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INTERNATIONAL SCIENTIFIC UNITY

COLLECTION OF SCIENTIFIC PAPERS

ISSUE №17

1ST INTERNATIONAL SCIENTIFIC AND PRACTICAL CONFERENCE

MODERN SCIENCE: RESEARCH, ECONOMY AND INNOVATION

APRIL 30 - MAY 2, 2025
ZAGREB, CROATIA

ISU

INTERNATIONAL SCIENTIFIC UNITY

1st International Scientific and Practical Conference

«Modern Science: Research, Economy and Innovation»

Collection of Scientific Papers

April 30 - May 2, 2025
Zagreb, Croatia

UDC 01.1

Modern Science: Research, Economy and Innovation: Collection of Scientific Papers "International Scientific Unity" with Proceedings of the 1st International Scientific and Practical Conference. April 30 - May 2, 2025. Zagreb, Croatia. 329 p.

ISBN 979-8-89704-981-3 (series)
DOI 10.70286/ISU-30.04.2025

The conference is included in the Academic Research Index ReserchBib International catalog of scientific conferences.

The collection of scientific papers "International Scientific Unity" presents the materials of the participants of the 1st International Scientific and Practical Conference "Modern Science: Research, Economy and Innovation" (April 30 - May 2, 2025).

The materials of the collection are presented in the author's edition and printed in the original language. The authors of the published materials bear full responsibility for the authenticity of the given facts, proper names, geographical names, quotations, economic and statistical data, industry terminology, and other information.

ISBN 979-8-89704-981-3 (series)

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Depth of the layer, cm	Before processing	Chiselling at 34 cm
5 – 15	71.8	40.8
15 – 25	65.2	67.3
25 – 35	75.5	84.0

When the temperature inside the formation decreases, a temperature gradient occurs, a heat flow arises that also promotes the flow of moisture (thermodiffusion of moisture). When the temperature inside the formation increases, the adhesion and attraction forces between the elements of the solid and liquid phases, the existing surface tension and hydraulic potential decrease. As a result, due to the difference in capillary pressures, moisture moves toward the lower temperature. The presence of moisture inside the formation continues until equilibrium is established between the pressures. This is facilitated by solar radiation. This radiation ensures the heating of the formation and the evaporation of moisture. As a result, capillary- sorption forces arise, which at the point of contact of the aggregates ensure the movement of moisture.

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RESEARCH ON THE INFLUENCE OF CAROB POWDER ON THE POROSITY OF BAKED SEMI-FINISHED PRODUCTS

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Flour confectionery is one of the groups of high-calorie food products that are in significant demand among consumers, therefore, it is proposed to add carob powder to the custard dough to enrich the custard semi-finished product with useful elements.

Carob powder is a plant raw material that contains biologically active elements (proteins, fat- and water-soluble vitamins, dietary fiber, micro- and macroelements) and does not contain caffeine, theobromine, phenylethylamine. Carob powder is

obtained from dried carob fruits and is divided into types: unroasted (Dry) and, depending on the degree of roasting, light, medium, dark [1].

Porosity is an important indicator of the quality of flour confectionery products, as it characterizes their structure, volume and affects the digestibility of the product. Porosity reflects the volume of pores located in a certain volume of crumb, expressed as a percentage of the total volume.

Custard cakes are products whose feature is the presence of large voids inside the product, which indicates the feasibility of determining the porosity index of these products.

The aim of the research is to determine the effect of carob powder of varying degrees of roasting on the volume and porosity of custard semi-finished products.

The study was conducted on samples of custard semi-finished products from traditional dough (Control), custard semi-finished products from dough with the addition of carob powder (types: Dry, Light, Medium, Dark) and cocoa powder. The studies used carob powder of the country of origin Spain, according to the requirements of TU U 10.6-2949619066-001:2019 «Carob pod flour». The determination was carried out by the method of digital image processing using the computer program ImageJ [2].

The essence of the digital image processing method is to analyze the image of a product section by scanning it and then counting the dark areas.

First, it is necessary to obtain an image of a section of the custard semi-finished product by photographing or scanning. For further processing, the obtained photos are entered into the ImageJ program, then the program automatically processes the obtained images: corrects the formatting of the photo in grayscale with the subsequent division of areas into dark (pores) and light (mass of non-porous material). Processing of the results is reduced to calculating the area of dark areas (circles) [3].

The porosity of the test samples of custard semi-finished products is shown in the figure. The results of the studies of the indicators of custard semi-finished products are given in the table.

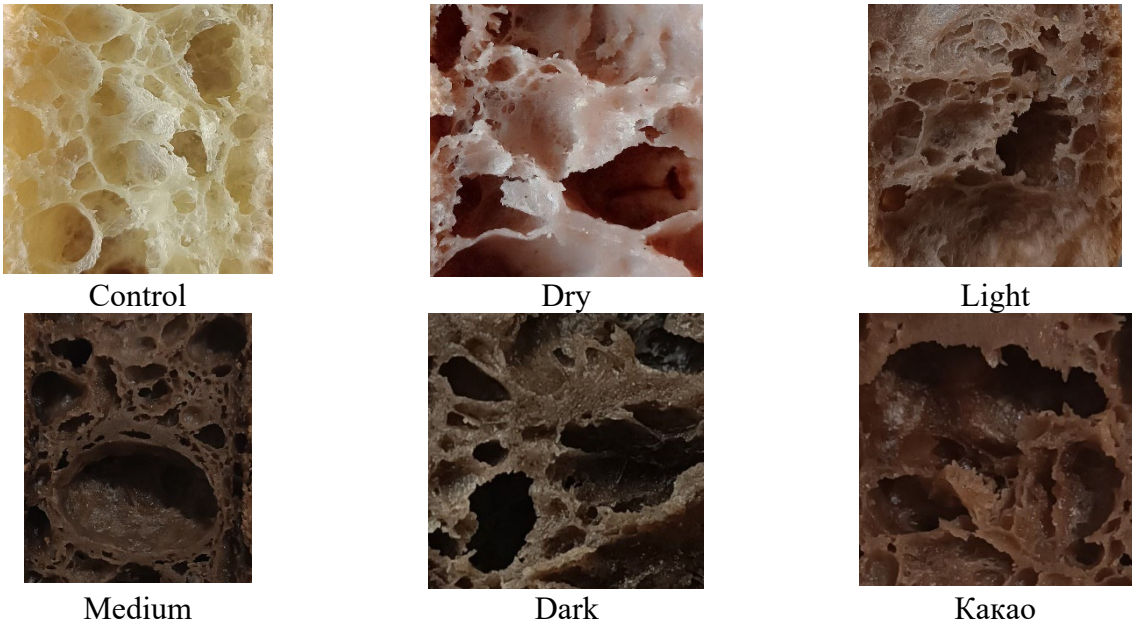

Figure. Digital image of porosity of custard semi-finished products

Table. Indicators of custard semi-finished products ($n=5$, $P \leq 0,05$)

Indicator	Control	Dry	Light	Medium	Dark	Какао
Total volume, cm^3	217,5	209,2	214,1	215,3	216,9	204,7
Cavity volume, cm^3	114,3	108,5	112,1	109,1	115,5	104,9
Specific volume, cm^3/g	5,4	4,61	4,86	4,76	4,7	5,28
Porosity, %	83,3	90,5	90,8	89,3	77,0	85,0

Analyzing the results obtained, it can be noted that the use of Dry and Light carob powder for the production of custard semi-finished products contributes to the improvement of the porosity of the products in comparison with the control sample. In samples using Medium and Dark carob powder, the porosity decreases due to the formation of a «densification» of the dough inside the semi-finished products.

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ДОСЛІДЖЕННЯ МЕТОДІВ КОМП'ЮТЕРИЗАЦІЇ ПРОЦЕСУ ОРГАНІЗАЦІЇ ТА ПРОВЕДЕННЯ ОДНОГО КЛАСУ СПОРТИВНИХ ЗМАГАНЬ

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На сьогоднішній день проблеми комп’ютеризації будь-якого виду спорту як такої не існує. Але більшість таких програм, по-перше є стаціонарними, тобто прив’язані до операційної системи, а по-друге є достатньо дорогими, щоб використовувати їх в маленьких організаціях. А відсутність можливості комп’ютеризації спортивних змагань у таких видах спорту, як бойові мистецтва потребує надмірних витрат людських ресурсів на всіх етапах їх організації та проведення.

Мета роботи: Створення безкоштовної веб-платформи для управління процесом організації та проведення змагань з бойових видів спорту, яка не прив'язана до конкретної операційної системи.

Основна частина.

Collection of Scientific Papers
with Proceedings of the 1st International Scientific and Practical Conference
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Certificate of the subject of the publishing business: ДК №7980 of 03.11.2023.

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