

Physical and Chemical Classification of Local Soybean Seeds

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Abstract

The physical and chemical classification of certain soybean seeds grown under local conditions was studied. It was confirmed that local soybean seeds have a high oil content. The oil-acid composition of the oils in soybean seeds, as well as the characteristics of the phospholipids in the seeds, were analyzed.

Keywords: soybean seeds, physical-chemical composition, constituent components, fatty acids, phospholipids.

Introduction

In recent years, there has been particular attention given to the cultivation of oilseed soybeans. Several varieties of oilseed soybeans have been developed in Uzbekistan [1-3], and they are being produced on a large scale under industrial conditions. Therefore, studying and analyzing the physical and chemical classifications of local soybean seeds has significant importance.

In the research, various local soybean seed varieties were used as raw materials. The seeds were described by the following parameters, %: oil content – 36.8...41.0; moisture content – 7.8...10.5; impurities – 2.3...3.6. The average acid number of the soybean seed samples in the study was 2.41...4.06 mg KOH/g [4]. During experiments on oil extraction and the reprocessing technology of oils using the effect of electromagnetic fields [5], the quality indicators of the soybean seeds and raw vegetable oils are provided in Tables 1 and 2.

Table 1

Quality Indicators of Soybean Seeds

No.	Seed Variety	Quality Indicators	Moisture, %	Impurities, %	Oil Content, %	Acid Number of Oil, mg KOH/g
1.	"Madaniyat-114"	7.8-9.1	2.3-2.5	36.8-37.1	2.41-3.01	
2.	Gallaorol Variety	8.1-10.5	3.1-3.6	38.9-41.0	2.56-4.06	

Table 2

Chemical Composition of Soybean Seeds

Composition, %	Seed Variety	"Madaniyat-114"	Gallaorol Variety
Lipids	36.8-39.7	36.9-40.1	
Proteins (Nx6.25)	15.4-16.3	16.4-16.9	
Ash	2.1-2.6	2.7-3.1	
Core	59.1-61.3	60.7-63.9	
Proteins	24.5-27.3	24.9-25.7	
Ash	1.9-2.3	2.5-3.0	

Table 3

Average Physical-Chemical Indicators of Local Raw Soybean Oil Samples

Indicator Name	Value
Acid Number, mg KOH/g	2.0±0.3
Peroxide Number, mmol ½ O/kg	6.2±0.2
Iodine Value, mg I	20±0.4
Freezing Point, °C	-18±0.2
Phospholipid Content, %	0.9±0.3
Tocopherol Content, mg/100g	60±0.4
Organoleptic Indicators	Yellow color, characteristic soy seed odor
Metal Content (mg/kg)	Fe: 2.5, Cu: 4.1, Mg: 10.9, Na: 15.8, Ca: 11.9

Table 4

Fatty Acid Composition of Local Raw Soybean Oil Samples

Fatty Acid Name	Content, % (± 0.7)
Myristic C14	0.2
Palmitic C16	5.9
Stearic C18	3.8
Oleic C18:1	27.8
Linoleic C18:2	61.7
Total Saturated Fatty Acids	9.9
Total Unsaturated Fatty Acids	89.5

Table 5

Phospholipid Group Composition of Local Raw Soybean Oil Samples

Phospholipid Group Name	Content, %
Phosphatidylcholines	14.0 $\pm$ 0.4
Phosphatidylinositols	11.0 $\pm$ 0.3
Phosphatidylserines	16.5 $\pm$ 0.2
Phosphatidylethanolamines	18.5 $\pm$ 0.4
Phosphatidic and Polyphosphatidic Acids	30.0 $\pm$ 0.2
Diphosphatidylglycerins	7.0 $\pm$ 0.3
Non-lipid Phosphorus	3.0 $\pm$ 0.3

Conclusion

It has been determined and evaluated that the local soybean seeds grown under domestic conditions differ from traditional seeds in terms of their high oil content, fatty acid composition, and phospholipid content.

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