

ANALYSIS OF THE WASTE GENERATED FROM RICE BRAN SYRUP PRODUCTION AS COMPOUND FEED RAW MATERIAL

Farrukhbek Nabiyeovich Sarbolayev, Senior Lecturer

Tashkent Chemical-Technological Institute, Faculty of Food Products Technology,
Department of Food and Perfumery-Cosmetic Products Technology, Tashkent,
Uzbekistan.

ORCID ID: <https://orcid.org/0000-0002-1780-2056>

sarbolayevfn87@gmail.com, +998903297939

Gulnoza Zinatullayevna Djahangirova, PhD, Professor

Tashkent Chemical-Technological Institute, Faculty of Food Products Technology,
Department of Food and Perfumery-Cosmetic Products Technology, Tashkent,
Uzbekistan.

<https://orcid.org/0000-0001-8880-6014>

djaxangirova77dgz@gmail.com

Khurshida Xatamova, Master's Student

Tashkent Chemical-Technological Institute, Faculty of Food Products Technology,
Department of Food and Perfumery-Cosmetic Products Technology, Tashkent,
Uzbekistan.

ABSTRACT

The main goal of our research is to analyze the waste raw material generated during the production of syrup from rice bran based on the physical and chemical indicators, taking into account the requirements of today. The obtained results were compared with the standard requirements for compound feed raw materials, and the norms for introduction into compound feed were determined. In particular, it was found that rice sludge contains 61.44% protein, 9.25% crude fat, 3.61% fiber, and 16.92% nitrogen-free extractive substances at a moisture content of 6.29%. It was recommended to use it as a promising raw material that can replace grain crops, which are valuable raw materials for compound feed. Scientific results were obtained on the use of local secondary raw materials with specific characteristics in syrup production, which helps to increase the nutritional value of animal feed and reduce their cost.

Keywords: compound feed, flow chart, rice bran, rice sludge, feed unit.

INTRODUCTION

"The third direction of the "Development Strategy of New Uzbekistan for 2022-2026," entitled "Accelerated Development of the National Economy and Ensuring High Growth Rates," states the goals of "Expanding the fodder base of animal husbandry and increasing production volume by 1.5-2 times" [1]. The need to produce compound feed and replenish its fodder base assortment with local raw materials, secondary and intermediate products of industrial enterprises is increasing day by day. Transferring agricultural raw material processing to waste-free production technology is economically (resource-saving) practically important. Expanding the raw material base for the production of compound feed using waste from food and related industrial

enterprises, along with saving raw materials, makes it possible to develop a technology for the production of compound feeds enriched with components capable of increasing the quantity and nutritional value of feed [2, 3, 4].

Rice bran and whole rice differ only in shape; both contain carbohydrates, proteins, and fats and are rich in B vitamins [5]. Rice protein contains 17 amino acids, including 9 essential and 8 non-essential amino acids, and has advantages such as a rational amino acid composition, low allergenicity, high biological activity, and high nutritional value." [6].

Research Material and Methodology.

"Rice sludge, a byproduct of producing syrup from rice bran, was used as the research material. Our studies were conducted at the research laboratory of the "Food and Perfumery-Cosmetic Products Technology" department of the Tashkent Chemical-Technological Institute, and at the "Republican Laboratory for Diagnosis of Animal Diseases and Food Safety" located at 21-a, Kichik Halqa Yo'li Street, Tashkent. The samples were products of "ZEBINISO ONA" LLC, located at 27, Tashkent Ring Road Street, Uchtepa District, Tashkent. The research was conducted using the following methods: Express method for determining moisture content in feed, compound feed, and compound feed raw materials, total acidity, ash content, mass fraction of crude fat, methods for determining crude protein, and nitrogen-free extractive substances."

Analysis and Results

Statistical data on molasses production may vary depending on the country, the type of molasses (corn, beet, malt, etc.), as well as the time period. The total volume of molasses production in the world is more than 60 million tons per year (including glucose syrups, invert syrups, and corn molasses). The main producers are: China, USA, India, Brazil, European Union. Initially, we analyzed the dynamic characteristics of corn grain grown in our Republic in the 2010-2023 period based on open statistical data (Figure 1). It can be seen that the grain quantity continuously increased from 2000 to 2016, then decreased in 2017-2018, and then production has increased again from 2019 to the present.

Quantity, thousand tons



Figure 1. Rice produced in farms of all categories in our Republic in 2010-2023, thousand tons

Next, we investigated the waste products generated in the basic diagram of obtaining molasses from rice grits (Figure 2). The process of producing molasses with a high content of glucose and maltose from rice grits involves several sequential steps (Figures 3.6):

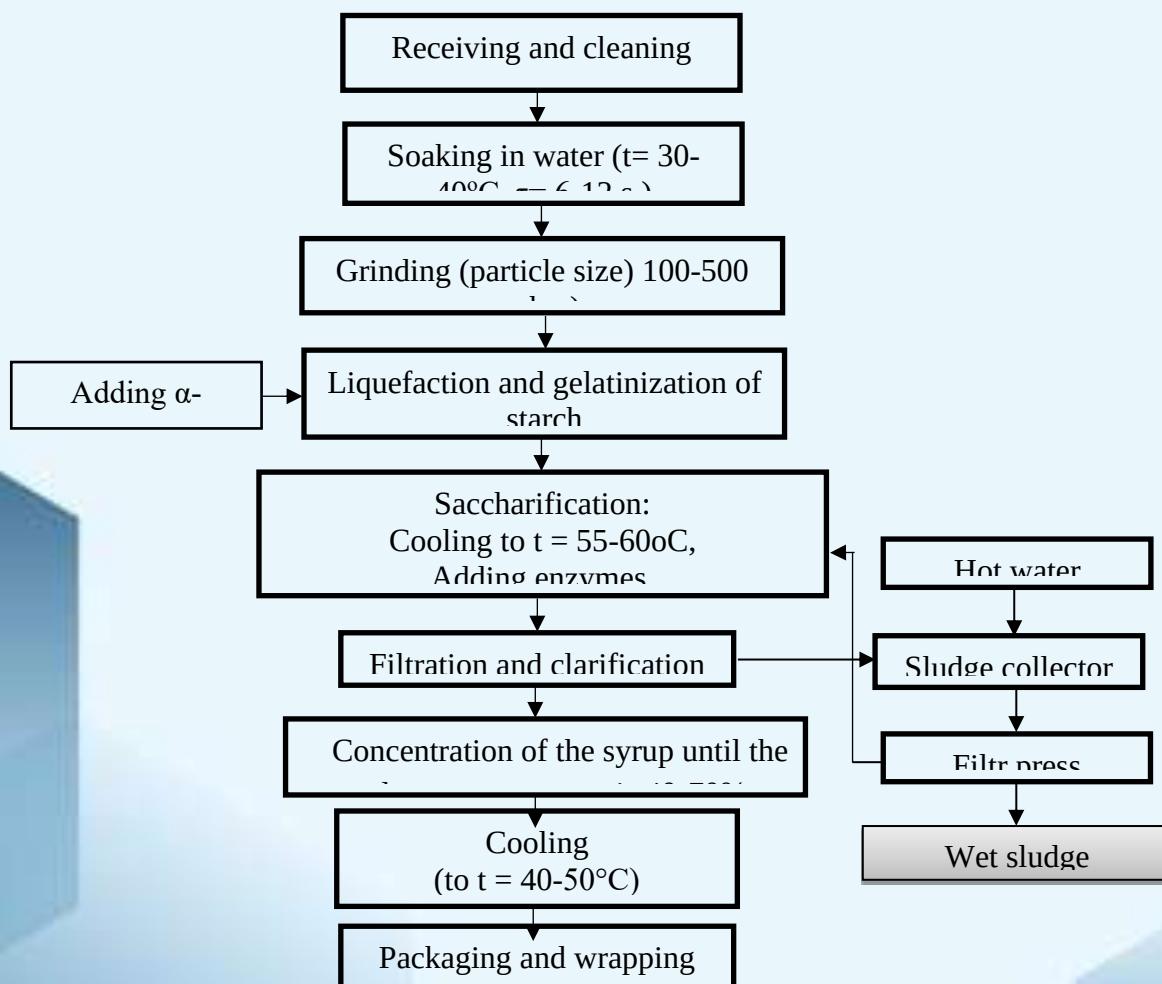


Figure 2 - A basic diagram of obtaining molasses from rice grits

Currently, a number of by-products, including rice sludge, are generated at the final stage of the technological process in the production enterprise. Local entrepreneurs transport this raw material in limited quantities in its wet state for the purpose of feeding livestock. However, the high moisture content and unstudied nutritional value of this raw material are the basis for limiting its widespread use. To this end, we studied some chemical indicators that form the basis for the nutritional value of this raw material based on laboratory analyzes. The research results are presented in Table 1.

1-table

Nutritional value indicators of rice sludge

Indicator name	Indicator value
Moisture content, %	6,29
Crude fiber content in dry matter, %	3,61
Crude protein content in dry matter, %	61,44
Crude fat content in dry matter, %	9,25
Total ash content in dry matter, %	2,49
Nitrogen-free extract (NFE), %	16,92
Metabolizable energy (ME), MJ	5,00

Thus, the main evidence for the advantage of rice sludge is its high content of crude protein and fiber.

CONCLUSION

Taking into account that the main problems of food production and the priority directions for solving them, based on a systematic analysis of the literature, are mainly the use of unconventional raw materials and the application of various methods of processing plant raw materials, through this work we recommend using waste products from the starch-molasses industry as a promising raw material in the production of feed replacing traditional grain crops. Research data shows that the indicators of rice sludge comply with the technical specifications imposed on producers, emphasizing that certain physicochemical indicators have a relevant chemical composition for nutritional value.

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