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ANALYSIS OF THE PROSPECTIVENESS AND SAFETY OF THE USE OF PLANT RAW MATERIALS IN THE ENRICHMENT OF FLOUR AND BREAD PRODUCTS

KHASHIMOVA NAZIRA

Basic doctoral student of Namangan Institute of Engineering and Technology
E-mail.: khoshimova1983@gmail.com, phone.: (+99893) 407 70-78

Abstract:

Objective. This article provides information on measures to prevent micronutrient deficiency, which is one of the most important problems of the population. The creation of products containing a wide range of biologically active nutrients for mass consumption remains an urgent task today. The growing attention to the use of local raw materials in production is causing great interest in obtaining additional nutrients from various plants in our country.

Methods. According to the information presented above, fortification with fruits and vegetables can be the basis for creating a product with high nutritional value.

In addition, non-waste technologies for the enrichment of food products at the expense of industrial secondary raw materials are being created. Considering these aspects, we believe that the vitamins and minerals contained in locally produced green walnut husks can be a potential raw material for increasing the biological value of flour and bakery products.

Results. The peel of green walnut variety "Ideal" was taken as the object of the study. The reference sample (control) is a grain of spring soft wheat. Sampling of green walnut husks was carried out according to the developed technical instructions. Its quality is checked in accordance with the established requirements of state Standards. Indicators of the level of toxicological safety of walnut peel greens were determined according to generally accepted methods in accordance with the requirements of Sanitary Rules, Norms and Hygiene Standards of the Republic of Uzbekistan (№ 0366-19).

Discussions. Studies have shown that the green skin of walnuts contains tannins. All tannins are active antioxidants that have a general strengthening and healing effect on the human body.

According to the results of laboratory studies, the additive contains questionable substances, which, according to the conclusions of microbiological studies, are recognized as safe for the human body. If we take into account the active antioxidant ability of tannins, we can see that the shelf life of the finished product is extended when this substance is added to it as an additive.

Conclusion. The next stage of research work is to mix whole grain flour with green walnut husk additive and study samples for comparative analysis.

Keywords: fortification, flour confectionery, vitamins, minerals, enrichment, walnut peel, flour, bread, flour enrichment.

Introduction. In recent years, the number of diseases caused by malnutrition has increased among the population. According to the World Health Organization, more than 2 billion people on the Earth suffer from vitamin and mineral deficiencies, especially vitamin A, iodine, iron and zinc, important biopolymers. From year to year there is a trend towards the spread of hypoelementosis (deficiency of magnesium, iodine, iron, etc.) and hypovitaminosis (lack of vitamins A, B, D, etc.) [1,20,16]

To date, the creation of products containing a wide range of biologically

active nutrients widely consumed by the population remains an urgent task. The growing attention to the use of local raw materials in production is causing great interest in obtaining additional nutrients from various plants in our country. [2,18].

It is important to use non-traditional raw materials containing physiologically active substances when developing recipes with a functional orientation that positively affect human health, and when expanding the range of bakery products. [3,19].

The presence in plants rich in biologically active substances

(carbohydrates, organic acids, dietary fiber, nitrogen, minerals, aromatic substances and vitamins) makes it necessary to use them in the food industry, including the baking industry. It is considered very economical to expand the use of fruits, berries and vegetables, as well as their secondary raw materials in the baking industry, to obtain juice, extract, puree, paste and powder from them and low-cost processing.

For example, in the food industry, it is widely used in the production of various products from apples: natural and condensed juice, puree, powder, pulp, jam, extract (with apple pectin), cellulose, etc. These products contain carbohydrates (sugar, fiber, pectin, hemicellulose, starch), acids (malic acid), macro- and microelements (K, Na, Ca, P, Mg, Fe), vitamins (C, B1, B2, B6, PP).) is distinguished by its richness. They are widely used in the preparation of bread and flour confectionery, as well as in the activation of pressed, dry and liquid yeast. Raw materials obtained from apples make it possible to enrich bakery products with sugar, dietary fiber, minerals and vitamins.

In addition, a special place in the food industry is occupied by secondary raw materials obtained from grapes: juice, molasses and grape pulp powder. The amount of raw materials obtained from grapes, for example, sugar and some macronutrients (K, Ca, P, Mg), exceeds apple products. They contain a large amount of acid, and grape products are very rich in vitamins B1, B6 and PP.

Up to 50% of waste (including peel and seeds) is generated during the processing of pomegranate in the food industry. The bark contains coloring and pectin substances, sugars, organic acids and other components. The use of pomegranate powder makes it possible to strengthen gluten, increase the gas-forming ability of the dough, increase its lifting power, enrich the bread with nutrients and minerals.

According to the results of the research, the amount of cabbage, beetroot and carrot puree 10% relative to the flour mass improves the structural and mechanical properties of the dough. Increases the microflora of the fermenter and increases its activity.

Pumpkin fruits contain carbohydrates, nitrogenous and mineral compounds. It has 8-10 percent dry matter, including organic acids and vitamins. The bulk of the dry matter (up to 10%) is sugar. Pumpkin sugars are made up primarily of sucrose with smaller amounts of glucose and fructose. Zucchini and products of its processing are promising vegetable raw materials that affect the quality of semi-finished products and finished products in the production of bakery products. [4,1].

Pumpkin, amaranth and sesame are promising raw materials with functional properties and high nutritional value. They have an optimized nutritional value and high economic efficiency in the enrichment of flour products. Enriched flour products of this type are a source of quickly digestible and easily digestible protein. Of particular importance is the high content of tocopherol, B vitamins and some micro- and macroelements in the flour. [5,15]

Among flour confectionery products, gluten-free varieties are also produced. Common ingredients in gluten-free products include starch from corn, potatoes, and rice. However, products based on such raw materials are characterized by low nutritional value, low content of important micronutrients and increased spoilage rate. As a rule, gluten-free products are characterized by a high concentration of fat, sugar, additives used to improve taste, texture and appearance. [6,17].

A promising way to increase the nutritional value of bread products is the inclusion of natural strengthening substances in their formulation, including oat flour processing products [7,12].

With the improvement of the technology for the production of bread products from wheat and rye flour, beetroot powder, carrot and pumpkin suspensions are added to the products along with yeast. [8,9,12].

Methods. According to the above information, fortification with fruits and vegetables can be the basis for creating a product with high nutritional value [10].

In addition, non-waste technologies for the enrichment of food products at the expense of industrial secondary raw materials are being created. Considering these aspects, we believe that the vitamins and minerals contained in locally produced green walnut husks can be a potential raw material for increasing the biological value of flour and bakery products. Of particular importance are the chemical composition, biological value, versatility, technological properties, low cost and other factors of this recommended raw material.

The purpose of the research work is to determine the phytochemical composition of the green peel of locally

produced walnuts and justify their use for the enrichment of flour products.

Results. The peel of green walnut variety "Ideal" was taken as the object of the study. The reference sample (control) is a grain of spring soft wheat. Sampling of green walnut husks was carried out according to the developed technical instructions.

Its quality is checked in accordance with the established requirements of state standards. Indicators of the level of toxicological safety of walnut peel greens were determined according to generally accepted methods in accordance with the requirements of Sanitary Rules, Norms and Hygiene Standards of the Republic of Uzbekistan (№ 0366-19).

The table below presents the results of the study. When studying the chemical composition of the peel of walnuts and comparing the results obtained with cereal crops (in our case, with wheat grain), certain differences were revealed in the amount of vitamins and minerals (Table 1).

Table 1

Vitamin and mineral composition of green walnut husks and wheat flour, mg (g, mcg)/100g

№	Nutrients	Powder of husk	Wheat flour
1	C (Ascorbic Acid)	1 g	-
2	A (β-carotene)	0,012	-
3	P (Routine)	4,8	-
4	B ₁ (Thiamine)	0,3 mcg	0,24
5	B ₂ (Riboflavin)	0,1 mcg	0,08
7	B ₅ (Pantothenic)	-	0,17
8	B ₆ (Pyridoxine)	0,5 mcg	0,4
9	B ₉ (Folic Acid)	-	19,5
10	Vitamin PP	-	2,2
11	E (Tocopherol)	0,6 mcg	2,2
12	Na (Sodium)	1,2	12
13	Mg (Magnesium)	148,0	40
14	K (Potassium)	441,0	176
15	Ca (Calcium)	188,0	24
16	P (Phosphorus)	416	115
17	Mn (Manganese)	3,8	0,3
18	Fe (Iron)	2,9	2,1
19	Cu (Copper)	1,6	0,06
20	Zn (Zinc)	3,5	0,42
21	F (Fluorine)	0,003	2,2
22	I (Iodine)	6,85	-

According to the data in Table 1, the studied samples of green walnut husk powder are similar in chemical composition to wheat flour. However, a number of substances contained in the supplement, such as P (rutin) - 4.8 mg, C (ascorbic acid) - 1 g, I (iodine) - 6.85 mg, P (phosphorus) - 416 mg, in flour in general. In addition, their large number is of great importance. Therefore, it is possible to achieve the creation of functional foods with increased nutritional value by introducing these types of additives rich in biologically active substances into flour and bakery products.

Discussions. Studies have shown that the green skin of walnuts contains tannins. All tannins are active antioxidants that have a general strengthening and healing effect on the human body [11,13].

According to the results of laboratory studies, the additive contains questionable substances, which, according to the conclusions of microbiological studies, are recognized as safe for the human body. If we take into account the active antioxidant ability of tannins, we can see that the shelf life of the finished product is extended when this substance is added to it as an additive.

All types of food raw materials, as well as finished products, must comply with the requirements of medical, biological and sanitary quality standards. The content of carcinogenic food substances and pathogenic microorganisms in any product, including raw materials, must not exceed the permissible maximum concentration. With this in mind, we conducted laboratory tests to determine the indicators of environmental and epidemiological safety of the researched additive.

According to the results of a laboratory study, the amount of toxic heavy metals and pesticides in raw materials did not exceed the normative indicators, no harmful compounds were noted. The data

obtained indicate that the studied raw material complies with the regulatory requirements of toxicological safety.

The microbiological composition of the studied raw materials was determined by growing substrates on agar media under conditions favorable for the growth of a colony of microorganisms, and then the species composition and amount of microflora were determined by phase-contrast microscopy.

The results of the study were analyzed and confirmed that additives made from locally grown green walnut husks meet the requirements of Sanitary Rules, Norms and Hygiene Standards of the Republic of Uzbekistan (**№ 0366-19**).

However, in the production of bread and bakery products from wheat flour, there must be certain norms for the use of additives from green walnut husks. According to the information presented in the above sections, the bark contains a large amount of iodine, and its excess is harmful, like any other substance. At the same time, the presence of dyes in the composition of this additive affects the quality of bread and causes excessive darkening of its core. In view of the above, we recommend introducing this supplement in limited quantities (no more than 6 percent).

Therefore, it is desirable to find a technological solution that allows increasing the nutritional and biological value of the product without increasing its norm when using the studied raw materials. Of course, such a solution should also be convenient for small bakeries. The use of the recommended technology should not involve the purchase of separate equipment and complex production lines.

The process of collecting and processing green walnut husks was carried out in the following order (Fig.1):

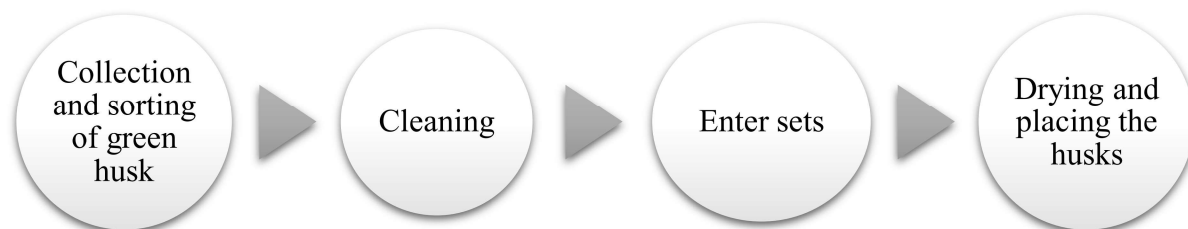


Figure 1. Technological scheme of the process of harvesting and processing green walnut husks

The green husks of walnuts are ground in coffee grinders before being added to the flour product. The reason for this is that the trace element iodine contained in the supplement is volatile, and losses of this trace element increase during grinding and storage. Therefore, before

adding this additive to the flour mass, it is recommended to grind the required amount.

Conclusion. The next stage of research work is to mix whole grain flour with green walnut husk additive and study samples for comparative analysis.

References

1. Хашукоева А.З., Современные возможности рациональной витаминотерапии у беременны/ А.З. Хашукоева, М.И. Агаева, К.А. Ермилова, Г.Г. Мосешвили// МЕДИЦИНСКИЙ СОВЕТ • №13, 2018, 82-85 ст.
2. Романцова К.Р., Исследование и разработка хлебобулочных изделий с амарантовой мукой и цикорием /Кристина Романовна Романцова, Лариса Егоровна Мелёшкина // ПОЛЗУНОВСКИЙ ВЕСТНИК № 3 2022, 37-42 ст.
3. Бисчокова Ф. А., Использование железосодержащего сырья для производства хлебобулочных изделий / Бисчокова Фатима Азаматовна, Бориева Лариса Зрамуковна, Шогенова Инна Борисовна, // cyberleninka.ru
4. Vasiyev M., Non mahsulotlari texnologiyasi, Toshkent -«Yangi asr avlodi» 2009, 280 б.
5. Калинкина Н. О., Обогащение сдобного печенья белком и пищевыми волокнами/ Н. О. Калинкина, е. Ю. Егорова //ползуновский вестник № 1 2019, 17-22 ст.
6. С.П. Меренкова, Обоснование применения композиций безглютеновых видов муки в технологии специализированных мучных кондитерских изделий / С.П. Меренкова, В.И. Боган, Д.А. Арапова, Т.Ю. Фомина, //Вестник ЮУрГУ. Серия «Пищевые и биотехнологии». 2019. Т. 7, №1. 12-20 ст.
7. Пономарева Е.И., Обоснование рациональной влажности пшеничного хлеба, обогащенного мукой из овсяных отрубей/ Елена И. Пономарева, Светлана И. Лукина, Вячеслав Ю. Кустов, Евгения А. Габелко//Вестник ВГУИТ/Proceedings of VSUET, Т. 79, № 2, 2017, 121-125 ст.
8. Ивлева А. Р., Перспектива применения биологически активных добавок в пищевых продуктах для геродиетического питания/ А. Р. Ивлева,З. А. Канарская, Ф. К. Хузин, В. М. Гематдинова//ВЕСТНИК МАХ № 2, 2017, 18-25 ст.
9. Костюченко М. Н. Современные технологические решения для повышения сроков годности хлебобулочных изделий/М. Н. Костюченко, Л. А. Шлеленко, О. Е. Тюрина, Т. В. Быковченко, Е. В. Невская // Хлебопечение России. 2012. № 1. 10–12 ст.

10. Апаршева В.В., Совершенствование технологий хлебобулочных изделий, обогащенных региональными растительными ингредиентами, Диссертация, Тамбов-2016.169 ст.
11. [Дубильные вещества - Ahmad Tea](#)
12. Ауэрман Л.Я. Технология хлебопекарного производства: учебник/ Л.Я.Ауэрман, под ред. Пучковой.Л.П.-СПб: Профессия, 2002 -416с.
13. Пучкова Л.И. Лабораторный практикум по технологии хлебопекарного производства/ Пучкова Л.И.-СПб.: ГТОРД, 2004 г.-264 ст.
14. Ершов П.С. Сборник рецептур на хлеб и хлебобулочные изделия /Ершов. П.С. -СПб. -191 ст.
15. Батчелор А. Д. Культура грецкого ореха в Калифорнии //Советские субтропики, 1937, № 8.
16. Айзикович Л.Е. Физико-химические основы технологии производства муки. М.: Колос 1975- 26-70 ст.
17. Ядров Л. А. и др. Орехоплодные и субтропические плодовые культуры. Справ, изд. Наркевп- чюте. — Симферополь: Таврия, 1990 г.
18. Коробкина З.В. Витамины и минеральные вещества плодов и ягод.М.: Экономика 1969 г.
19. Бутковский В.А., Пушкина Г.Е. Технологическое оборудование мукомольного производства, М.Г.П. Журнал хлебопродукты, 1999 г.
20. Стрела Т.Е. Орех грецкий. Справочное пособие. Киев: Наукова Думка 1990 г-15-20 ст.
21. Хошимова Назира Хакимжановна, Джахангирова Гулноза Зинатуллаевна Обогащение муки и хлебобулочных изделий на основе нетрадиционного сырья // Universum: технические науки. 2022. №11-4 (104). URL: <https://cyberleninka.ru/article/n/obogaschenie-muki-i-hlebobulochnyh-izdeliy-na-osnove-netraditsionnogo-syrya> (дата обращения: 11.08.2023).

OPERATION PROCESS AND EXPERIMENTAL RESULTS OF CONTINUOUSLY FRUIT AND VEGETABLE DRYING EQUIPMENT

MANSUROV OMON

Doctoral student of Namangan Institute of Engineering and Technology
E-mail: omonabduvaliyevich3162@gmail.com, phone.: (+99893) 911 09-82

XAMDAMOV ANVAR

Associate professor of Namangan Institute of Engineering and Technology
E-mail: Khamdamov@gmail.com, phone.: (+99893) 946 09-56

QODIROV OLIMJON

Doctoral student of Namangan Institute of Engineering and Technology
E-mail: olimjonqodirov18@gmail.com, phone.: (+99890) 641 19-96

Annotation: The article describes the device of continuous drying of fruits and vegetables and the process of its operation. The drying devices currently used in industry and the processes and disadvantages of their operation are presented. The drying device is now compared to existing devices and the advantages are explained.

C O N T E N T S

PRIMARY PROCESSING OF COTTON, TEXTILE AND LIGHT INDUSTRY	
J.Sidiqjanov, N.Nabidjanova	
Development of shrinkage calculation for men's shirt base pattern manufactured by the garment dyeing method.....	3
N.Nabidjanova, J.Sidiqjanov	
Method development of applying shrinkage values into base pattern of men's garment dyed shirt.....	10
F.Bozorova, A.Djuraev	
Experimental review of the rubber pad of the new design of the sewing machine.....	15
M.Mirxojayev	
Manufacture of single cotton fabric with new composition, specified bend from yarn gathered from local raw material cotton fiber.....	22
A.Khamitov, B.Akhmedov, J.Ulugmuradov	
A study to determine the change in porosity indicators of the shoe upper hinge in technology processes.....	28
M.Rasulova, K.Khodjaeva	
Study of operating modes in the process of selection and tailoring of package materials in the preparation of men's outerwear.....	34
M.Chorieva	
Analysis of the protective properties of fabrics for special clothing of oil and gas extraction field workers at high temperatures.....	41
G.Gulyaeva, I.Shin, K.Kholikov, M.Mukimov	
Research of knitting structure stability parameters.....	47
R.Rozmetov	
Study of the influence of drying agent temperature on raw cotton and its components.....	52
A.Gofurov, T.Tuychiev, R.Rozmetov, M.Axmedov	
Results of research on an improved cotton regenerator.....	57
GROWING, STORAGE, PROCESSING AND AGRICULTURAL PRODUCTS AND FOOD TECHNOLOGIES	
A.Mukhammadiyev, I.Usmonov, Sh.Uktomjonov	
Electrotechnological processing of sunflower seeds with ultraviolet light.....	64
A.Yamaletdinova, M.Sattorov	
Application of effective methods in the transportation of high-viscosity oils.....	69
N.Khashimova	
Analysis of the prospectiveness and safety of the use of plant raw materials in the enrichment of flour and bread products.....	76
O.Mansurov, A.Xamdorov, O.Qodirov	
Operation process and experimental results of continuously fruit and vegetable drying equipment.....	81

CHEMICAL TECHNOLOGIES	
B.Uktamaliyev, M.Kufian, A.Abdukarimov, O.Mamatkarimov	
Temperature dependence of active and reactive impedances of PMMA-EC-LiTf / MGTF ₂ solid polymer electrolytes.....	86
M.Ikramov, B.Zakirov	
Innovative completely soluble NPK gel fertilizers based on biopolymers with controlled release of nutrients.....	91
A.Khurmamatov, A.Matkarimov	
Results of experiments of studying the composition and purification of technical waters.....	97
A.Nuritdinov, A.Kamalov, O.Abdulalimov, R.To'raxonov	
Obtaining composite materials based on polycarbonate.....	104
U.Eshbaeva, D.Safaeva, D.Zufarova, B.Baltabaeva	
Ir spectroscopic analysis of biaxially directed polypropylene and polyethylene polymer films.....	110
U.Eshbaeva, A.Nishanov, D.Zufarova	
A new adhesive composition for the manufacture of corrugated cardboard...	115
D.Salikhanova, M.Ismoilova, B.Adashev, M.Muratov	
Analysis of emulsions obtained in ultrasonic homogenizer and magnetic stirrer devices.....	123
S.Ravshanov, J.Mirzaev, S.Abdullayev, J.Obidov	
Comparative analysis of physical-chemical parameters of domestic triticale grain.....	128
M.Urinboeva, A.Ismadiyorov	
Cleaning natural and associated gases from sulfur compounds.....	132
MECHANICS AND ENGINEERING	
U.Kuronbaev, D.Madrakhimov, A.Esanov	
Influence of the clearance between the punch and the matrix on the formation of burr on the insect teeth of the developed saw cutting machine...	135
D.Kholbaev	
Control of cotton pneumotransport facility through scada system.....	142
D.Kholbaev	
Cotton pneumotransport pipeline control through mechatronic (Scada) system.....	147
R.Muradov	
Ways to increase the efficiency of gining machine.....	151
S.Utaev	
Results of the study on changes in the performance indicators of engines when operating in diesel and gas diesel modes.....	155
B.Mirjalolzoda, M.Abduvakhidov, A.Umarov, A.Akbaraliyev	
Improved gin saw cylinder.....	161
ADVANCED PEDAGOGICAL TECHNOLOGIES IN EDUCATION	
S.Khudaiberdiev	
Analysis of the most up-to-date server database management systems.....	164
N.Aripov, Sh.Kamaletdinov, I.Abdumalikov	
Using the factor graph to evaluate the quality of output data for shift-daily loading planning.....	170
B.Kholhodjaev, B.Kuralov, K.Daminov	

Block diagram and mathematical model of an invariant system.....	175
A.Yuldashev	
Historical and theoretical foundations of public administration and leadership	184
ECONOMICAL SCIENCES	
A.Isakov	
Strategy and forecasting of effective use of investments in business activity..	188
K.Musakhanov	
Agro-tourism entrepreneurship development model in Namangan region.....	193
N.Makhmudova	
Innovative mechanisms of the development of service sectors in small business and private business subjects in developed asian countries.....	201
Kh.Kadirova	
Conceptual foundations of the development of the financial market of Uzbekistan.....	206
G'.Shermatov, Sh.Nazarova	
Specific challenges of small business utilization in health care.....	211
R.Tokhirov, Sh.Nishonkulov	
Econometric analysis of the impact of innovative development of business entities on economic growth on the example of Uzbekistan.....	215
O.Hakimov	
Problematic issues of taking loans from commercial banks.....	223
T.Musredinova	
Development of an economic strategy for promoting products and services to foreign markets.....	230
F.Bayboboeva	
Fundamentals of economic security in small business activities.....	234
A.Ergashev	
Improvement of commercial banks' capital and its economic evaluation methods.....	240
G'.Shermatov	
Improving the methodology of identifying and management of risks affecting the activities of commercial banks.....	247
Sh.Lutpidinov	
Issues of the development of freelance activity under the development of the digital economy.....	253