Spanish Journal of Innovation and INTEGRITY
ISSN: 2792-8268
Volume: 12, November-2022
http://sjii.indexedresearch.org

Factors Forming the Quality of Plant Drink from Oat Grain

Nazirova Rahnamohon Mukhtarovna, Ph.D
Doctor of Technical Sciences, Associate Professor of the Department of Technology of Storage and Primary Processing of Agricultural Products, Fergana Polytechnic Institute

Usmonov Nodirjon Botiralievich
Senior lecturer of the department "Technology of storage and primary processing of agricultural products", Fergana Polytechnic Institute

Aminjonov Hokimjon
Master student of group M 20-21, Fergana Polytechnic Institute; Fergana, Republic of Uzbekistan

Annotation: *The purpose of the work is to modernize the technology for the production of vegetable drinks and assess the degree of influence of innovative technology on the quality of the resulting product. The paper considers the current state of the production of vegetable drinks and its development trends, considers the factors that shape the quality of herbal drinks from oat grain. Modern methods of extraction are also studied; the requirements for the quality of vegetable drinks from grain are formulated.*

Keywords: *oats, vegetable milk, drink, extraction.*

The priority task of the food industry at present is the production of socially significant food products that meet modern requirements for quality, nutritional value and safety. The issues of quality and safety are of the greatest relevance for mass consumption products, which provide the human body with essential nutritional factors. Drinks, including functional drinks, occupy a considerable share in the diet of a modern person. In addition, the technology of their production is such that the introduction of new functional ingredients into them is not very difficult, and the absence of heat treatment allows you to save all the vitamins and nutrients in the product. The factors that form the quality of vegetable drinks from oat grain include raw materials - the main and auxiliary ones.

A vegetable drink from oat grain is made in accordance with GOST 28188-2014 "Non-alcoholic drinks. General Specifications" raw materials for its production are oats and water.

The rich composition and powerful useful and healing (healing) properties allow the widespread use of oats in the food industry and in traditional medicine.

The main substances of grain that determine its nutritional value are protein, carbohydrates, lipids, vitamins and other biologically active compounds. Chemicals are not equally distributed in different parts of the seed. Fruit and seed coats contain a lot of cellulose and pentosans. The aleurone layer has a high concentration of protein, cellulose, ash, and the endosperm has a high concentration of starch and protein. The germinal parts (axis, shield) are rich in protein and oil.

Nitrogenous substances. Protein substances of grain make up 87 - 90%, and non-protein - 10 - 13% of the total nitrogenous compounds. The protein complex of oat grain consists of albumins, globulins, prolamins and glutelins. The main storage proteins of grain are globulins and glutelins. In varieties of

Spanish Journal of Innovation and INTEGRITY
ISSN: 2792-8268
Volume: 12, November-2022
http://sjii.indexedresearch.org

various cultivated species grown in Western Siberia, the content of individual protein fractions varies within the following limits: albumins and globulins extracted by water - 17.8 - 26.5%, salt-soluble globulins - 26.2 - 31.9%, prolamins - 12 ,4 - 17.7%, glutelins - 27.9 - 41.7%. The nutritional value of proteins is determined primarily by the content of "essential" amino acids (lysine, tryptophan, methionine, threonine, valine, phenylalanine, leucine, and isoleucine).

Carbohydrates. The carbohydrate complex of oats includes starch, mucus-forming polysaccharides, hemicelluloses, cellulose, lignin, and small amounts of mono- and oligosaccharides. The main substance of the carbohydrate fraction is starch. Its content, depending on the type and variety, ranges from 36 to 59%. The naked varieties of the species A. sativa are characterized by a higher content of starch (55.7%) than the filmy ones (43.0%). 19 The endosperm of caryopses is especially rich in starch, where it is in the form of granules of various shapes with a size of 3–11 microns. The starch of oat grains is located loosely, and the gaps are filled with a fine-grained mass of protein.

The physicochemical properties of the main grain polysaccharide (starch) largely depend on the ratio of its two components: amylose and amylopectin. Good culinary properties of cereals are associated with a high content of amylose. The content of amylose in oat starch, depending on the variety in the conditions of the Leningrad region, ranges from 16.8 to 17.6%. A wider range of variability (19.0 - 25.9% depending on the genotype) was noted in representatives of cultivated species grown in Western Siberia.

The high viscosity of oatmeal is due to the presence in the grain of a non-starch water-soluble polysaccharide β-D-glucan. It is considered a physiologically important dietary component of grain.

The content of β-D-glucan in the whole grain is 3.4%, and in the products of grain processing - 2.9 - 4.3%. The largest percentage of β-D-glucan is found in the peripheral parts of the grain.

The summary provides data (obtained by various methods) of the content of β-glucan in the whole grain (2.5 - 6.6%) and in the collapsed (2.8 - 5.5%). Depending on the varietal characteristics, the amount of water-soluble polysaccharides in the whole grain varies from 2.58 to 3.52%.

Lipids. The nutritional value of oats, which distinguishes it from other cereals, is the high lipid content in the grain. The total lipid content in grain without film in varieties of different origin ranges from 3.1 to 11.6%. With an average (for zoned varieties) lipid content in the grain of 6.5 - 7.8%, the share of free (extracted by ether) is 4.3 - 7.0%, bound - 0.36 - 0.48% and strongly bound - 0 .24 - 0.40%. According to other authors, free lipids in grain without a film contain 5.5 - 8.0%, and bound - 1.4 - 1.6%. In whole grains, the content of free lipids (oils) varies from 3.5 to 6.2% in 20 filmy varieties, from 7.1 to 9.0% in naked grains. In grain without a film, the concentration of oil in cultivated species is 6–7.5%, while in wild species it is noticeably higher – 6.3–10.2%.

The composition of filmy oat oil includes saturated fatty acids (%): myristic (0.2 - 1.0), palmitic (17.1 - 18.9), stearic (1.30 - 1.85) and unsaturated (%); oleic (38.8 - 45.8), linoleic (32.2 - 42.3), linolenic (1.50 - 2.48). Lauric, arachidic, palmitoleic acids were found in trace amounts.

In general, it can be noted that oat oil has high nutritional value in terms of fatty acid content: essential linoleic acid predominates in its composition; linolenic acid, which is also essential, but rapidly oxidizing, accounts for a low percentage of the total of all acids.

Vitamins and phenolic compounds. In oat grain, B vitamins such as thiamine, riboflavin, niacin (nicotinic acid), pantothenic acid, and to a lesser extent choline, biotin, and pyrodoxine are the most well studied. Oats differ from other grain crops in their lower content of niacin. The content of riboflavin and pantothenic acid is also reduced, which should be borne in mind when preparing a diet for animals. Depending on the genotype, the content of vitamins varies widely (mg / kg): thiamine - 5.37 - 9.69, riboflavin - 1.05 - 1.87, niacin - 4.4 - 11.7, pantothenic acid - 6 .3 - 12.7.

Spanish Journal of Innovation and INTEGRITY
ISSN: 2792-8268
Volume: 12, November-2022
http://sjii.indexedresearch.org

Phenolic compounds of various compositions were found in cereal grains. In oats, they occur as phenolcarboxylic acids, flavonoids, aminophenols, and their ester or other conjugated forms. In plants, such quality indicators as color, smell, taste are associated with phenolic compounds. Some of them have the effect of vitamin R.

Mineral composition. The content of raw ash in the whole grain, depending on the variety, ranges from 2.0 to 5.7%, and in naked varieties 21 it is less (1.6%) than in filmy ones. Minor quantitative changes occur when various doses of mineral fertilizers are applied: from 2.15 to 2.44%. Both in the whole grain and in the collapsed grain, the main ash elements are phosphorus and potassium. According to N.P. Yarosh, G.K. 412 - 454, magnesium - 154 - 167, calcium - 72 - 86, sulfur - 152 - 161, chlorine - 44 - 53, iron - 11.2 - 11.7, manganese - 3.5 - 4.4, copper - 1.4 - 2.6, zinc - 5.1 - 5.3. In naked varieties, the content of mineral elements varies within the following limits (mg per 100 g of dry matter): potassium - 465 - 502, phosphorus - 517 - 520, silicon - 49 - 58, magnesium - 135 - 174, calcium - 68 - 99, sulfur - 190 - 198, chlorine - 30 - 63, iron - 8.5 - 8.6, manganese - 4.3 - 4.8, copper - 0.36 - 0.42, zinc - 5.5 - 6.6 .

Antioxidants in oats. It is known that most of the antioxidants are contained in the outer shell of the grains. Hydroxyaromatic acids are the main antioxidants in whole grains. Hydroxyaromatic acids are derivatives of benzoic and cinnamic acids. Hydroxybenzoic acids (gallic, salicylic, vanillic, lilac, protocatechin and n-hydroxybenzoic) are found in oat grains. hydroxycinnamic acids (ferulic, caffeic, o-, m-, and n-coumaric, cinnamic, synapic) are also found in this cereal. Hydroxyaromatic acids in grains are both in the free and bound state. Free hydroxyaromatic acids are mainly in the outer shell and are easily extracted with organic solvents.

Oats contain a new class of antioxidants - avenanthramides (compounds of anthranilic acid derivatives and hydroxycinnamic acid derivatives). Three such compounds were found, their content in the range of 40-132 µg/g. These compounds are stable, biopermeable, have anti-inflammatory, antioxidant and anti-atherogenic effects.

Thus, it should be noted that oat grain contains a variety of natural antioxidants, but hydroxyaromatic acids are the most abundant.

The quality of grain used for vegetable drinks is determined by a combination of internal factors - the natural characteristics of plants and external factors - soil composition, climatic conditions and a set of agrotechnical measures.

Environmental factors. The presence in the soil of the required amount of moisture, nutrients, as well as favorable climatic conditions are the conditions for harvesting a high grain yield.

The composition of soils and the use of mineral fertilizers act as significant factors affecting grain quality. However, the use of mineral fertilizers requires strict control of the chemical service of the agro-industrial complex. Plants should receive the necessary nutrients, taking into account their presence in the soil and the predicted yield. An excess of fertilizers, as well as their lack, reduces the yield, worsens the technological and nutritional advantages of grain, and can lead to the formation of harmful substances, such as nitrosamines.

Protection of plants from harmful factors during cultivation can increase the yield by 10 - 30% or more. Pesticides (chemicals) used, such as herbicides (weed control), desiccants (to dry plants), insecticides (pest control), fungicides (disease control), and retardants (growth control), can have adverse effects if used incorrectly. on its quality. Accumulation of some pesticides in grain may cause them to enter processed products, so their amount should not exceed 0.01 - 5.0 mg per 1 kg of product.

The factors that preserve the quality of grain include the conditions and terms of transportation and storage.

Spanish Journal of Innovation and INTEGRITY
ISSN: 2792-8268
Volume: 12, November-2022
http://sjii.indexedresearch.org

Premises and containers intended for the storage of grain and other products are carefully freed from food residues and dust; if possible, carry out wet cleaning, disinfection and whitewashing. Be sure to free the space around the storage from weeds, organic debris and other debris. Take measures to exterminate pests. It is also important to maintain the technical serviceability of granaries and equipment.

The most important factors influencing the state and preservation of grain include: the humidity of the grain mass and its environment, the temperature of the grain mass and its environment, air access to the grain mass. These factors form the basis of storage modes. Three modes of storage of grain masses are used - in a dry state, in a chilled state, without air access.

Grain storage must be carried out at its moisture content of 14 - 15%. The grain must be well cleaned and uninfected. Relative humidity in the storage should be no more than 65 - 70%. The temperature favorable for grain storage is from 5 to 15 °C. Important conditions for the preservation of grain are: ventilation and maintenance of cleanliness in storage.

Under these conditions, the grain of various crops retains its sowing qualities for 5-15 years, technological - 10-12 years. However, in practice, grain batches are renewed every 3 to 5 years.

During storage in the grain mass, the temperature, humidity, weediness, infestation by representatives of the animal world, called pests of grain stocks, as well as the color and smell of grain are checked. The timing of the check depends on the condition of the grain and storage conditions.

Given the great harm that insects and other pests cause to grain, it is necessary to take measures to prevent their development or to destroy them. This is, first of all, careful control over the presence of pests during the acceptance and storage of grain, as well as over the state of infestation of all facilities of the enterprise, ensuring a strict sanitary regime at all facilities of the enterprise, creating conditions that exclude the development of insects and ticks.

The next factor that forms the quality of a vegetable drink from grain is the technology of its manufacture. The manufacturing technology includes the following technological steps (Figure 1).

Grain crushing
↓
Mixing flour with water.
At a ratio of 1:10
↓
Heating water-grain mixture
↓
Decoction holding time 5 minutes
↓
Boiling grain broth
↓
Blending grain bases with taste
aromatic raw materials
↓
Mixing
↓
Heating up a drink
↓
hot pouring drink

Figure 1. Technology for the manufacture of vegetable drinks

Creation of vegetable drinks according to the scheme presented above involves the preparation of a vegetable drink obtained by mixing flour with water. Mixing flour with water in a ratio of 1:10 is optimal, since this ratio achieves a solids content of about 13%. Mixing flour with water should be carried out at a temperature of 30 - 40 ° C, which avoids the formation of lumps, which can later have a negative impact on the quality of the drink. After that, intensive mixing takes place, Crushing grain mixing flour with water. At a ratio of 1:10 Heating the water-grain mixture Holding the broth for 5 minutes Boiling the grain broth Blending grain bases with flavoring raw materials Stirring Heating the drink Hot pouring the drink 26 heating to 90 °C and holding at this temperature. Boiling of grain broth is carried out at a temperature of 100 ° C, for 2 minutes.

Blending of grain bases is carried out to improve organoleptic characteristics and increase the content of biologically active components. Various juices, sugar, pectin solution can act as additives. Further agitation is necessary to stabilize the drink. Heating the drink to a temperature of 90 - 95 ° C. Bottling of vegetable drinks is carried out hot.

The quality of ready-made vegetable drinks will primarily depend on the quality of the raw materials from which they are prepared. Soluble and insoluble compounds will form the beverage system, both flavor and colloid.

The process of grain grinding will have a significant impact on the formation of a vegetable drink system. When grinding grain, various fractions are obtained, the particles have different sizes. In the process of preparation, all the benefits of the raw materials go into the drink.

REFERENCES:

1. R. M.Nazirova, M.X.Xamrakulova, N.B.Usmonov. Moyli ekin urug‘larini saqlash va qayta ishlash texnologiyasi. O’quv qo’llanma. Фергана-Винница: ОО «Европейская научная платформа», 2021. – 236 с. https://doi.org/10.36074/naz-xam-usm.monograph
2. Nazirova R. M., Sulaymonov O. N., Usmonov N. B.//Qishloq xo‘jalik mahsulotlarini saqlash omborlari va texnologiyalari//0‘quv qo‘llanma. Premier Publishing s.r.o. Vienna - 2020. 128 bet.
3. Nazirova R. M., Qahorov F.A., Usmonov N. B.// Complex processing of pomegranate fruits. Asian Journal of Multidimensional Research. 2021, Volume: 10, Issue: 5. pp. 144-149. https://www.indianjournals.com/ijor.aspx?target=ijor:ajmr&volume=10&issue=5&article=020
4. Мухтаровна, Н. Р., Ботиралиевич, У. Н., & ўғли, М. А. М. (2021). Особенности обработки озоном некоторых видов плодов и овощей для их долгосрочного хранения. Central Asian Journal Of Theoretical & Applied Sciences, 2(12), 384-388. Retrieved from https://cajotas.centralasianstudies.org/index.php/CAJOTAS/article/view/367
5. Mukhtarovna, Nazirova R., et al. "Study of the Influence of Processing on the Safety of Fruit and Vegetable Raw Materials." *European Journal of Agricultural and Rural Education*, vol. 2, no. 6, 2021, pp. 43-45. https://www.neliti.com/publications/378976/study-of-the-influence-of-processing-on-the-safety-of-fruit-and-vegetable-raw-ma#cite
6. Nazirova Rakhnamokhon Mukhtarovna, Qahorova Shohsanam Akram kizi, Usmonov Nodirjon Botiraliyevich//Biological Protection Of Plants. International Journal of Progressive Sciences and Technologies. Vol 27, No 1 (2021). http://ijpsat.es/index.php/ijpsat/article/view/3168
7. Nazirova Rakhnamokhon Mukhtarovna, Tursunov Saidumar Islomjon ugli, & Usmonov Nodirjon Botiraliyevich. (2021). Solar drying of agricultural raw materials and types of solar dryers. *European Journal of Research Development and Sustainability*, *2*(5), 128-131. Retrieved from https://scholarzest.com/index.php/ejrds/article/view/824

8. Nazirova Rakhnamohon Mukhtarovna, Sulaymonov Rustam Ismoilovich, Usmonov Nodirjon Botiraliyevich, Qosimova Komila Muhammadsoli kizi, & Abdullayev Dilmurod Dilshodjon ugli. (2021). Influence of storage conditions on preservation of potato. European Scholar Journal, 2(2), 68-70. Retrieved from https://scholarzest.com/index.php/esj/article/view/265
9. Nazirova Rahnamokhon Mukhtarovna, Akramov Shokhrukh Shukhratjon ugli, & Usmonov Nodirjon Botiraliyevich. (2021). Role of sugar production waste in increasing the productivity of cattle. Euro-Asia Conferences, 1(1), 346–349. Retrieved from http://papers.euroasiaconference.com/index.php/eac/article/view/110
10. Nazirova Rahnamokhon Mukhtarovna, Akhmadjonova Marhabo Makhmudjonovna, & Usmonov Nodirjon Botiraliyevich. (2021). Analysis of factors determining the export potential of vine and wine growing in the republic of Uzbekistan. *Euro-Asia Conferences*, *1*(1), 313–315. Retrieved from http://papers.euroasiaconference.com/index.php/eac/article/view/99
11. Nazirova Rakhnamokhon Mukhtarovna, Holikov Muhridin Bahromjon ogli, & Usmonov Nodirjon Botiralievich. (2021). Innovative grain reception technologies change in grain quality during storage. *Euro-Asia Conferences*, *1*(1), 255–257. Retrieved from http://papers.euroasiaconference.com/index.php/eac/article/view/79
12. Nazirova Rakhnamokhon Mukhtarovna, Tojimamatov Dilyor Dilmurod ogli, Kamolov Ziyodullo Valijon ogli, & Usmonov Nodirjon Botiralievich. (2021). Change in grain quality during storage. Euro-Asia Conferences, 1 (1), 242–244. Retrieved from http://papers.euroasiaconference.com/index.php/eac/article/view/75
13. Nazirova Rakhnamokhon Mukhtarovna, Rahmonaliyeva Nilufar Nodirovna, & Usmonov Nodirjon Botiralievich. (2021). Influence of seedling storage methods on cotton yield. Euro-Asia Conferences, 1 (1), 252–254. Retrieved from http://papers.euroasiaconference.com/index.php/eac/article/view/78
14. Nazirova Rakhnamokhon Mukhtarovna, Otajonova Baxtigul Bakhtiyor qizi, & Usmonov Nodirjon Botiralievich. (2021). Change of grape quality parameters during long-term storage. Euro-Asia Conferences, 1(1), 245–247. Retrieved from http://papers.euroasiaconference.com/index.php/eac/article/view/76
15. Nazirova Rakhnamokhon Mukhtarovna, Mahmudova Muhtasar Akhmadjon qizi, & Usmonov Nodirjon Botiralievich. (2021). Energy saving stone fruit drying technology. Euro-Asia Conferences, 1(1), 248–251. Retrieved from http://papers.euroasiaconference.com/index.php/eac/article/view/77