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ELECTROPHORETIC COMPOSITION OF EASILY SOLUBLE PROTEINS IN THE GRAIN OF SOME VARIETIES OF SOYBEANS

Abstract: *The article presents the results of electrophoretic analysis of water-soluble proteins in the grains of domestic and foreign soybean varieties grown in our country, as well as a brief description of the research work of world scientists on soybeans.*

Key words: *soy, protein, electrophoresis, acetone, ethyl ether, centrifuge.*

Language: *English*

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Introduction

Over the years of independence in the agricultural sector of the country, on the basis of measures taken to create new varieties of soybeans suitable for soil and climatic conditions, certain results have been achieved in the cultivation of soybeans as a secondary crop, high-yield and grain quality and disease-resistant varieties. The Action Strategy for the further development of the Republic of Uzbekistan sets such tasks as “planting of food and oilseeds, introduction of intensive methods in agricultural production” [1; 1-2 p.]. Based on these tasks, it is important to determine the high biochemical parameters in the grains of some varieties of soybeans (*Glycine max.* L), ie, the high content of protein and fat, the separation of high-yielding varieties.

Soybeans are an oil and legume crop that plays an important role in world agriculture. The widespread use of soybeans in the world is due to the quality of grain and protein. The amount and ratio of protein, fat and other important organic substances in the grain, as well as various macro and microelements allow it to be used in various industries. Soybeans are used to make butter, margarine, cheese, milk, flour, confectionery and canned food. Soybean oil accounts for 40% of the world's vegetable oil production [2; 95 p.]

The Main Findings and Results

Soy is the main protein and oil crop in the modern world, and is the best resource-saving and unique legume. Because soy fixes and leaves 200 kg to 250 kg of nitrogen from the atmosphere into the soil [3; 256 p.]. Soybeans are included in the UNESCO list of strategic crops due to their high nutritional value and protein storage [4; 19-21 p.]. The uniqueness and versatility of the use of soy is determined by its chemical composition: the seeds and green mass are composed of organic and inorganic substances. The distinctive feature of soybeans among field crops is their high protein and fat content. In the world practice, soybean is recognized as a source of plant protein and its cheap, high-quality protein. Unlike many plant proteins, soy proteins play the role of building blocks in the development of human and animal cells and provide the necessary amino acids.

Soy protein is similar in quality to meat, egg and milk proteins [5; 11-13 p].

Soy protein has a unique amino acid content that is almost equal to that of animal protein, according to the World Health Organization [6; 22-26 p].

Soy contains not only essential amino acids, but also 13-24% fat, 25% carbohydrates, 4.5-5.5% klechatka, 7% minerals (including calcium, phosphorus, sodium, iodine, molybdenum, nickel), 2% Phosphotides and vitamins E, B_1, B_2, B_6, pantothenic acid, niacin, choline, folic acid, biotin [7; 30-32 p], [8; 25 p.].

Extensive research in the fields of biochemistry, physiology and genetics on this plant is relevant. One of the main problems is to keep the genetic purity of agricultural crops in the same genetic condition. Variety purity control is mainly performed using DNA fragments, or analysis of protein components and isoenzymes. Electrophoresis of plant reserve proteins remains a simple and reliable method in the identification, testing, seed production and seed control of plant varieties [9; 134 p.].

Research on the genetics and biochemistry of soybean varieties is helping to improve the quality of selection research. To this end, it is necessary to introduce fast and reliable research methods that meet modern requirements in selection practice.

Based on the above, the purpose of this study is to study the electrophoretic spectra of easily soluble proteins of the seeds of some soybean varieties zoned in the country.

Varieties of soybeans such as Vilana, Oyjamol, Ustoz MM-60, Oltintoj, Orzu, Dostlik were taken as the object of research. The obtained seed samples were crushed and ground into flour. The ground soy flours were first degreased in Sok-Slet apparatus, first in acetone and then in ethyl ether. The defatted samples were mixed with distilled water in a ratio of 1:10 (flour: distilled water) and extracted for 1 h. Flour extracts were centrifuged at 6,000 rpm for 30 min and electrophoretically examined in an alkaline gel [10; 28-54 p].

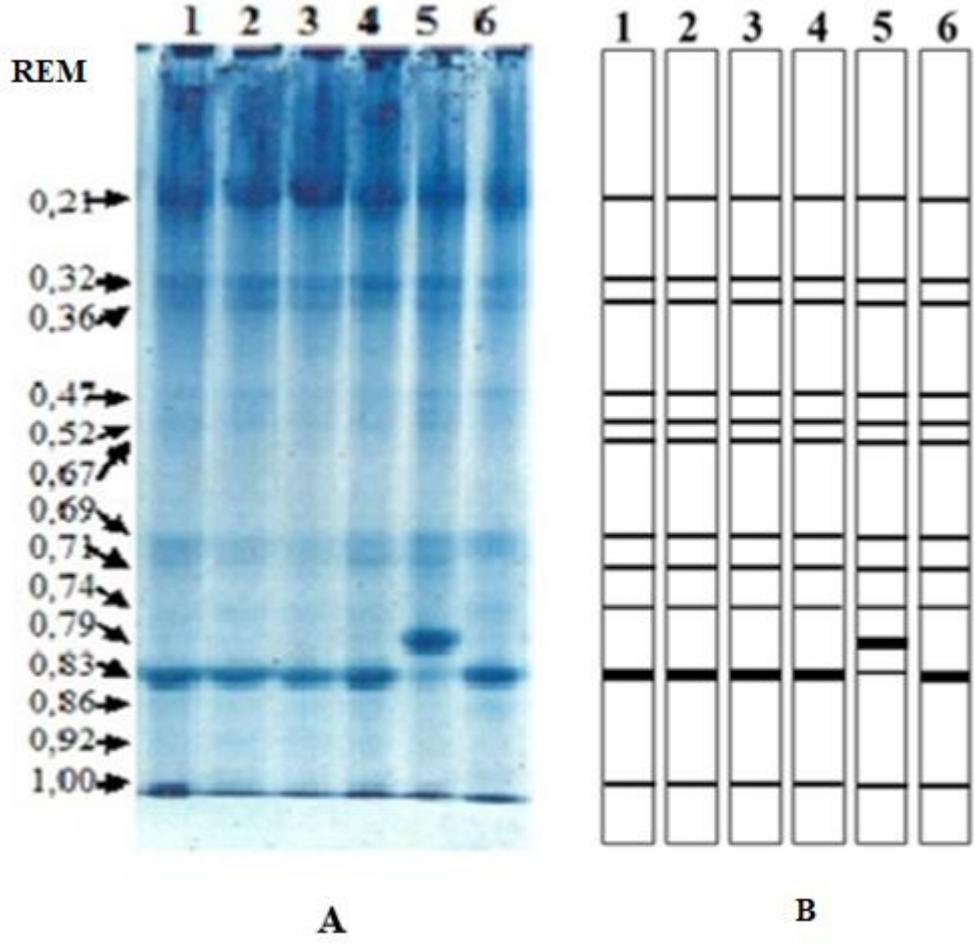

Figure 1. Electrophoresis (A) and Scheme (B) of water-soluble protein fractions in seeds of some varieties of soybeans
1-Vilana, 2- Oyjamol, 3- Ustoz MM-60, 4- Oltintoj, 5- Orzu, 6-Dostlik.
(Relative electrophoretic mobility-REM)

As can be seen from the figure below (Figure 1), the area up to the part where the electrophoretic mobility of proteins in the electrophoregram is 0.21 is slightly blurred, making it difficult to identify, and therefore identification of components begins with the identified component. A total of 14 components were found, with electrophoretic mobility ranging from 0.21 to 1.00. The different components of this group of proteins in the intra-variety diversity of seeds of each individual variety (5 to 10 seeds) were not determined. The dream variety differs from other studied varieties in that the relative electrophoretic mobility of the main components is 0.79 and 0.83.

Other varieties do not have a component with an electrophoretic mobility of 0.79 and a component with a mobility of 0.83 is present in all varieties. The difference between the studied varieties was observed in the minor component with electrophoretic mobility of 0.67, 0.74 and 0.92.

Based on the results obtained, the main component composition with electrophoretic mobility of 0.79 and 0.83 can serve as protein markers in genetic research.

Conclusion

In short, the protein and fat content of soybeans, as well as the component composition of proteins, serve as markers in scientific research, allowing them to be used in practical selection.

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