

Efficient Seed Processing Steps for Maximum Recovery

Singarapu Snigda Srilaasya¹ Swarnalatha V², Pallavi M³

¹Dept of Seed Science & Technology Centre

²⁻³Genetics and Plant Breeding,

¹⁻²⁻³Seed Research Technology Centre, PJTSAU

ARTICLE ID: 06

A crucial stage in agricultural production is seed processing which ensures the delivery of quality seeds with the highest levels of viability and purity. A number of steps are takingly carried out and effective procedures are necessary for seed processing in order to increase recovery rates and preserve seed health. This article addresses contemporary needs and the need for high precision in the seed industry by examining the crucial steps of seed processing and the cutting-edge technologies that improve seed quality.

1. Seed reception and initial inspection:

Raw seeds are received in batches from the field to start the procedure. Important steps include: Testing for moisture: Verifying that the moisture content of seeds is within acceptable storage ranges.

For germination and vigour tests, representative samples are collected.

Purity inspection: It is the process of seeing and mechanically checking after the impurities such as diseased seeds, weed seeds and inert matter.

2. Pre-cleaning:

Larger contaminants are eliminated during pre-cleaning, which also gets the seeds ready for subsequent processing. Equipment that is frequently used includes: Air screen cleaners: These use air currents to separate heavier seed material from lighter trash. Scalpers: To remove materials that are too lar

3. Conditioning:



Seed conditioning focus mainly on refining the seed lot by enhancing its physical properties.

Magnetic separation is used for seeds that contain metal or to get rid of specific impurities.

De-stoners: Used to get rid of heavy objects like stones.

Gravity separation: By separating seeds according to density, gravity separation gravity separations aids in the removal of damaged or immature seeds.

4. Grading:

In this step seeds are sorted according to size and shape using

Rotary grader: Used for separation of seeds in uniform sizes.

Indent cylinder separators: It is used for separation of seeds based on length. It is important for crop precision and sowing as it ensures uniformity.

5. Seed treatment:

Seed treatment helps in seed protection and it improves germination of seed.

Some of the common treatments include

Fungicide and insecticide coatings: To protect seeds against pests and diseases.

Polymer coating: It helps in handling seeds along with precision planting.

Bio priming: It helps in incorporating beneficial micro-organisms which aids in seed vigour.

6. Drying:

Seed drying is very important step for maintaining optimum seed moisture for storage.

Modern drying includes:

Low temperature drying: It preserves seed viability

Dessicant based dryers: It is used for high value seeds.

7. Final cleaning and sorting:

Colour sorters and optical sorters are examples of advanced cleaning technologies that ensures the elimination of any leftover contaminants. These tools use artificial intelligence (AI) and machine vision to identify minute changes in texture, colour and shape.

8. Packaging and storage:

Packaging and storage are essential for maintaining seed quality during seed distribution

It includes:

Hermetic packaging: It reduces pest infestation

Controlled atmosphere storage: It maintains low oxygen levels to reduce seed deterioration.

9. Quality testing and Certification:

Before seeds are released for distribution, they should undergo some quality tests to ensure industry standards in market. Some of the important include

Germination test: It determines seed viability

Seed Vigour test: It will assess the seed's potential and uniform growth.

Genetic purity test: Ensures whether the seed meets the specifications.

Advanced Technologies in Seed Processing

- With the advent of artificial intelligence (AI) and machine learning (ML), the seed industry has witnessed significant advancements. These include:
- **AI-Powered Optical Sorters:** Capable of analyzing seeds at high speeds for defects and impurities.
- **IoT-Integrated Monitoring:** For real-time tracking of seed storage conditions.
- **Blockchain for Traceability:** Ensures transparency and authenticity in seed supply chains.

Conclusion:

Strict adherence to sophisticated seed processing procedures is necessary for high seed recovery. Seed manufacturers may provide premium-quality seeds that satisfy the expanding needs of contemporary agriculture by using cutting-edge technologies and following best practices. In addition to improving seed recovery, these methods support an effective and sustainable agricultural system.