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PROSPECTS FOR USE IN COOKING AND BREAD YEAST MUSHROOMS WITH MODERN TECHNOLOGY

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ABSTRACT

The article analyzes the research work carried out on the cultivation of Sacchar omyces cerevisiae - a yeast fungus (yeast). According to the results obtained, when cultivating yeast fungi, it is possible to use nutrient media prepared from the juices of various cereals and root crops containing starch. The economic efficiency of the modern method of cultivating baker's yeast on a nutrient medium prepared from the extract (juice) of Jerusalem artichoke (Helianthus tuberosus) has been established.

KEYWORDS: *Yeast, Saccharomyces Cerevisiae, Beer, Baking, Winemaking, Yeast, Artichokes.*

INTRODUCTION

Yeast is one of the oldest microorganisms widely used in various food industries, especially in distilling, brewing, baking, winemaking and so on. Their valuable biological properties underlie the development of many new biotechnologies and have a significant impact on their effectiveness **[1].**

An important role is played by a wide class of macromycetes, the genus *Saccharomyces*, which is widespread among yeasts, since all species cause strong fermentation of sugars followed by alcoholic fermentation. Yeasts of this species are single-celled oval-shaped microorganisms that reproduce without offspring (spawning) and also with the help of hereditary ascospores. There are other important representatives of yeast, for example, the genus *Schizosaccharomyces*, which reproduces in 4-8 numbers with the help of ascospores formed by division or reproduction of rod-shaped cells **[2].**

Saccharomyces pombe yeast is used in the fermentation industry in many countries around the world, especially in countries with hot climates, such as in Africa for brewing “Pombe” beer, which is very successful and in demand in the world market. The wide distribution of yeasts, which differ not only in classification criteria, but also in their properties, and a large number of their representatives require a special approach to their systematization.

The taxonomic characteristics of many yeasts, including *Saccharomycetes*, served as the basis for the study of their genetic characteristics by scientists in many countries. In all classifications, the ability of yeast to ferment various sugars, such as galactose, sucrose, raffinose, maltose, etc., is traditionally a characteristic of *Saccharomycetes* **[3-4].**

As for classical studies, in 1837 Meyen identified 3 types of yeast, the names of which are 1. *Sacch. cerevisiae* - from beer; 2. *Sak. vini* – from wine; 3. *Sak. Pomorum* - from cedar, that is, according to scattered sources.

In 1870, only spore-forming yeasts were introduced into *the Saccharomyces* **[5]** family.

From 1932 to 1942, the staff of the Dutch Pure Culture Museum made significant contributions to the classification of yeasts. Later, in 1952, research revealed the synonyms of a number of yeast cultures **[6-8].**

Yeasts used in the production of bakery products (mainly epiphytic microorganisms common on fruits, vegetables and vegetables) play an important role in nature, primarily in the rate of reproduction, growth rate, intensity and rate of fermentation **[9].**

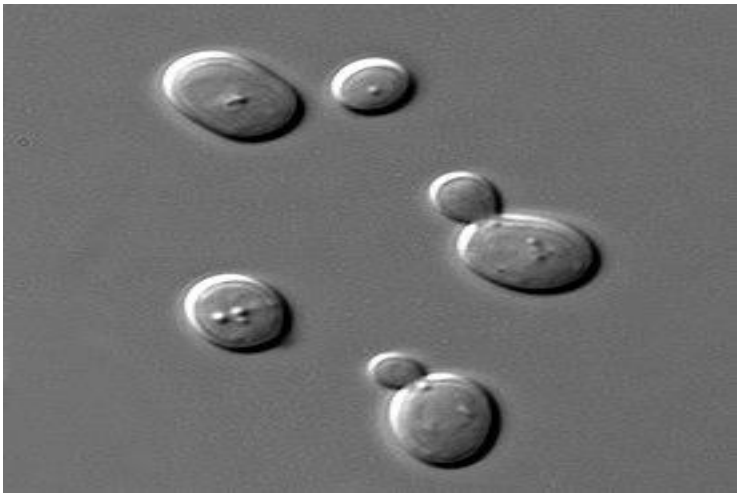

Figure 1. *Saccharomyces cerevisiae* - Appearance of yeast under a light microscope.

Saccharomyces cerevisiae is a macroscopic yeast of large oval shape, primarily adapted to increase the acidity of the dough and its acid-forming microflora of various composition.

Figure 2. *Saccharomyces cerevisiae* -Appearance of yeast in the electron microscope.

The main feature of these yeasts is that, in addition to morphological and physiological ones, the newly calling yeasts first ferment glucose, fructose, sucrose, maltose, then simple dextrins, polysaccharides, lactose, harder starch, and then no longer ferment fiber. They do not absorb food, ethyl alcohol, lactic acid, therefore, in case of food poisoning, the lysis of yeast cells with many of these substances has energy **[10-11].**

Varieties of yeast used in bakery production and their technological characteristics. A race is understood as separate types of microorganisms within a species, which differ from each other in secondary characteristics and may disappear with the instability of strains and growth in a new environment, but differ in their individual characteristics and in some cases are unique. Yeast strains, in particular, should have high growth rates and biosynthetic activity, which is especially important for multiphase cultivation techniques.

This also applies to the yeast used in bread baking, since it takes more time to make bread and bakery products from different types of flour (wheat, rye, corn, corn flour, etc.) and semi-finished products from them. This requires not only the total mass of yeast, but, most importantly, their enzymatic activity. The last factor is the main, decisive in the creation of technological regimes and methods, which is not only economic, but also technological in assessing the quality and quantity of the product. **[12,13]**

Methods and materials:

The first yeast factory was built in 1860, where yeast was produced by the "Viennese method". According to this technology, depending on the amount of used grain raw materials, about 9-10% of yeast biomass and 30% of alcohol were obtained.

The "Viennese method" for the production of bread yeast consists of the following operations: the nutrient medium is prepared from 30-35% dry whole malt and 70-65% from rye flour. 20% of the obtained water is added in the amount necessary to ensure the final density of the wort. After mixing the grain with water, the resulting mass is gradually heated to 50-55°C, the proteins are used for 1 hour for complete decomposition, after which the starch is affected by the addition of malt amylases (α- and β-amylases). After completion of saccharification and preliminary filtration, the nutrient liquid is cooled to 25–28°C, followed by the addition of a yeast mother culture **[12].**

In biotechnology, first of all, much attention is paid to plant raw materials that are acceptable for waste-free technology for the use of all parts of processed plants. Based on this, at the first stage of our study, we chose a potential substrate for yeast production.

In modern methods, yeast can be propagated in nutrient media prepared from beet molasses, rice flour, sweet potato root (*sweet potato*), and artichoke (*Helianthus tuberosus*) juice.

We are conducting experiments on the cultivation of Saccharomyces cerevisiae on a nutrient medium prepared from the extract (*juice*) of a perennial plant (*Helianthus tuberosus*), widely grown in our country.

Reproduction of yeast Saccharomyces cerevisiae on selected nutrient media, (million/ml)

Strains	Growing time, hour.					
	12		24		48	
	Jerusalem artichoke extract	Syrup (control)	Jerusalem artichoke extract	Syrup (control)	Jerusalem artichoke extract	Syrup (control)
I-2	12,5	11,8	13,4	13,7	9,5	6,8
2	17,3	15,8	18,8	17,0	16,9	14,5
K	10,7	18,2	12,8	12,5	11,0	9,4
N	19,0	17,2	17,5	17,0	17,6	16,1
I-1	14,4	10,2	15,3	13,7	12,1	10,3

As can be seen from the table, the yeast grows well on a nutrient medium prepared from artichoke (*Helianthus tuberosus*) extract for cultivating Saccharomyces cerevisiae. This was especially evident at the stages I-2, 2, I-1. This process is more efficient at a temperature of 28-30°C.

The use of Jerusalem artichoke (Helianthus tuberosus) extract in the production of yeast biomass is promising, as it can easily replace sugar cane and beet molasses and achieve economic efficiency. This meal is easy to prepare and economically inexpensive. By extracting the extract (juice) of Jerusalem artichoke (Helianthus tuberosus) in various combinations, it is possible to increase the yeast biomass to varying degrees.

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