

Activity of Peroxidase Enzyme in Grains of Some Varieties of Soybeans Grown in Uzbekistan

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Abstract

The article provides information on the activity of peroxidase enzyme in the composition of the seeds and bark of some varieties of soy cultivated in Uzbekistan and the importance of this enzyme in plant life. As is known, soybeans are one of the main nutritional plants of Agriculture. Orzu and Vilana varieties are resistant to other varieties, and the main thing is that they can be planted in crop fields in all regions of the Republic, achieve high fertility and thereby satisfy the demand of the population for feed products.

Keywords

Soybeans, Cereals, Peroxidase, Oxidoreduktase, Enzyme

1. Introduction

The increase in the number of people on Earth from day to day, in addition to its own achievements, also raises universal problems. The main thing in these problems is the increasing need of the population for food products, the period itself prohibits the adaptation of traditionally cultivated crop varieties to the natural climatic conditions of the same territory, first of all, in the satisfaction of the population's need for food. In particular, the fact that the number of the population in Uzbekistan is increasing day by day, the average age of life expectancy is also an indication of the effectiveness of reforms aimed at improving human life in our country. As is known, soybeans are among the most important nutritional plants in the world.

On the basis of the reforms carried out in Uzbekistan, human interests are of paramount importance, in this regard, the decree of the president of our country

Shavkat Mirziyoyev dated February 7, 2017 No. 4947 was called “The strategy of action on five priority directions of further development of the Republic of Uzbekistan in 2017-2021”. The third direction of the strategy of action is called “further development and liberalization of the economy” and in this direction “modernization and rapid development of Agriculture” is given special importance [1]. Intensive development of Agriculture in our country crib modernization with the effective use of crop fields, many decisions have been taken by the president of the Republic of Uzbekistan and the Cabinet of Ministers in order to satisfy the population’s need for feed products.

Consequently, the decree of the president of the Republic of Uzbekistan “on ensuring the implementation of the resolution of PP-2832 of March 14, 2017” on measures to increase the cultivation of soybeans in the Republic in 2017-2021 and to organize the cultivation of soybean legumes in the Republic [2], decree of the Cabinet of Ministers of the Republic of Uzbekistan No. 105.

Due to these decisions, special attention is paid to the planting and cultivation of soybeans in our country, a lot of scientific and practical work is being carried out in this regard, and the crop area of soybeans is determined to be increased by 20 thousand hectares in 2021 [1]. The crop area of the shadow in the world is 121.5 hectares. It is grown in the largest amount in the USA, Brazil and Argentina [3].

2. Materials and Method

The object of the study was to separate the seeds of the varieties of soybeans from the peel and grind. The grain was prepared using distilled water from the crushed flour and bark parts of the grain, and the extracted extract was centrifuged for 15 minutes at a speed of 6000 RPM [4]. Examination of the activity of peroxidase A.N. Boyarkin was carried out according to the [5] method. This is traditional method of peroxidase activity. Each sample was checked three times and the results obtained were calculated from average indicators based on the Microsoft Excel program.

3. Result and Discussion

Soybeans occupy a special place among cereals and legumes, with a relatively high content of proteins, fats, microelements and Macroelements in its composition. According to literature sources, soy protein content 35% - 50%, 18% - 22% fat and 23% - 25% carbohydrates were shown [6]. The composition of soy Dogi also includes peroxidase ferment, which is a bioindicator for plant resistance [7].

Peroxidase-enzymes belong to the class of oxidoreductases and perform a catalytic function in the oxidation of various organic and inorganic substances with the participation of hydrogen peroxide [8]. These ferments are involved in many processes in the growth and protection of plants. N.Y.A. Shugaley and his colleagues [9] divide soy varieties into two groups according to the activity of the

peroxidase enzyme: varieties with high peroxidase activity in the grain coat and varieties with low peroxidase activity in the grain coat. They claim that the enzyme activity of the varieties included in the first group is ten times higher than that of representatives of the second group. The high activity of peroxidase in soy flour and coat has been shown to be hereditary in the influence of Er gene, while its low activity is in the influence of Er gene in the homozygous State [10].

It is known that many lands of Uzbekistan are saline. This, in turn, requires the task of identifying promising plants and cultivating them.

Planting seeds of one species into large areas in agriculture, the use of fungicides and other agrotechnical works contribute to the emergence of a new type of pathogens, such pathogens strongly damage the anterior resistant varieties of plants. If the preservation of the varieties was carried out in the previous years to 20 - 30 years, then now the resistance to pathogens is lost after 5 - 7 years. This situation derives from the need for in-depth study of the biochemical basis of the immune system of plants, the theoretical work obtained to effectively use plants to protect and combat diseases [11]. Today, pesticides, which are widely used in the fight against plant diseases and pests, have a sufficient effect not only on disease pathogens, but also on plants, as well as the environment. Methods of combating economically underdeveloped and environmentally safe conditions remain a topical issue [12]. Therefore, today's topical issue is the separation of varieties from agricultural crops that withstand various stresses and diseases and do not need chemical means in the fight against pathogens.

In recent years, it has been seen by many scientists as an analytical marker in assessing the degree of resistance of plants to stress factors to the peroxidase enzyme [13].

Peroxidase can be found in all living organisms: plants, animals and microorganisms [3]. This enzyme has several molecular forms, allowing it to adapt to the effects of changing conditions on plants. Through the various molecular forms of peroxidase, it is possible to create new ways to fully illuminate the protective function of plants and determine their tolerance to the disease in crop species.

In the Republic of Uzbekistan, as is the case in the world in the following years, attention to soybeans is growing. To ensure the cultivation of soybeans in a wide range of areas, the selection of varieties of soybeans that are flexible, pathogen resistant to various environmental conditions is today's demand.

In this article, the results of the research carried out on the varieties of the shade such as Ayjamol, Oltintoj, Orzu, Dostlik, Ustoz MM-60 and Vilana, Selekt-302, Slaviya are presented in order to identify varieties that grow in different regions of the country, give high dressing and are resistant to various cassettes and influences. The study is aimed at studying the degree of activity of the peroxidase enzyme in the DOI content of soy varieties [14] [15]. These species grow in the collection area of the institute.

In our research work on the study of the activity of peroxidase ferment in the

composition of some varieties of soy, it was found that this enzyme is in a higher activity than the part of flour in the shell of soy grain (**Table 1**).

From the information presented in the table, we can see that the highest indicator in terms of the activity of peroxidase ferment among the varieties we studied was manifested in the bark of Vilana (98.57) and Orzu (46.75) varieties. Average, Dostlik (5.35), Ustoz MM-60 (7.01), Slaviya (5.55) varieties were relatively low in the coat, while Selecta-302 varieties were low in the coat compared to the varieties studied in the Oyjamol (10.29) and Oltintoj (13.66) varieties (**Figure 1**).

Even in the flour part of the research facilities, the activity of the peroxidase enzyme was studied. The enzyme-Orzu (2.24) gave a higher level of activity in the flour of other varieties compared to the activity in the flour. A slightly lower result was seen in the flour of the Vilana variety (0.66), where enzyme activity was very high in the Vilana. Among the studied varieties, the lowest index on the activity of peroxidase in flour was revealed in the sixth (0.53) grade.

Flour/coat		Variety	Orzu	Do'stlik	Oltintoj	Oyjamol	Ustoz MM-60	Vilana	Selekta-302	Slaviya
		Non fat Fat free In the juice meeting	At room temperature	Flour	0	0	0	0	0	0
Coat	Flour		0	0	0	0	0	0	0	0
Coat	Flour		0	0	0	0	0	0	0	0
Coat	Flour		0	0	0	0	0	0	0	0
Coat	Flour		0	0	0	0	0	0	0	0
Coat	Flour		0	0	0	0	0	0	0	0
Coat	Flour		0	0	0	0	0	0	0	0
Coat	Flour		0	0	0	0	0	0	0	0

Figure 1. The activity of peroxidase in the grain of soy varieties (on filter paper).

Table 1. Peroxidase ferment in soy cereal varieties activity (1 mg protein).

No.	Name of variety	Flour	Coat
1	Orzu	2.24 ± 0.16	46.75 ± 1.55
2	Dostlik	0.75 ± 0.11	5.35 ± 0.67
3	Oyjamol	1.09 ± 0.09	10.29 ± 0.34
4	Oltintoj	0.53 ± 0.05	13.66 ± 0.75
5	Ustoz MM-60	1.09 ± 0.07	7.01 ± 0.34
6	Vilana	0.66 ± 0.07	98.57 ± 7.32
7	Selekta-302	1.40 ± 0.10	2.28 ± 0.25
8	Slaviya	1.30 ± 0.08	5.55 ± 0.35

From the water extracts prepared from the flour and crumbly part of the cereal of our same peas, the filter from 10 mk was drip into the specified place of the paper and, according to the method, painted peroxidase [7]. In our experiment on filter paper aimed at studying the intensiveness of the peroxidase enzyme, it was found that among the soy varieties whose research facilities are considered Orzu, Ustoz MM-60 and Vilana varieties are peroxidase intensive compared to other varieties (Figure 1).

4. Conclusions

The activity of the peroxidase enzyme in the grain of soy varieties was studied in different methods, and the results that did not coincide with each other were demonstrated. We can conclude that the variety of results in various tests is related to the pH environment that occurs under the influence of chemical reagents. From this, it can be seen that the isoforms of the peroxidase enzyme, in accordance with the soil-climatic conditions of the environment in which the soybean crop is grown, will continue to show its activity.

Among the research sources studied on the basis of the results obtained and the information presented in the literature, Orzu and Vilana varieties are resistant to other varieties, and the main thing is that they can be planted in crop fields in all regions of the Republic, achieve high specificity and thereby satisfy the population's demand for feed products. The activity indicators of the peroxidase enzyme, which are identified as a result of the research, can serve as a basis in assessing the resistance of the soy plant to various environmental stresses and pathogens.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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