

Effective Seed Packaging and Handling for Quality Assurance

Sultan Singh*

Ph.D. Scholar, Chaudhary
Charan Singh Haryana
Agricultural University, Hisar-
125004



*Corresponding Author
Sultan Singh*

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INTRODUCTION

Seed packing and handling are crucial components of the seed processing and distribution process. Proper packaging materials and techniques must be chosen based on various factors, including seed type, storage duration, environmental conditions, moisture content, cost considerations, and geographic location. The packaging materials should provide the necessary physical protection for the seeds, such as tensile strength, bursting strength, and tearing resistance, to withstand the rigors of handling.

Once the processing and treatment processes are finalized, the seeds are carefully placed into containers with specified net weights. Packaging or bagging marks the final phase of bulk seed handling. This packaging process encompasses the following key operations:

1. Precisely filling the seed bags to meet specific weight requirements.
2. Inserting informative leaflets into the seed bags to offer guidance on enhanced cultivation practices.
3. Affixing labels and certification tags to the seed bags and securing them through sewing.
4. Storing and shipping the seed bags to their designated destinations.

Equipment Utilized for Seed Packaging

A) Bagging

a. **Bagger–weigher:** These compact machines, when appropriately installed below a storage bin, are designed to efficiently fill and accurately weigh a bag in a single operation. The operational steps typically involve:

- i. Suspending an empty bag on the bagger-weigher using a bag clamp.
- ii. Initiating the flow of seeds into the bag, often triggered by a trip lever.
- iii. As seeds flow into the suspended bag, a counter-balance mechanism of the scale type is activated. This mechanism ensures that when the bag contains the precise weight of seeds, the seed flow lever is released, automatically halting the seed flow.
- iv. The bag, now filled with the exact weight of seeds, is removed from the bagger-weigher and sealed.

- Bagger-weighers and bagging scales used in seed packaging may come in manual, semi-automatic, or automatic variations.

Manual weighing: This particular scale, typically in the form of a portable platform, is generally deemed less effective for volume-based weighing tasks due to its elevated labor demands and relatively limited bag-filling capacity in terms of bags filled per minute. With this scale, bags are filled to an estimated weight, positioned on the scale, and then fine-tuned using a hand scoop. These scales find utility in specific conditions like, weighing bags of non-free flowing seeds, A bagging bin is not available, Labour costs are minimal.

Semi-automatic: This is the most commonly used scale in seed packaging. The scale is affixed to the underside of a bagging bin, and the bag is secured to the bottom of the scale using a clamp. The feed gate is initially opened manually and can be closed manually or automatically once the desired weight is achieved. These scales are capable of weighing and filling four to eight bags, each weighing 50 kg, per minute. The actual

capacity depends on the type of seed being packaged and the proficiency of the operators.

Automatic scales: Scales of this category are primarily employed for smaller packages, such as vegetable and lawn seeds. These machines are equipped to handle the entire weighing and filling process automatically. The setup is akin to that of a semi-automatic bagger. In some fully automated systems, the process involves picking up the empty bag, positioning it on a bagger, filling the bag, and then releasing the filled bag. Subsequently, the filled bag is conveyed to a bag-closing station.

Platform scales: Lorry weigh-bridges are primarily employed for weighing substantial loads of incoming seed delivered via trucks, trailers, or wagons. Seeds typically received in bags, boxes, or other containers can be managed using fork-lift trucks or by manual handling, particularly when a platform scale is at hand.

b. **Bag sewing machine:** Upon filling an open-mouth bag, it becomes necessary to seal the bags top using a bag sewing machine. These machines are high-speed, precision equipment and require proper operation and maintenance to avoid frequent breakdowns and ensure a longer operating life. To ensure the correct operation of the bag sewing machine, the following practices are essential:

- Operation should be carried out exclusively by well-trained personnel.
- The machine should be equipped with the appropriate thread size.
- The sewing machine should sew across the bag's top at a speed that matches the speed at which the sewing foot advances the bag through the machine. Forcing the sewing machine across the bag too quickly or dragging it too slowly can lead to operational issues.

- Commence sewing into the bag on the side opposite the bag seam to prevent jams.
- Operate the machine with the proper thread tension to guarantee the correct stitch is achieved.

The proper operation of the sewing machine requires:

- Using a smooth and appropriately adjusted looper. Avoid removing thread knots from the looper with sharp or pointed instruments, as this may scratch the looper and lead to thread damage.
- Maintaining the machine in a well-oiled and clean condition.
- Periodically, immerse the entire neck of the bag sewing machine in a 50-50 mixture of kerosene and light motor oil for a few seconds. This lubricates the machine, removes dust, and clears any accumulated debris.
- Taking care to avoid striking a seed as the bag is sewn shut.

B) **Handling:** Various conveyor systems are available for transporting both unpacked and packaged seeds within processing plants, facilitating movement in vertical,

horizontal, or inclined directions. Processing plants employ a variety of conveyor types, including bucket elevators, belt conveyors, vibrating conveyors, pneumatic conveyors, screw conveyors, chain conveyors, and lift trucks. The selection of the appropriate conveyor type for each operation, whether it involves receiving seeds in the plant, transferring seeds from dryers, shellers, or between different processing machines, or conveying packaged seeds into storage, significantly impacts the efficiency of processing operations. Conveyor choices should be based on factors such as the types of seeds being handled, the direction and length of conveying, the capacity of the equipment to which seeds are transferred, and the need for proper cleaning.

Packaging Material: The selection of packaging materials and the quantity of seeds to be packed are contingent on various factors, including the type of seeds, the expected storage duration, the storage conditions, seed moisture content, seed cost, packaging material cost, and the geographical location where the seeds will be stored.



Paper Bag



Super Bag



PP Bag



Jute Bag



Cloth Bag

Types of packaging material:

- **Moisture Vapour-Permeable Containers:** Examples include jute (burlap) bags, cloth bags, paper bags, and multiwall paper bags. These containers allow some moisture vapour to pass through.
- **Moisture Vapour-Resistant Containers:** These are containers like jute bags that are laminated with a thin polyethylene film, providing a degree of resistance to moisture vapour.
- **Moisture Vapour-Proof Containers:** These are containers that effectively block moisture vapour and include options like tin cans, polyethylene

bags, aluminium foil pouches, and glass bottles.

CONCLUSION

Packaging materials need to safeguard the essential physical characteristics of seeds and possess ample tensile strength, bursting strength, and tearing resistance to endure the stresses associated with handling. It's crucial to emphasize that these materials do always guarantee protection against insect pests. Ultimately, successful seed packing and handling are integral to preserving seed quality and ensuring that seeds reach their intended destinations in optimal condition, contributing to successful crop production.