



## Methods for Determining Seed Health - Positive and Negative Sides

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**Abstract:** In recent years, much attention has been paid in the Republic to the protection of crops, which begins from the moment of storage to the preparation of seed material for sowing. Today, this issue is of particular relevance in an increasingly changing environmental situation in the world. Considering that the spread of diseases is facilitated by finding their source in the seeds themselves, the so-called preventive measures to combat plant diseases are primarily aimed at disinfecting the seed material itself, against the presence of fungal spores, microbes, nematode viruses and other harmful diseases in the planting material itself. organisms.

**Keywords:** agricultural crop, seed production, healthy seeds, seed lot, seed material, harmful organisms, plant diseases, seed germination, standardization, economic efficiency.

### INTRODUCTION

In the new edition of the Law of the Republic of Uzbekistan "On seed production" dated February 16, 2019 No. 521, in order to regulate relations in the field of seed production in the context of the new economic development of work in the field of seed production in Uzbekistan, the President of the Republic of Uzbekistan adopted Resolution PP-106 dated January 28, 2022 year "On measures and additional measures for the further development of seed production of agricultural crops", where the preparation and packaging of seeds of cotton, sorghum, vegetable, oilseeds, legumes and fodder crops grown in seed organizations, in accordance with international standards, as well as the implementation of domestic and foreign market under the national brand "Seeds of Uzbekistan".

In the development of the national economy of Uzbekistan, in order to increase the economic efficiency of soil fertility, the environment and agricultural production are largely taken into account with the efficient use of natural resources.

At the level of development of the natural sciences, great importance is attached to creating the necessary conditions for the growth of cultivated crops in the pest control system.

In recent years, in our Republic, great importance has been attached to the protection of agricultural crops, from the harvest to the preparation of seed material for planting.

Today, the change in the environmental situation in the world is one of the urgent problems. First of all, it is aimed at carrying out preventive measures for the disinfection of the seed material itself.

Considering that the spread of diseases is facilitated by finding their source in the seeds themselves, the so-called preventive measures to combat plant diseases are primarily aimed at disinfecting the seed material itself, against the presence of fungal spores, microbes, nematode viruses and other harmful diseases in the planting material itself.

However, despite the fact that the disinfection of seed material by chemical methods has been solved in practice, methods for determining the effectiveness of some drugs have not been developed or even standardized, and according to the international requirements of ISTA (International Seed Inspection Association), seeds of agricultural crops ready for sale must be determined on infection. Therefore, it is very important to create methods for identifying microorganisms after the chemical treatment of seed lots against harmful microorganisms in a short time.

Detecting seed damage as early as possible is important for a number of reasons:

1. firstly, harmful diseases transmitted by seeds develop even more in the field, and over time, the yield decreases and it becomes a poor-quality product;
2. secondly, when importing batches of seeds, diseases are brought to another region, which raises questions about the analysis of relevant batches according to quarantine requirements;
3. thirdly, the information obtained about the health of seeds is used in the timely evaluation of the cause of low germination of plants in laboratory and field conditions, and complements the method for determining germination.

Recently, works on the complex study of viruses of the “Vertically Kleb” type have often appeared. As a result of many years of research, various interesting indicators in the field of biology and ecology have been obtained (Ramazanova, 1964, 1965, 1975; Idessis, 1971; Dzhamalov, 1968; Dzhamalov, Usmanbekov, 1968; Azimdzhanov, 1972, 1974a, 1974b; Karadzha). o tai., 1973; Rannai, 1973; Bootn, 1974; Sghathorat et al., 1975; Kozubaev, 2011).

But, when analyzing each of the above literature, there are indicators related to some specific types of crops and their impact on the spread of seed infection during the growing season that are not well understood.

### **Experimental methods and results**

A literature review showed that the issue of transmission of infection from one to another is not new. It turned out that there are many cases of conflicting opinions. Since the role of seeds in the transmission of infection through seeds to the developmental phase is an urgent issue, it is necessary to solve the problem of identifying the seed itself at the beginning of the early detection of aggressive pathogens. Seed health depends primarily on the presence or absence of pathogens or pests, micronutrient deficiencies, and other conditions such as aging.

Seed health depends on the following three most important factors:

- 1) The inoculum present in the seeds reduces the yield and the cost of the product;
- 2) Pathogens can be brought to a new region along with a batch of seeds, so a quarantine certificate may be required for this side of the issue in order to carry out quarantine measures and enter the international market;
- 3) Determining the state of health of seeds, clarifying the cause of abnormal tumors and possibly supplementing the results of seed germination.

A separate seed health check is carried out at the request of the seed sender to determine the specific pathogen. If the seed lot has been treated with pesticides, the sender must report the specific treatment. Experiments are carried out in several variants for variability, but the number of tested seeds must be at least 400.

Together, in the laboratories of the Research Institute of Selection, Seed Production and Agricultural Technology of Cotton Growing and the Research Institute of Plant Protection of Uzbekistan, several aggressive pathogens found in seeds of cotton, wheat and other crops have been identified.

To determine the health of the seeds, two ISTA requirement methods were used to test seeds for gommosis (*Xantomonas malvacearum*) and root rot (*fusarium.Rhizoctonia*, *Verticilium*), dry method and wetting method and the following results were obtained (table 1).

**Table 1. The results of the infection detection of cotton seeds "C-6524" with the use of dry method and wetting method without incubation.**

P/No.	Investigated pathogen	Number of damaged seeds, %			
		dry method		wetting method	
		not processed	processed	not processed	processed
1	Gommosis ( <i>Xanthomonas malvacearum</i> )	6.0-6.5	3.2	8.1	3.8
2	Root rot ( <i>Fusariosis. Rhizoctonia, Verticilium</i> )	7.3-7.5	3.5	8.6	4.2

In an untreated seed sample, infection with gommosis ranged from 6.0 to 6.5%, root rot - from 7.3 to 7.5%. After seed treatment of the formed pathogens, 3.2 and 3.5% remained.

In experiments to determine the damage of seeds by the method of wetting, it is clear that some harmful pathogens have increased, i.e. the remaining gommoses, but the infection was 3.8%, and root rot 4.2%.

If we consider an average of 100 thousand plants per 1 hectare of cotton field, it is revealed that from 3.2 to 4.2 thousand plants, even under good weather conditions, were previously infected with gommosis and root rot. Similar experiments were carried out on grain crops.

Thus, the residual infestation of wheat seeds of the Gairat variety when treated with pathogens of powdery mildew, gray and stem rust of Alto Super and Impact seeds was 3.8-4.2%. Here, as well as in cotton seeds, there is a tendency to an increase in pathogens with the method of wetting the seeds (table 2).

**Table 2. The results of the infection detection of wheat seeds "Gairat" with the use of dry method and wetting method without incubation.**

P/No.	Investigated pathogen	Number of damaged seeds, %			
		dry method		wetting method	
		not processed	processed	not processed	processed
1	Flour, wheat dew ( <i>Erysiphe graminis f. tritici</i> )	12.0-12.5	3.0-4.0	18.0-20.0	4.2
2	Brown rust of wheat ( <i>Puccinia triticin</i> )	10.3-10.7	3.5-3.7	15.1-15.7	3.8
3	Grain stem rust ( <i>Puccinia cereals f. tritici</i> )	11.2-11.6	3.8-4.2	11.2-11.6	3.8-4.2

**Conclusions:**

1. There is a correlation with the level of seed damage even if the most cultivated plant under subjective conditions has passed the laboratory analysis for the quality of the seed lot and received the Certificate of Conformity. Therefore, it is necessary to develop and approve the Method for determining the health of seeds in a short time.
2. The results obtained by this method must be entered in the annex of the Certificate issued for seeds of agricultural crops.

3. This helps to objectively assess the quality of distributed seeds and take timely precautions in the development of agricultural products.

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