E- Global Congress
Hosted online from Dubai, U. A. E., E - Conference.
Date: 30th July 2025
Website: https://eglobalcongress.com/index.php/egc
ISSN (E): 2836-3612

ANALYSIS OF DEVELOPMENT TECHNOLOGY OF HAIRY SEED SEEDS

Karimov Jakhongir Djumabayevich
Researcher, Director of the State Institution "Center for Assessment of the Quality of Agricultural Products" under the Inspection for Supervision of the Agro-Industrial Complex under the Cabinet of Ministers of the Republic of Uzbekistan

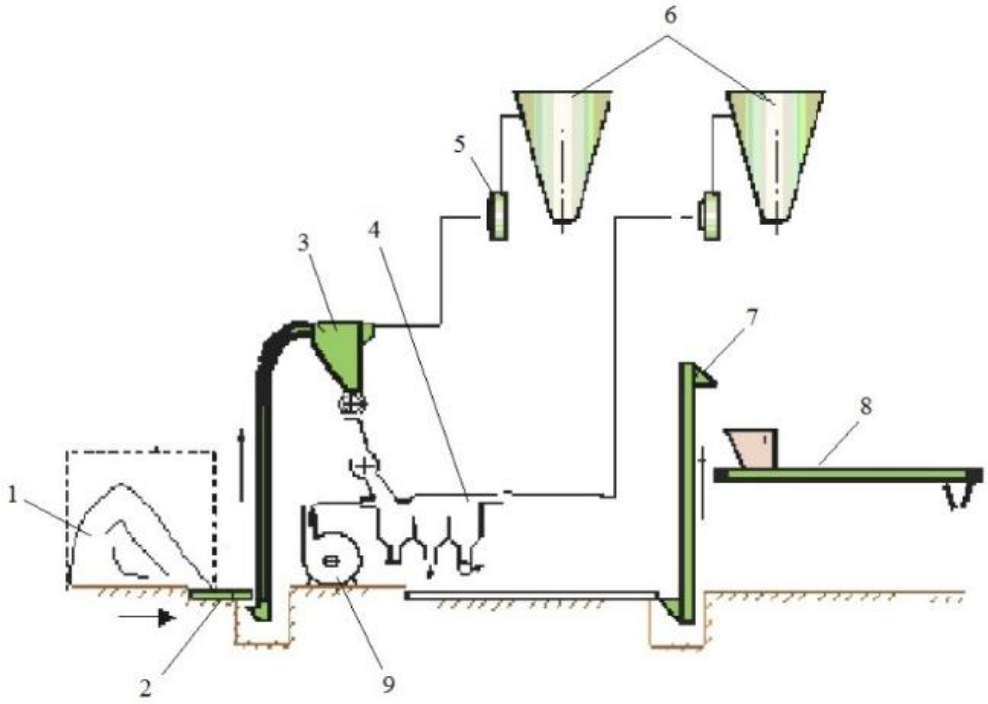
Akramov Alisher Ashuraliyevich
Doctor of Technical Sciences, Senior Researcher, Head of the Laboratory of the Scientific Research Institute of Fiber Crops, Tashkent, Uzbekistan

Jumaniyazov Qadam
Doctor of Technical Sciences, Professor, Deputy Director of the Scientific Research Institute of Fiber Crops, Tashkent, Uzbekistan

Abstract
Currently, one of the important tasks is to automate the technological processes of seed production, increase technological efficiency through the introduction of energy- and resource-efficient equipment. This article reviews the previous and currently used technological systems of seed production, their advantages and disadvantages.
The technology of seed production for hairy seeds includes the following main processes: cleaning the initial hairy seeds from impurities, sorting, treating them with chemical and biological substances, and packing them in paper bags.
Until 1995, the technological processes of seed production for hairy seeds (with a grain content of not more than 9%) were carried out using the simplest machine units, mainly using manual labor Figure 1. Seed was transferred to the production process manually using a wooden shovel. This led to a decrease in the quality of seed sorting without ensuring a uniform delivery of seed to the cleaning and sorting units [1].
In this technological process in Figure 1, the hairy seed was first transferred to the auger 1 by hand using a shovel, and through the auger the seed was

ISSN (E): 2836-3612

transferred to the USM-A type seed cleaning unit 2, where the cleaning and sorting processes were carried out.



1- hairy seed set; 2nd screw; 3-USM-A cleaning unit; 4-SPS type pneumatic seed sorter;
5-VTs-8 fan; 6- cyclone; 7th elevator; 8th input mediciner; 9-UVTs-22 ventilator.

Figure 1. Schematic diagram of the location sequence of technological machines and aggregates for the preparation of hairy seed used before 1995

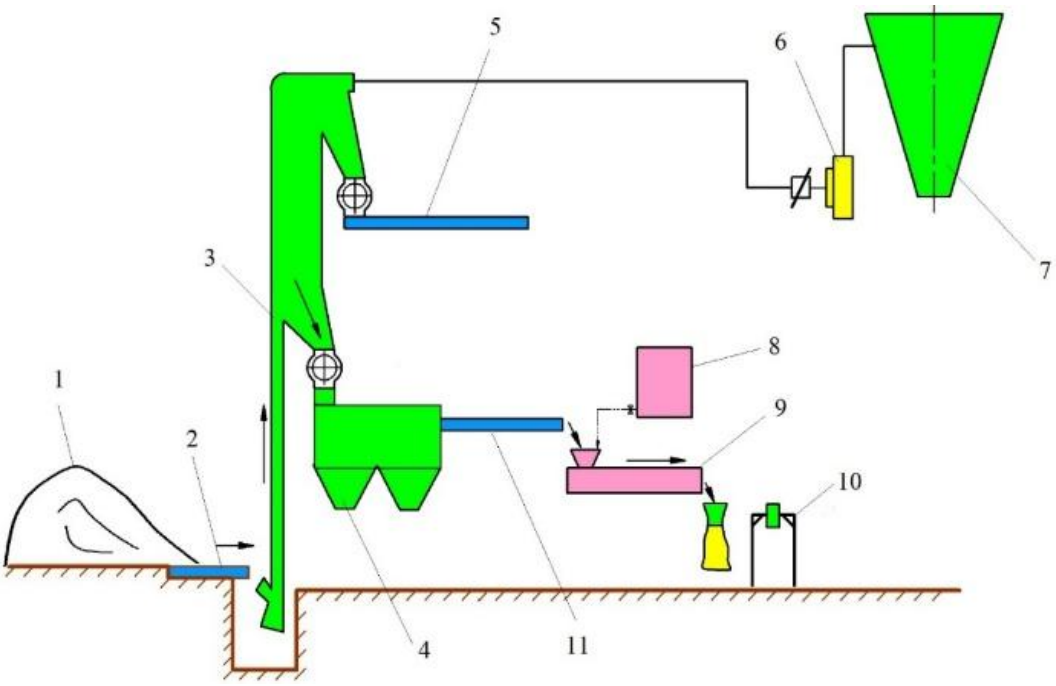
In the above technological process, the seed was cleaned of light impurities using the USM-A cleaning machine, transferred to the SPS type seed sorting unit by weight, and sorted along the horizontal air flow using a fan. The sorted seed was transferred to the auger sprayer through an elevator and treated against pests and diseases. The treated seeds were placed in paper bags, and the bags were sewn shut by hand [2].

The productivity of the USM-A seed cleaning machine was at most 7500 kg/h, and the efficiency of cleaning the hairy seeds from small and light impurities was 20-25%. The productivity of the SPS type horizontal air flow sorting unit for hairy seeds in the technological process was 6000 kg/h. Screw feeders were used to treat the seeds with drugs, and the amount of

ISSN (E): 2836-3612

working suspension consumed for treating 1 ton of seeds was estimated by eye, which in many cases led to an increase in the amount of working suspension and an increase in the moisture content of the seeds above the standard requirements.

Scientific research was carried out in the areas of seed processing technology and the development of technological machines and units for its implementation, as well as the improvement of existing ones. As a result, since 1995, units equipped with a vertical air flow sorting unit of the ChSA type for hairy seed seeds and mechanical seed cleaners of the MChT type included in it began to be introduced into the industry [3, 4].



1-seed hopper; 2-screw; 3-Pneumatic seed cleaning and sorting unit of the ChSA type; 4-Mechanical seed cleaner of the MChT type; 5-technical fraction outlet; 6-fan; 7-cyclone; 8-working suspension tank; 9-compressor; 10-bag sewing machine; 11-seed fraction transfer screw.

Figure 2. Schematic of the arrangement of technological equipment for the preparation of hairy seeds used in 1995-2005

The introduction of these cleaning and sorting units created conditions for additional mechanical cleaning of seed seeds, which significantly increased the quality indicators of seed seeds. Another noteworthy aspect is that the

ISSN (E): 2836-3612

number of additional devices in the technological process, namely elevators and fans, was reduced. This made it possible to reduce the energy consumption of equipment by 30-40 percent, and mechanical damage to seeds was reduced. The sequence of installation of machines and units in this technological process is presented in Figure 2.

In order to improve the seed production system in our republic, in order to ensure the implementation of the Resolutions of the Cabinet of Ministers No. 604 of December 23, 2004 and No. 4 of January 5, 2005, the working processes of technological machines and units in the existing seed processing workshops were studied and analyzed. The technological process revealed the following shortcomings: the incompatibility of the existing pneumatic sorting unit for hairy seeds with the machines for treating seeds with chemical preparations, or more precisely, the low productivity of the sorting unit, the lack of mechanization of the system for transferring the initial hairy seeds to the technological process, i.e., the manual sorting process, which resulted in a decrease in the efficiency of the sorting unit, the failure of the machines and units to fully meet modern requirements in terms of manufacturing quality and design, and the determination of the working suspension by eye based on the norm for 1 ton of seeds in the treatment technological process.

To eliminate the above shortcomings, a modern technological equipment system for hairy seeds was developed by the scientific staff of the Seed Preparation Laboratory of the Cotton Industry Scientific Center (Fig. 3) [1, 5].

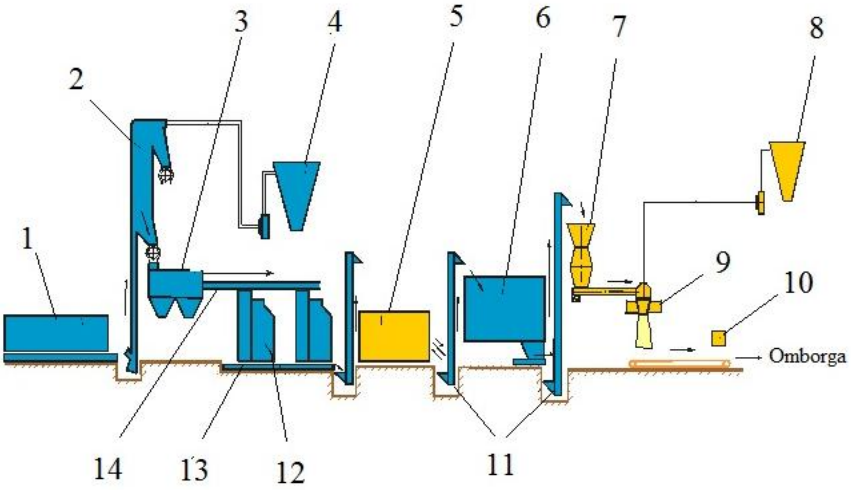
The main criteria determining the quality indicators of the prepared seed during the seed preparation process are: achieving high seed germination, achieving high germination capacity, ensuring the absence of foreign impurities in the seed composition, and minimizing mechanical damage to the seed. As a result of the research of many scientists conducting scientific research in this area, it has been proven that sorting seed seeds first by relative mass and then by geometric dimensions leads to an increase in seed quality indicators.

As a result of scientific and practical research conducted to improve the techniques and technologies of seed preparation, a technology for the preparation of hairy seeds equipped with modern equipment has been

ISSN (E): 2836-3612

developed. This technology includes the following processes and equipment:

- transfer of primary hairy seeds to the acceptance and sorting process in a specified amount, pneumatic cleaning of impurities in the seed composition and sorting by weight, reduction of the degree of hairiness in accordance with the requirements of the established standard, pneumatic-mechanical cleaning and sorting by geometric size, temporary collection and standard transfer of seed seeds, treatment and packaging in paper bags (Figure 3).



1-UPS receiving hopper; 2- ChSA type pneumatic sorting unit; 3-MChh type mechanical seed cleaner; 4-cyclone; 5-hairy seed cleaning machine; 6-BDOS type hopper-doser;
7th medication machine; 8 air cleaning aspiration device; 9-measuring device; 10-bag sewing machine; 11th elevator; Linter machine model 12-5LP; 13-collecting screw; 14-distributing screw.
Figure 3. Scheme of the installation sequence of machine aggregates in the technological system of modern hairy seed seed preparation.

The treatment stage is one of the main and decisive processes in the preparation of seed seeds. This stage plays an important role in ensuring the germination of seeds after planting, their growth during the growing season, and their resistance to various diseases and pests. The results of the study showed that the currently used machine for treating hairy seeds with a suspension of drugs is technically outdated and the efficiency of mixing

ISSN (E): 2836-3612

hairy seeds with a suspension of drugs is low. In order to eliminate these shortcomings, scientists from the Fiber Crops Research Institute developed a new mixing drum as a result of scientific research. The eight edges of the developed drum are equipped with slats at an angle, the function of which is to ensure the transfer of seeds to the additional tubular mixer installed in the center of the drum. As a result, the completeness of the treatment of the treated seeds is increased due to the increase in the active mixing surface of the drum. Currently, work is underway to prepare working drawings of this mixing drum.

References

1. V. Rakipov, R. Jamalov. Final report on the scientific research work No. 050901 “Preparation of technical requirements for the design of workshops using domestic and imported cleaning, sorting, calibration and treatment equipment”, “Cotton Cleaning Institute”, 2006 - 130 p.
2. Recommendations for the treatment of seed, PDQI 43-2002, Tashkent 2002.
3. Dyachkov V.V., Rakipov V.G. et al. Creation of an aggregate for cleaning and sorting of fluffed cotton seeds. Otchet NPO "Klopkoprom", po teme 8808, Tashkent 1990., p. 126.
4.Abdukarimov, A. A., & Mamatqulov, S. B. (2020). Innovatsion texnologiyalar asosida paxta urug‘larini dastlabki tayyorlash tizimini takomillashtirish. Toshkent: O‘zbekiston qishloq xo‘jaligi ilmiy-ishlab chiqarish markazi.