

ANALYSIS OF CHEMICAL COMPOSITION AND MAIN QUALITY INDICATORS OF FLAX SEED FLOUR

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Abstract

The work used seeds of flax of the oilseed variety "Bakhmalskiy-2" (lat. *Linum usitatissimum* L.), obtained at Zamona Rano LLC (Tashkent region, Uzbekistan). Oil flax is a highly profitable crop, one of the advantages of which is drought resistance, which is a very weighty argument for republics with an arid climate, in particular for Uzbekistan. In addition, oil flax has a simple cultivation technology that does not require the use of insecticides, which increases its food safety.

Introduction

According to FAO [1, p. 47-50], flax crops of oilseed varieties in the world amount to more than 3 million hectares, and the seed collection reaches 2.6-3.0 million tons.

In the republic, cultivated varieties of flax are grown in the Kashkadarya, Surkhandarya and Samarkand regions. The seeds of this crop contain fatty oil (30.0 - 48.0%), mucus (5.0 - 12.0%), protein (18.0 - 23.0%), carbohydrates (12.0 - 26.0%), organic acids, enzymes, vitamin A. The presence of mucus and glycoside linamarin determines the therapeutic effect of the seeds. The oil is recommended for use in atherosclerosis, diabetes, hepatitis and other diseases. Linetol from the oil is included in the composition of drugs for the treatment of burns, trophic ulcers and infected poorly healing wounds [2, p. 76-77]. In accordance with the Decree of the President of the Republic of Uzbekistan dated 16.01.2019 No. PP-4118 "On additional measures for the further development of the oil and fat industry ..." a significant increase in the raw material base for the production of vegetable oils is envisaged based on an increase in the sowing area for other (in addition to cotton) alternative oilseed crops (soybeans, sunflower, flax, etc.)5.

The chemical composition and physicochemical quality indicators of flour obtained from the cake of peeled flax seeds after direct cold pressing of oil (abbreviated ML) were studied.

The results of the study are presented in Figure 1 and Tables 1.





a)



b)

Figure 1 – Appearance of flax seeds (a) and flax flour (b)

Table 1 shows the results of the study of the chemical composition and energy value (caloric content) of FL.

It should be noted that flax seeds are rich in vitamin B1 (thiamine), which is necessary for normal metabolism, energy production, and the functioning of the neuromuscular system.

Analysis of the chemical composition of the studied FL (Table 1) showed that the bulk of the DM is represented by proteins and dietary fiber (cellulose). This product, as well as FS, has an unbalanced composition of proteins, fats, and carbohydrates. The advantage of the studied flour is the high content of vitamin B1 (thiamine), exceeding the physiological needs of an adult by 16.7%.

Table 1 – Chemical composition and energy value of FL

Nutrient	Amount of nutrient in g/100 g of product		
	product	SNFP*	RSP**, in % of SIN
Water	7,20	-	-
Proteins (P)	28,50	76,00	37,50
Fats (F)	9,00	56,00	16,07
Carbohydrates (C)	11,50	219,00	5,25
P:F:C ratio	1,0:0,3: 0,4	1,0:1,0:4,0	-
Fiber	34,20	20,00	171,00
Ash	9,60	-	-
Vitamin B1 (thiamine), mg	1,75	1,50	116,70
Minerals, mg:			
iron (Fe)	9,70	18,00	53,90
calcium (Ca)	290,00	1000,00	29,00
magnesium (Mg)	660,00	400,00	165,00
phosphorus (P)	780,00	800,00	97,50
zinc (Zn)	7,50	12,00	62,50
Caloric content, kcal	238	1684	14,13

It should be noted that flax seeds are a source of selenium, a unique essential element of the human body's antioxidant defense, which has an immunomodulatory effect and is involved in regulating the action of thyroid hormones. Deficiency of this element leads to Kashin-Beck

disease (osteoarthrosis with multiple deformation of the joints, spine and limbs), Keshan disease (endemic cardiopathy), and hereditary thrombasthenia [120].

The results of the study of the main indicators of the quality of ML are presented in

Table 2 **Quality indicators of the studied ML**

Indicators	Value of the indicators
Appearance	Homogeneous, powdery mass with dark inclusions
Color	Beige
Smell	Weakly expressed, characteristic, without foreign odors
Taste	Characteristic of this product, sweetish with a slight bitterness, without foreign taste
Moisture, %	7,20 ± 0,30
Total acidity, OH	2,50 ± 0,10
Bulk density, g/cm ³	37,50 ± 0,50
Flowability, g/s	6,20 ± 0,30
Angle of natural repose, deg	41,00±0,50

It has been established that, according to organoleptic indicators, the studied product can be used as a recipe component of Uzbek flatbreads.

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