low moisture content due to the adaptation of the technological process and the recipes. To adjust the formulation of bakery products, taking into account the goal - to reduce the glycemic index of finished products, for dough kneading 50% moisture was used flour rye whole-wheaten, wheat flour I grade, dry wheat gluten, bran and yeast baked pressed.

To select the factors that are subject to the experimental study, the a priori ranking method was used. As a result, it was found that to achieve the goal of evaluating bakery products is important to taste, glycemic index and energy value.

To correct the prescription composition of bakery products, taking into account the goal of reducing the glycemic index of finished products, rye flour used for wholemeal and non-bakery flour, such as: flour of green buckwheat, cheakpea flour, lentil flour. They help to increase the glycemic index, balance the food value and bring it closer to the modern requirements, because they have high protein content.

Water was replaced with Stevia extract. The quantity of rye wholemeal flour varied within 15 ... 60%, dry wheat gluten - 5...15%, bran – 2 ... 6% of the total amount of flour component. Leaves of *S. rebaudiana* contain 0.46% fructooligosaccharides, such as inulin – a natural polysaccharide with important functional properties, which refers to prebiotics and food fibers. And they are known to play an important role in the metabolism of lipids and the control of diabetes, and the meal obtained after extraction has also been used in dough mixing in an amount of 1...5% to the weight of flour.

In accordance with this goal, particular attention was paid to the influence of non-baking flour on the index of glycemic index, and determined the optimal ratio of dry components for the best sensory parameters.

According to the results of the mathematical model, the optimal ratio of the recipe components was established. At the same time, if the basis for taking the lowest glycemic index, the content of flour of green buckwheat was 20%, flour 12.5%, lentil flour 13.9%, and to obtain the best flavor properties 9.2%, 6.06%, 19.01% respectively.

Results show that the selected combination of ingredients allows to significantly increase the energy value and glycemic index of bakery products. Furthermore, it leads to partially fitting for the basic requirements for food that can be used in the daily diet of people with metabolic syndrome.

As a result of optimization, it has been established that to a greater extent on the calculated glycemic index the greatest influence is made by the content of non-baking flour, bran and dry wheat gluten. For further research, the six best formulations that will be used to find answers to a range of questions have been identified, this will be the subject of further research.

Research adviser – PhD, senior lecturer Natalia Sokolova

## **ELABORATION THE TECHNOLOGY OF RESEIVING FOOD COLORANTS WITH RAW MATERIALS**

**Sharova Irina, the 3 rd year student Faculty of  
Inovative food technologies restaurant-hotel bisines  
Odessa National Academy of Food Technologies, Odessa**

Our country need harmless cheap colorants with reasonable for restaurant business enterprises/ Plenty of food industry branches are interested in using of natural colorants in production. People prefer more organic products.

A plant *Hibiscus Sabdariffa* L, and red cabbage is source of anthocyanins (plant pigment), which are perfect for food colorant industry. At the same time extraction process from plants is a quite simple and could be used for wide production cost. Raw materials for getting colorants were hibiscus, onion peel, red cabbage.

For giving the product pleasing features often use synthetic and naturals colorants, Unfortunately, for last years people have chosen synthetic colorants in our country and abroad. The kind of colorant paints products in stable color and has low price.

But we have reliable information about mutagenic and cancerogenic characteristics of these colorant. People have adapter for naturals colorant during Evolution. The colorants were extracted from fruit, vegetables, berries and plant roots. Natural colorants have coloring pigments, organic acids, vitamins and aromatic substances. Natural colorants are secure for

## З М І С Т

### РОЗДІЛ 1 – АКТУАЛЬНІ ПИТАННЯ ЗБЕРІГАННЯ ТА ТЕХНОЛОГІЇ ПЕРЕРОБКИ ЗЕРНА, ОВОЧІВ ТА ФРУКТІВ

TECHNOLOGY OF NUT SAUCES WITH BALANCED FATTY ACID COMPOSITION Kashkano M.A., Kovalchuk V.O. ....	4
MILLING AND RHEOLOGICAL PROPERTIES OF FLOUR FROM DIFFERENT KINDS OF WHEAT Barkovska Y.S., Egorshyn E.A. ....	5
CONSUMER PROPERTIES OF SMALL-SEEDED BEAN CULTURES Markovska K.O., Simonina V.S. ....	7
PREPARATION OF CONFECTIONERY MACROSPHERES BASED ON SODIUM ALGINATE Ershova K., Stahurska J. ....	8
OPTIMIZATION OF THE BAKERY PRODUCTS RECIPE BY USING HIGH-LEVEL PROTEIN CONTENT FLOUR Viktoriia H. ....	9
ELABORATION THE TECHNOLOGY OF RESEIVING FOOD COLORANTS WITH RAW MATERIALS Sharova I. ....	10
ДОСЛІДЖЕННЯ ОРГАНОЛЕПТИЧНИХ ПОКАЗНИКІВ ЗІЗІФУСУ ПРИ ЗБЕРІГАННІ В РОЗЧИНАХ NaCl Забранська К. О. ....	11
ДОСЛІДЖЕННЯ СПОСОБУЗНИЖЕННЯ ПИТОМОЇ КОНЦЕНТРАЦІЇ ОКСИДІВ НІТРОГЕНУ У ВІДВЕДЕНИХ ГАЗАХ ХЛІБОПЕКАРСЬКИХ ПІДПРИЄМСТВ Проданова Г.О. ....	13
ПІДВИЩЕННЯ ЯКОСТІ СОЇ ШЛЯХОМ ЇЇ ФРАКЦІОНУВАННЯ Лопаткін В.Г. ....	14
БІОТЕХНОЛОГІЇ ПІДВИЩЕННЯ ЗАПАШНИХ ВЛАСТИВОСТЕЙ ЇСТІВНИХ ГРИБІВ, ЩО КУЛЬТИВУЮТЬСЯ Власенко К.М., Кузнецова О.В., Орешко А.О. ....	17
РОЗРОБКА ТЕХНОЛОГІЇ КОНСЕРВОВАНИХ ХЛІБНО-ПЛОДОВИХ ПРОДУКТІВ Данильчук В.В. ....	19
ПОРІВНЯЛЬНА ХАРАКТЕРИСТИКА ТА ПЕРСПЕКТИВИ ВИКОРИСТАННЯ ЗЕРНА СОРГОВИХ КУЛЬТУР Ольховська Є.О. ....	21
ПЕРСПЕКТИВНІСТЬ ВИКОРИСТАННЯ НЕХЛІБОПЕКАРСЬКИХ ВИДІВ БОРОШНА В ТЕХНОЛОГІЇ КЕКСІВ Тортіка Н.М., Зантарая С.О., Ковальчук Д.С. ....	24
КОМБІНАЦІЯ ФРУКТОВИХ ТА ОВОЧЕВИХ СОКІВ З ТОЧКИ ЗОРУ ХАРЧОВОЇ ЦІННОСТІ Іващук А.І. ....	25

Наукове видання

**Збірник наукових праць  
молодих учених, аспірантів  
та студентів**

**Том 1**

Головний редактор, д-р техн. наук, проф. Б.В. Єгоров  
Заст. головного редактора, канд. техн. наук, доц. Н.М. Поварова  
Відповідальний редактор, д-р техн. наук, проф. Г.М. Станкевич  
Технічні редактори А.В. Коваль, Т.Л. Дьяченко

Ум. друк. арк. 27,9.