

STUDY OF THE FOOD SAFETY AND NUTRITIONAL VALUE OF THE BUCKWHEAT GRAINS OF KAZAKHSTANI SELECTION

Abdymanap A. Ospanov^{1*}, Carmen Violeta Popescu^{2,3}, Nurzhan Zh. Muslimov⁴, Liviu Gaceu⁵, Aigul K. Timurbekova¹, Manea Stefan², Alina Dune², Candice Popescu⁶, Gulnara B. Jumabekova⁷

¹Faculty of Technology and Bioresources, Kazakh National Agrarian University, Abay Avenue 8, 050010 Almaty, Republic of Kazakhstan

²S.C. Hofigal Export Import SA, Intrarea Serelor 2, 4 District, 042124 Bucharest, Romania

³Faculty of Pharmacy, West University "Vasile Goldis", Liviu Rebreanu 86, 310045 Arad, Romania

⁴Agrobiological Research Institute, Taraz Innovation and Humanities University, Zheltoksan 69 B, 080000 Taraz, Republic of Kazakhstan

⁵Faculty of Food and Tourism, Transylvania University of Brasov, Castelului 148, 500036 Brasov, Romania

⁶Innergy (SC INNER Chi Nature srl), Ciobanului 133, 077135 Constanta, Romania

⁷Faculty of Technology, Taraz State University "M. Kh. Dulati", Tolebi 60, 010000 Taraz, Republic of Kazakhstan

***e-mail: ospanov_abdymanap@mail.ru**

Abstract

Like the majority of developing countries, the Republic of Kazakhstan, being in a globalizing economy today, has faced with the serious problems of healthy and balanced diet of the population. The solution of developed situation is raised to the rank of priority directions of the state agrarian policy. The literature review shows that, depending on the: agro-climatic conditions of cultivation and the varietal characteristics, the chemical composition of buckwheat seeds includes: the following: phosphorus, iron, copper, cobalt, calcium, boron, zinc, iodine, nickel, complex carbohydrates (cellulose), and the malic, citric and oxalic acid, and also vitamins B and P. The literature also indicates the therapeutic and prophylactic properties of buckwheat, which are characterized as a: hypotonic, anti-sclerotic, and expectorant drug. Rutin contained in the buckwheat improves the angiasthenia properties and increases the permeability of vascular capillaries. In this regard, the investigations, which are aimed at studying the deep chemical composition to determine the value of useful substances by the extraction method for their further use in the pharmaceutical and medical purposes, are the relevant and innovative direction in the food industry.

The study techniques were as follows. The initial quality of buckwheat seeds (organic matter content) was evaluated by the short-time near-infrared spectroscopy. Germination of buckwheat seeds was studied by means of the experimental sowing of 50 seeds and a further counting of the number of germinated seeds. Studying of the buckwheat seeds chemical composition was carried out by using the nuclear gas chromatograph GS1000D Firm of Yokogawa (Japan) of the Company "Hofigal Export Import SA" at the different phases of their physiological development through the germination on 28, 38, 45, 49, 105th day. The data obtained was recorded in the laboratory notebook to conduct the further systematization and analysis. And then, based on the data obtained, the charts of chemical composition changes, depending on the variable germination periods, were drawn up.

The percentage of protein content in the grain of "Bogatyr" buckwheat was 11.1% (mostly globulins and albumins), and an increased amount of lysine - up to 8% was established. Starch content was 66.2%, and the cellulose content was equal to 12.5%. Fat content in the selected samples of "Bogatyr" buckwheat grains was 3.2%. An antagonist of cholesterol - a fat-like lecithin substance prevails in the fats of buckwheat grains (up to 80%). The greatest amount difference of polyphenols content (at recalculation to caffeic acid) was observed on Day 49 day, and equal to 1.26%, and their smallest content was observed on day 28 of buckwheat growing - only 0.67%. Maximum total content of flavonoids was observed on Day 49 of the buckwheat vegetative development, and equal to 2.01%. The minimum total content of flavonoids was observed at the initial stage of buckwheat plants development – only 1.22% on Day 28 of physiological development. An analysis of received chart showed that there is no "trace" of microelements in the fresh sample of buckwheat, such as copper, lead, cadmium, and strontium. Buckwheat laboratory samples contained important microelements as a group of alkaline metals - sodium, potassium, and calcium, as well the important elements as: iron, magnesium, manganese, and zinc. An analysis showed that the content of microelements significantly increases in the dry wheat samples.

Based on the results of studies conducted we can conclude that the quantitative content of microelements is not uniform at the various phases of vegetation development of the grown buckwheat, which can be explained by the increasing physiological needs of plants that are associated with the intensification of growth, increased activity of metabolic processes and photosynthesis. It should be noted that in the early stages of development the buckwheat can dispense with its own reserves of microelements, but at the tillering phase they need an increase in the concentration of those microelements.

Key words: *Nutritional value, Food safety, Buckwheat grains, Pharmaceutical and medical-prophylactic, Mineral composition, Minerals, Extract.*