INTERNATIONAL JOURNAL ON ORANGE TECHNOLOGY

https://journals.researchparks.org/index.php/IJOT e-ISSN: 2615-8140|p-ISSN: 2615-7071

Volume: 03 Issue: 6 |Jun 2021

DESCRIPTION OF TECHNOLOGY FOR SEPARATION OF STARS FROM DIFFERENT VARIETIES OF RICE

Ishmukhamedova Rano Choriyevna

Associate Professor, Karshi Engineering and Economics Institute, Uzbekistan

Matyakubova Karomat Shomurotovna

Lecturer, Department of Chemical Technology, Urgench State University, Uzbekistan

Reyimbayeva Munojot Anvar kizi

Student, Urgench State University, Uzbekistan

----------***----------

Abstract: In recent years, not only around the world, but also in Uzbekistan, a large number of studies have been devoted to the isolation of starch from plant raw materials, which shows how quickly the demand for starch is growing all over the world. In addition to the traditional use of starch, for example, in the paper and cardboard industry, in recent years, a number of new directions for the effective use of starch and products from it have been expanding.

Keywords: rice, rice hulls, starch, sieves of different sizes.

Rice production in our country has developed rapidly, especially after the independence of the republic. According to the Resolution of the President of the Republic of Uzbekistan Sh.M. Mirziyoyev dated July 29, 2019 No PP-4406 "On additional measures for deep processing of agricultural products and further development of the food industry" in addition, it is planned to create ample opportunities for deep processing of carbohydrate-rich grains [1].

Accordingly, research has been conducted on the technology of extracting starch from various varieties of rice rich in starch. Rice is one of the oldest food crops on the surface. It is the staple food of many countries in the world (China, India, Japan, Pakistan, Indonesia), especially in the tropics. Rice (Oryza) is an annual and perennial cereal belonging to the brown family. About 20 species of rice grow mainly in the tropics and subtropics of South and East Asia, Africa, the Americas, and Australia.

In the tropics, subtropics, and temperate regions, annual rice (Oryza sativa) is grown. It was cultivated in Southeast Asia 7,000 years ago. Rice India and China and Cultivation began in Central Asia in the III-II centuries BC, in Europe in the VIII century, in America in the XV-XVI centuries. In West Africa, bare-grained or African rice is also grown, while wild-growing species such as punctata and short-tailed rice are used for food. In 2004, the average yield of rice in the world was 39.7 s /ha, while in Uzbekistan it was planted on 60,000 hectares, with an average yield of 46.5 s /ha and a gross yield of 279,000 tons [2].

Rice tastes good, is of high quality and is digested several times faster than other grains, so it is often used as a dietary food. Rice has a maximum digestibility of 95.9% and a caloric value of 3594, which is slightly lower than that of wheat (3610). Boiled rice water has long been known as a medicine. Rice is rarely ground into flour. It does not contain gluten, so it does not cover bread. In the Caucasus and Central Asia, rice is the most popular national dish made of rice, pudding in Europe, and curry, the most popular dish in Southeast Asia. It turns white when the rice is whitened. It is used to make alcohol, vodka, beer and starch. Bran is a nutritious fodder for livestock, especially pigs. It contains 10-13.7% protein, up to 14% fat, many phosphorus compounds, of which phytonutrients, lecithin and others are important for the nutrition of young cattle. Bran produces high-quality food and technical fat (up to 10% fat) [3].

The fruit of the rice is a grain, wrapped in a flower petal, and does not grow together with it, but is separate. It is called rice until the grain is white. The grain itself varies in shape from round to cylindrical, the surface is always angular, the color is silver - white, yellow, reddish-brown, purple. The endosperm of the grain is usually transparent or opaque. The opaque endosperm of the translucent grain is located in the center. The weight of 1000 grains in the shell is 26-40 g. The grain is 5-10.5

https://journals.researchparks.org/index.php/IJOT e-ISSN: 2615-8140|p-ISSN: 2615-7071
Volume: 03 Issue: 6 |Jun 2021

mm long and 2.5-4 mm wide. The aleurone layer is made up of a series of tissues. Rice is a grained grain, the flower bark is 13-30% (usually 17-23%), the bark is 4-5%, the aleyron layer is 12-14%, the apricot is 2-3%, the endosperm is 65-67 %. The chemical composition of rice depends on the navigator, the growing area, the conditions and the degree of maturity. The average rice grain contains 14% moisture, 7.3% protein, 55.2% starch, 2% fat, 9% fiber, 3.1% sugar and 4.6% minerals. In peeled rice, the fiber content decreases to 1.1-1.3%, the ash content to 1.5-1.6%, and the amount of starch and protein increases. The bulk of rice proteins consist of the protein orisene in the glutelin group and small amounts of albumin, globulin and prolamins. Rice bran contains 48-57% of starch. Starch is more common in rice bran than other grains. Starch is a natural polysaccharide and has the following properties:

- annual renewal and unlimited supply of raw materials;
- slight variability by chemical, physical, microbiological or combined methods, as well as easy transition to new practical value;
- the ability to make all the changes of low-molecular compounds in chemistry with starch;
- Possibility to form new binding materials on the basis of starch or in combination with synthetic polymers;
- non-toxic and easy to work with starch.

Starch ($C_6H_{10}O_5$) is a polysaccharide, a form of cellulose ($C_6H_{10}O_5$), the source of which is obtained on an industrial scale from corn, wheat, barley, rice, potatoes and tapioca. Starch is a reserve carbohydrate in the form of starch granules in most plants and is a mixture of polysaccharides that give glucose when fully hydrolyzed and have a common formula. Starch is a white powder consisting of starch granules [3;4].

The structure and size of the grains are specific to each starch-bearing plant, from which the origin of starch can be determined under a microscope. The chemical composition of starch granules is not uniform: 96.1-97.6% of the dry matter is polysaccharides amylose and amylopectin. In the laboratory, rice varieties "Alanga", "Avangard" and "Nukus" were selected and experiments were performed in the laboratory of the Institute of Microbiology to obtain starch from rice husks.

As reported in the literature, starch extraction from rice is complicated due to the rigid structure of the protein substances that form strong bonds with the starch granules. To separate the starch from the rice, it is necessary to break down the solid shell consisting of starch and proteins. Therefore, heat treatment or chemical treatment is required to separate the starch from the rice grains.

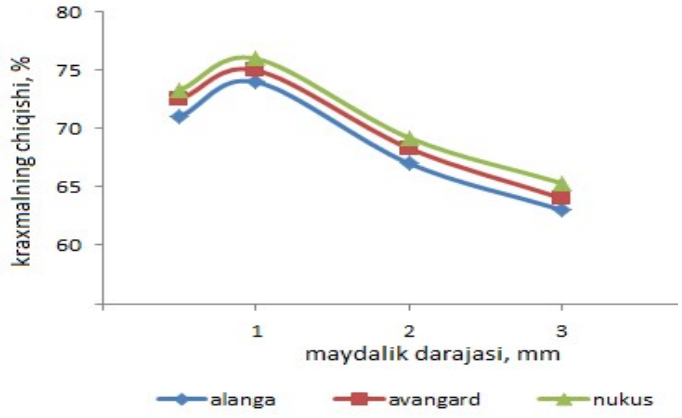
Our research consisted of 3 experiments: We separated the starch in two different ways. In the first method, mechanically ground rice grains were treated with hot water at 30–100°C. In the second method, the above mechanically prepared rice flour was soaked in a 0.5% solution of NaOH at room temperature. 100 ml of solution was used for 10 g of starch, the process lasted from 1 to 10 h, and the system was stirred vigorously until a mother solution was formed. The separation of starch in solvents when extracting starch from rice is the basis of this process. In our first experiments, we first studied the dependence of the degree of granularity of starch on the release of starch in order to study the melting of starch in solvents, ie in water. To do this, the separation of starch from the raw rice husk was first considered. Dropped in distilled water under normal conditions and in this case, almost no starch separation was observed for up to 3 days, which indicates a long-term separation under normal conditions under the influence of protein in the grain.

Table 1: Dependence of starch output on the fineness of the raw material

Rice varieties/ sieve sizes	Starch yield,%			
	0,5 mm	1 mm	2 mm	3 mm
Alanga	70,0	73,0	66,0	62,0
Avant-garde	72,0	74,0	67,3	63,
Nukus	73,0	75,0	68,2	64,3

The experimental results showed that the yield of starch increased with increasing fineness, but in 0.5 mm samples the residual particles mixed with the starch in solution made it difficult to separate and its purification had a negative effect on the yield of starch. The results of the experiment are shown in the table and figure below.

INTERNATIONAL JOURNAL ON ORANGE TECHNOLOGY
https://journals.researchparks.org/index.php/IJOT e-ISSN: 2615-8140|p-ISSN: 2615-7071
Volume: 03 Issue: 6 |Jun 2021



Picture 1. Dependence of the degree of fineness of the raw material on the release of starch and during the experiment, the dissolved starch was separated from the insoluble particles by a filter.

It was then centrifuged. The sediment was separated and dried. In the same way, the separation of starch from rice husks of different sizes was studied. Sieves of 3 mm, 2 mm, 1 mm and 0.5 mm were used for this purpose. So, according to the results of our initial experiments, up to 74% of Alanga grain, up to 75% of Avangard grain and up to 76.0% of Nukus grain starch are extracted from raw materials obtained from 1 mm sieves.

REFERENCES

[1] O‘zbekiston Respublikasi Prezidentining 2019 yil 29 iyuldagi PQ-4406 sonli «Qishloq xo‘jaligi mahsulotlarini chuqur qayta ishlash va oziq-ovqat sanoatini yanada rivojlantirish bo’yicha qo‘shimcha chora-tadbirlar to’g’risida»gi Qarori.

[2] Орипов Р.О., Халилов Н.Х. Ўсимликшунослик. Тошкент, 2006.-Б.246-248.

[3] Шиц Л.А. Крахмальные реагенты в технологии буровых растворов: традиции и перспективы // Крахмал и новые крахмалосодержащие источники – структура, свойства и новые технологии: матер. 1-й Московской международ. конф., 30 октября – 1 ноября. М., 2001. С. 55.

[4] Эфиры целлюлозы и крахмала: синтез, свойства, применение: матер. 10-й Всерос. науч.-техн. конф. с междунар. участием, 5–8 мая / под ред. В.А. Бондаря. Суздаль, 2003. 320 с.