

## FEATURES OF THE COMPLEX TECHNOLOGY OF RICE GRAIN PROCESSING.

**Murodov Komiljon Bakhtiyorovich**

*Asian International University, Bukhara, Uzbekistan.*

**Abstract.** *In the context of global population growth, resource scarcity is one of the main problems of the modern world. Accordingly, a fundamentally new approach to natural raw material processing technologies is necessary. These technologies should be resource and energy-saving, comprehensive, environmentally friendly, generate minimal waste or no waste.*

**Keywords:** *processing, waste, technology, rice groats, lignin, cellulose, utilization, polymer, microelement.*

## ОСОБЕННОСТИ КОМПЛЕКСНОЙ ТЕХНОЛОГИИ ПЕРЕРАБОТКИ ЗЕРНА РИСА.

**Аннотация.** *В условиях роста населения планеты дефицит ресурсов является одной из главных проблем современного мира. Соответственно, необходим принципиально новый подход к технологиям переработки природного сырья. Эти технологии должны быть ресурсо- и энергосберегающими, комплексными, экологически чистыми, создавать минимальное количество отходов или вообще не создавать отходов.*

**Ключевые слова:** *переработка, отходы, технология, рисовая крупа, лигнин, целлюлоза, утилизация, полимер, микроэлемент.*

### RELEVANCE

It is not for nothing that in recent years the principle of "three R" (reduce, reuse, recycle) - the three pillars of conscious consumption (resource management) - has been actively developing. In this regard, technologies for processing multi-ton agricultural waste that does not have food or feed value are of great importance. An example of such waste is rice bran (shell, fruit skin). In Uzbekistan, rice porridge is one of the main national products as an important component of children's and dietary foods [1]. Our country ranks second in the world after China in terms of buckwheat groats production [2]. Bran accounts for approximately 20% of the mass of the produced groats [3]. Estimates show that an average of 62.7 thousand tons of buckwheat bran are produced in Uzbekistan annually, but only a small part of this amount is used in practice. Existing developments on the processing of rice porridge production waste (recovery of dyes and preservatives, oils, sorbents, biologically active substances) have not been practically implemented. It is necessary to create a comprehensive scheme for buckwheat processing based on information on the chemical composition of the raw material, the variety and place of growth of buckwheat, as well as the composition of the processed products, depending on the physicochemical conditions of

raw material processing. Despite the fact that buckwheat bran is a valuable raw material containing, in addition to polysaccharides and lignin, biologically active polyphenol complexes, flavonoids, and microelements [10-11], we could not find information on the successful development of production using this raw material in our country.

Research objective: to develop new technologies for processing rice and buckwheat groats without changing and preserving their biologically active substances, micro and macroelements, and to apply them to industry.

Material and methods: At present, there is a great focus on natural products, as well as plant materials with no food value for the production of various products with high added value. From this point of view, it is possible to single out a problem that has affected various areas of human activity - the use of synthetic food dyes. In addition to having some advantages (low cost of production, good coloring ability, absence of a large number of impurities, strictly defined chemical composition), these dyes also have significant disadvantages (they do not have food value, their acquisition and use are often associated with serious environmental pollution, in addition, many synthetic dyes have a negative effect on human health and their use is prohibited in a number of countries of the world). In contrast, many natural dyes are not only dyes, but also have biological activity, so they can be used as medicines and biologically active additives. There are a number of technological solutions that allow the efficient extraction of dyes from buckwheat bran [4-9]. Currently, we have demonstrated the possibility of significantly simplifying the technology of dye extraction from buckwheat bran. However, none of the submitted registered dye recovery technologies considered the subsequent use of the solid residue. Some attempts at utilization of lignocellulosic pulp were made in [11] - bleaching and subsequent use in pulp-paper production is proposed. In this field, alternative sources of cellulose pulp are more effective, including with a lower amount of dyes, which allows to reduce the costs of lignification and bleaching of lignocellulosic pulp. At the same time, the problem of disposal of polymer waste, whose share in the total mass of waste is constantly growing, occupies a special place. In the developed countries of the world, great efforts are being made to collect and recycle polymer waste and to involve secondary plastic in economic circulation. Despite significant advances in polymer recycling, their reuse as food packaging (the most massive segment of household polymer waste) is currently very problematic.

The use of secondary plastic for the production of non-food products, in particular, wood-polymer composites (WPC), is economically and technologically justified: firstly, the sanitary requirements for raw materials are lower, secondly, the cost of secondary polymers is approximately 2-3 times lower than that of primary ones, and thirdly, the mass of the polymer component can be reduced to 20-30% of the mass of the composite. It should also be taken into account that when the collection, sorting and processing of secondary plastics is carried out within a single technological chain, the cost of polymer raw materials consists almost exclusively of production and technological costs and transportation. An important

component of WPC is the filler - currently, a wide range of plant fibers of various origins is offered as it [12-13].

Production of WPC from secondary plastics and agricultural crop waste is one of the ways to utilize waste and obtain the desired product, and therefore profit. It is especially important to note that composites based on thermoplastic polymers can be recycled (recycled) [14].

Conclusion: The technology for obtaining composite materials based on thermoplastic polymers and buckwheat bran developed by us [15, 16] allows using both the original buckwheat bran and the bran pre-treated to extract valuable substances as raw materials. On the one hand, the conversion of any type of waste into raw materials for the production of commodity products is a sound environmental strategy. On the other hand, such an approach is economically justified for a number of reasons: reducing the material capacity of the more expensive component of DNA (polymer), waste-free processing of multi-ton agricultural waste, obtaining tax benefits, the possibility of producing high-value-added products, and obtaining additional benefits through participation in various state environmental programs and projects.

#### REFERENCES:

1. Brief information about buckwheat [Electronic resource] / "Apex" LLC. - Access mode: <http://ap36.ru/index.php/grechka>, free. - Title on the screen.
2. Vysotsky, D. The current state and main trends of the buckwheat market: printed version of the presentation at the 1st International Conference "New Opportunities of Ukrainian APK: Niche Culture" (December 6-7, 2012, Kiev, Ukraine) / D. Vysotsky [Electronic resource]. - Access mode: <http://www.apk-inform.eom/ru/exclusive/topic/1012951#.VUG1dtLtIBc>, free. - Title on the screen.
3. Kaminsky, V. D. Buckwheat bran as a nutritional supplement / V. D. Kaminsky, A. I. Karunsky, M. B. Babich // Grain storage and processing. - 2000. - No. 5. - P. 26-31.
4. Method for obtaining biologically active substances from buckwheat bran: pat. 2222995 Russian Federation. No. 2001131260/13; published. November 19, 2001; published. February 10, 2004.
5. Method for obtaining hydrolysate from buckwheat husk instead of cocoa powder for biscuits and confectionery products: pat. 2545349 Russian Federation. No. 2013154812/10; published. December 10, 2013; published. March 27, 2015, Bull. No. 9
6. Method for obtaining a flavoring agent: pat. 2103373 Russian Federation. No. 96117052/12; published. August 22, 1996; published. January 27, 2008.
7. Method for obtaining dyes from agricultural waste: application 94038111 Russian Federation. published. October 10, 1994; published. August 10, 1996.
8. Method for obtaining oil from buckwheat bran: pat. 2100426 Russian Federation. No. 96110008/13; published. May 13, 1996; published. December 27, 1997.

9. Method for obtaining pigments and dyes from plant raw materials: pat. 2215761 Russian Federation. No. 2000116048/13; published. June 19, 2000; published. June 10, 2002.
10. Myagchilov, A. V. Flavonoids of *Fagopyrum sagittatum* (buckwheat) and *Serratula coronata* L. (crowning scythe) plants (isolation methods, identification of substances, prospects for use): candidate of biol. sciences ... dissertation: 03.02.14 / A. V. Myagchilov. - Vladivostok, 2015. - 154 p.
11. Shkorina, E. D. Composition and complex processing of buckwheat production waste: candidate of chemical sciences ... dissertation: 03.00.16 / E. D. Shkorina. - Vladivostok, 2007. - 157 p.
12. Polyolefin composites / edited by D. Nwabunma, T. Kyu. - Wiley, 2008. - 603 p.
13. Zini, E. Green composites: an overview / E. Zini, M. Scandola // Polymer composites. - 2011. - Vol. 32. - P. 1905-1915.
14. Klesov, A. A. Wood-polymer composites / A. A. Klesov. - SPb.: NOT, 2010. - 735 p.
15. Application 010889 Russian Federation. Method for obtaining articles from lignocellulosic polymer composite materials / V. A. Reutov, L. A. Lim, A. M. Zabolotnaya, N. A. Prishchenko; applicant FGAOU VPO Far Eastern Federal University. No. 2015106744 from February 26, 2015.
16. Application 010892 Russian Federation. Lignocellulose polymer composite material / V. A. Reutov, L. A. Lim, A. M. Zabolotnaya, D. A. Makeich; applicant FGAOU VPO Far Eastern Federal University. No. 2015106746 from February 26, 2015.