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# THE MAIN CHARACTERISTICS OF GRAINED GRAINS AND THE PRINCIPLES OF USING THEM IN BAKERY CONFECTIONERY

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***Abstract.*** *The growing global population presents challenges in food supply. Scientists are focusing on studying nutrients that boost immunity, enhancing the nutritional quality of foods, and enriching them with naturally obtained biologically active substances.*

***Keywords:*** *germinated barley, malt, vitamins, minerals, antioxidants, prevention of premature aging, metabolism, natural biologically active substances.*

**Introduction:** Cereals and cereal products occupy a leading place in the human diet. There is no doubt that in the future they will remain the main food products on any table. The imbalance in the diet of almost all groups of the population and the significant deterioration of the diet lead to a lack of vitamins necessary for a person's normal life. 90% of the world's population is deficient in vitamin C and approximately 50% is deficient in group B vitamins, this problem can be overcome by increasing the production and consumer demand and attractiveness of vitamin-enriched products [1]. From the information about the chemical composition of grain and the distribution between its components, it follows that the amount of minerals and vitamins in flour products ground in different sizes depends on which parts of the grain are included in the flour [2].

**Theoretical basements of research:** experts suggest adding a small amount of special biologically active additives to traditional products that perform a therapeutic and preventive function in bread and confectionery products [3]. For example, the use of rye malt, which contains enzyme preparations such as alpha-amylase, increases the amount of dextrins in the dough and slows down the aging of products. Malt gives the products a pleasant smell and taste, so its use in the production of cakes improves their emotional appeal and consumption properties [4].

A significant change in the physico-chemical and biochemical properties of grains occurs during grain germination, and at the same time, the flour properties of grains also change. In the sprouted grain, the size of the pod increases, a small root appears. During extraction, grain size increases, dispersion and viscosity decrease. During the germination of wheat grain, the weight of the grain decreases due to a significant increase in the intensity of its respiration. The appearance of the grain also changes. It was found that spring and autumn barley grains lose their luster within 12 hours after germination. Spring barley germinates 15 hours after germination and takes 21 hours to germinate and take root, the grains are lighter in color and the grass is darker in color. Winter barley grains germinate more slowly, germination occurs after 18 hours, and roots appear within 24 hours of germination [5].

According to the degree of germination of barley grain, it is divided into the main grain or a mixture of grains. At different stages of germination, the amount of water-soluble low-molecular substances increases, the amount of recoverable sugars and non-protein nitrogenous substances increases sharply, and protein nitrogen gradually decreases [6]. At the same time, due to increased respiration, the amount of sucrose decreases in the first hours of germination, and after 24 hours, it increases as a result of starch synthesis. According to scientists, all components of the respiratory system and metabolism, energy supply of germinated grains and new to All compounds necessary for tissue formation are formed during grain germination. The stage of forming small sprouts should be done as soon as possible, because high humidity during the germination stage creates a favorable environment for microorganisms. Germinated grain is an excellent nutrient substrate for various grain microorganisms[7].

First of all, improper drying and storage of grain with high moisture content is considered the reason for the decrease in the quality of the product when making flour from milled barley grain. But in the technology of obtaining sprouted grains, the germination process is controlled to enrich the grain with vitamins and enzymes. In the process of germination, the complex reserve substances of barley grain are easily lost, and the amount of antioxidants (vitamins, bioactive substances) and trace elements significantly increases. The production of functional products in confectionery from the dried flour of milled barley and its inclusion in the diet prevents premature aging of the human organism [8].

Studies show that regular consumption of sprouted grains increases metabolism and blood, increases immunity, eliminates vitamin and mineral deficiencies, normalizes acid-alkaline balance, cleanses the body of toxins, improves digestion, increases energy. it is considered a reasonable object in increasing and slowing down the early aging process [9,10].

**Practical basements of research:** Sprouted flour is: flour made from whole grains that have been sprouted to release all the nutrients stored in the grain. From barley and gluten-free grains to gluten-free brown rice, any grain can be milled and turned into a functional flour, and this flour can be used in all flour-based recipes.

Ever since humans have been eating the seeds of cereal grasses, we've known that whole grains straight from the field are difficult to digest. From stone grist mills to wind and water mills, millennia of human ingenuity have made it possible to grind dry, hard-shelled grains. But humans have cultivated grains, at least historically. But not only softening the whole grain by harvesting, but also facilitates their consumption (less work than grinding and less energy than cooking) [11,12,13].

**Research results and their discussion:** The use of yeast in the production of bread products from flours obtained on the basis of milled grains is 80% more efficient than that of flours obtained from unmilled grains. In addition, it was observed that the size and number of loaves in bread production increased by 30% when prepared from harvested barley flour.

In a 2023 study at the Faculty of Food Technology, researchers found that bread made from sprouted barley flour needed less water to form a dough with a better consistency, and it took less time to rise. In addition to a significant increase in bread height, it was observed that bread made from sprouted barley flour was softer than bread made from unsprouted flour, and retained its softness even after 7 days of storage. Also, these improvements are seen not only in bread made from sprouted barley flour, but also in bread made from a mixture of ordinary barley flour and sprouted barley flour [14,15]. Recent research shows that adding less than 2% germinated barley

flour to bread made from ungerminated barley flour has been observed to improve bread volume and increase dough strength. It was observed that the consumption of sugar in the flour confectionery products based on the flour obtained from the milled barley grain is 20% less than that of unmilled barley flour. In optimizing the process of harvesting grains, harvesting time, thermal environment, humidity environment, parameters of light indicators were determined based on experiments and the most optimal indicators were selected.

Temperature and humidity are important factors for germination and growth of seedlings. In this study, the efficiency of germination of barley seeds under various abiotic stresses was studied. The research was conducted at the Tashkent Institute of Chemical Technology. Six different temperature levels were used: 5, 10, 15, 20, 25 and 30 ° C. Temperature and duration of germination and seedling development were significantly affected. In the optimal range of 15 °C to below 25 °C, 20 °C was found to be acceptable. Germination occurred at 75% of potable water and its optimum range was found to be acceptable for germination. Determining the water requirement for barley grain germination is an objective basis. In this study, the optimum water consumption range for barley grain germination is 55-75 percent, as shown in Table 1.

**1-Table.**

**Determination of water requirement for germination of barley grain**

| **Amount of water to collect in ml** | | **The amount of water stored in grain is per 100 grams** | |
|---|---|---|---|
| **Example number** | **Recommended Water Amount %** | **Water amount ml** | **Barley grain germination rate %** |
| 1 | 20 | 1.282 | 15 |
| 2 | 30 | 1.924 | 25 |
| 3 | 35 | 2.565 | 30 |
| 4 | 30-40 | 3.207 | 35 |
| 5 | 30-50 | 3.834 | 45 |
| 6 | 30-60 | 4.489 | 55 |
| 7 | 30-65 | 5.131 | 60 |
| 8 | 30-70 | 5.772 | 65 |
| 9 | 30-75 | 6.414 | 70 |
| 10 | 30-80 | 0,641 | 75 |

Significant differences were found between the percentages of germination of 15, 20 and 25 barley seeds in dense and sparse conditions in a glass container. As it turned out, it was observed that the denser the seeds are, the whiter the roots are. Figure 1.

**1-Figure**

**Determining the condition of harvesting barley grain based on its placement density.**

25-pcs barley 20-pcs barley 15-pcs barley

Data show that seed number is a critical factor in seedling growth bioassays. An increase in water volume or denser barley shoots increases the amount of phytotoxins present in each seed, thus increasing the index of dark color penetration. Optimum grain density has a negative effect on the development of sprouts in glass containers and opening the lid of the container. They suffer from water loss, which has a bad effect on the development of seedlings. The results showed no significant differences between different seeds and seedling densities of 15, 20 and 25 per pot for the characters measured. Because high seedling density had the opposite effect on glass jar opening and there were no significant differences between the densities used, 15 seeds per glass jar were used for the barley germination experiments under wet conditions compared to high density. more suitable. It is very important to determine the optimal number of seeds to be used in the glass jar experiment. This is important in the optimization of resources, especially for obtaining functional flour confectionery raw materials.

**Conclusion:** A temperature of 20°C was determined to be the optimum temperature for germination of barley grain. Barley flour has a sweet taste at a temperature of 20°C to 30°C and is considered an optimal indicator for obtaining flour pastry flours.

The size of the seed plays an important role in the amount of water required for germination, giving a more accurate impression of the amount of water used. Different percentages of germination can occur in a wide range of water contents starting from 0.65 ml, which is 75% of drinking water.

No significant differences were observed between grain densities, so a higher density is recommended for laboratory experiments.

**REFERENCES**

1. Benincasa P., Falcinelli B., Lutts S., Stagnari F., Galieni A.. O‘sib chiqqan donalar: har tomonlama ko‘rib chiqish. Oziqa moddalar. 2019; 11(2):421.

2. Rixter, K., Kristiansen, K., & amp; Guo, G., Bug‘doyning unib chiqishi non pishirish samaradorligini oshiradi. Donli oziq-ovqat dunyosi, 59, 231-233.

3. Cardone, G., D’Incecco, P., Pagani, M. A., Marti, A., undirish butun arpa unining non tayyorlash samaradorligini yaxshilaydi 245-259.

4. Dziki, D., Gawlik-Dziki, U., Unlangan donlarni qayta ishlash. O‘sib chiqqan donlar: oziqaviy qiymati, ishlab chiqarish va qo‘llanilishi (69 -90-betlar).

5. Ding, J., Feng, H., unib chiqqan donlarning oziqaviy qiymatini oshirish uchun boshqariladigan undirish. Unib chiqqan donalar: oziqaviy qiymati, ishlab chiqarish va qo‘llanilishi (91–105-betlar).

6. Антонян, Л.Г. Исползование метанового брожения для переработки и утилизатсии отходов топинамбура / Л.Г. Антонян, А.М. Балоян, Э.Г. Африкян // БиотехнологиЙ. — 2005. — №2. — С. 4.

7. Артюхов В.А. Термическая инактивация свободной и иммобилизованной инулинази /. В. Г. Артюхов, Т. А. Ковалёва, М. Г. Холявка, Л. А. Би-тюская, М. В. Гречкина.// Прикладная биохимия и микробиология, 2010. — том 46. — № 4. — С. 422-427

8. Артюхов В.Г. Физико-химические и кинетические свойства инулиназ / В.Г. Артюхов, М.Г. Холявка, Т.А. Ковалева // Вестник биотехнологии и физико-химической биологии им. Й.А. Овчинникова. 2013. — Т.9. — №2. — С. 67-77.

9. Ахмадишин, Р.А. Сорбционние свойства клеточних стенок дрожжей / Р.А. Ахмадишин, А.В. Канарский, З.А. Канарская и др. // Матер. междунар. симпоз. 28-30 ноябрья 2005, Казан. - ФГУ «ФСТРБ», 2005. - Ч. И. - С. 49.

10. Ахмадишин, Р.А. Изучение влияния протеолиза дрожжей Сасчаромйсэс сэревисиаэ на адсорбционние свойства клеточной стенки и качество дрожжевого экстракта / Р.А. Ахмадишин, А.В. Канарский, З.А. Канарская и др. // Катализ в промишленности. - 2008.- № 4. - С. 41-46.

11. Бабева, И.П. Биология дрожжей / И.П. Бабева, И.Й. Чернов. - М.: Изд-во: Т-во науч. изд. КМК, 2004. - 239 с.

12. Бакулина, Л.Ф. Пробиотики на основе спорообразуюших микроорганизмов рода Басиллус и их исползование в ветеринарии / Л.Ф. Бакулина, Н.Г. Перминова, И.В. Тимофеев и др. // БиотехнологиЙ. - 2001. - .№2. - С. 48-56.

13. Баранова, Т.В. Исследование антиоксидантной активности амаранта в условиях Сентрално-Черноземного региона // Т.В. Баранова, Г.Г. Соколенко // Вестник БФУ им. Канта. - 2012. - Вип. №7. - С. 24-27.

14. Бархатова, Т.В. Бифидогенние свойства соевой меласси / Т.В. Барха-това, А.М. Лунев, З.А. Ковалева, Й.Н. Верескун // Известия ВУЗов. Пишевие технологии. - 2002. - № 3. - С. 76-77.

15. Бобрешова, О.В. Рол лизина в питании человека. Аналитический обзор / О. В. Бобрешова, П. И. Кулинсов, И. В. Аристов, ЖИ. П. Пашенко. - Воронеж: Элам-спектр, 2003. - 28 с.