



Seed pelleting- A key for enhancing the seed quality

Bhim Jyoti and Sunita Bhandari

Department of Seed Science and Technology, Veer Chandra Singh Garhwali University of Uttarakhand Horticulture and Forestry, Ranichauri, TEHRI GARHWAL (UTTRAKHAND) INDIA

ABSTRACT

Seed pelleting is the process of enclosing a seed with small quantity of inert material just large enough to produce globular unit of standard size to provide small amount of nutrients to young seedlings. Pelleting is the process of coating seeds with inert materials to make them uniform in size and shape. Pelleted seed could be direct seeded in the field or sown in flats for transplants, these seed allows for greater accuracy and results in a more efficient seeding process. Initially, seed coating and pelleting technology have been developed for seed signalation, adding bioactive chemicals, nutrients and beneficial microbes and for sowing seed under dry and wet conditions. Main objective of seed coating is to facilitate mechanical sowing to achieve uniformity of plant spacing and also act as a carrier for plant protectants. Mainly two type of material used in seed pelleting such as adhesive materials and filler materials. There are various methods used for pelleting viz., Inoculant pelleting, Protective pelleting, herbicide pelleting nutrient pelleting hydrophilic/hydrophobic coating and oxygen supplier coating. Seed pelleting is necessary to reduce the rate of deterioration specially in vegetable crops, reduce the quantitative and qualitative loss besides maintaining quality of the seed for longer storage. New seed coating techniques have contributed to reduced pesticide contents per seed and reduced cost because of improved seed adherence. From this article it is suggested that seed pelleting is an important process to reduced seed rate and thinning practices during seed production. It not only enhance the seed quality it also reduced the cost of seed production.

Seed is a basic input of agriculture. Inferior quality seed give poor performance and yield potential is too low and it production cost occurred very high. In some crops such as onion, lettuce and carrot have small seeds that are difficult to handle during sowing and seed rate became higher. All of these make seed production cost high. So, it is necessary to improve the quality of seed by using seed enhancement technique. Seed pelleting is one of most important process to increase the seed quality attributes. It is the process of enclosing a seed with small quantity of inert material just large enough to produce globular unit of standard size to provide small amount of nutrients to young seedlings. Pelleting is defined as the deposition of a layer of inert materials that may obscure the original shape and size of the seed, resulting in a substantial weight increase and improved plantability; while film coating retains the shape and the general size of the raw seed with a minimal weight gain. With the use of this process seed became uniform in size and shape. Pelleted seed could be direct seeded in the field or sown in flats for transplant. Pelleted seed allows for greater accuracy and results in a more efficient seeding process. Seeds are pelleted by tumbling them with the coating material and gradually adding moisture. Once the pellet coating reaches the desired size, the pelleted seeds are dried. The coating should result in

a more or less continuous coating, which eliminates or minimizes product dust-off. Both the methods may contain polymers, pesticides, biological materials, colourants or dyes and other additives. The most essential phase of precision planting is the singling of seeds for exact placement at a pre-determined depth and spacing in the soil with a uniform coverage and at a reasonable planting speed. Singling is difficult for seeds which are low in density and irregular in shape. These difficulties could be overcome by using seed pelleting process.

Pelleting of the seed with suitable adhesive, filler and bioactive chemicals focuses on the performance of seeds with respect to achievement of desired population, high probability of successful establishment of each seed planted and possibilities of precision planting, which is the key basis for successful crop/seed production.

Initially, seed coating and pelleting technology have been developed for seed signalation, adding bioactive chemicals, nutrients and beneficial microbes and for sowing seed under dry and wet conditions. Seed and seedling diseases contribute significantly to reduced seed germination and stand establishment resulting in an uneven crop density, increased weed density and reduced crop yield. With the help of several seed treatment techniques such as seed-dressing, polymer film coating, pelleting and

encrustment pesticides, insecticide, biologicals micro-nutrients and growth regulator could be delivered into seed that provide crop protection from seed and soil-borne diseases resulting better quality of seed.

Main purpose of seed-coating technologies:

There are two purpose of seed coating :

–To facilitate mechanical sowing to achieve uniformity of plant spacing,

– Act as a carrier for plant protectants.

Pelleting is necessary why?

–To reduce the rate of deterioration specially in vegetable crops

– Reduce the quantitative and qualitative loss besides maintaining quality of the seed for longer storage

– Nutrient benefits

– Protection from abiotic or biotic stress

– To improve seed germination

– Safe application of agricultural chemicals

– Protection from rodents, birds, and insects

– Brand identification

– Certain crop seeds are to light and small

– Pre-inoculation of legumes

Pelleting and coating material :

Two types of materials are used for pelleting purpose:

Adhesive materials: These are: gum arabic (45% W/V), Methyl cellulose (3% W/V), nitric coat (4.3% W/V), gelatin (5% W/V), plastic rexins, dextran etc.

Properties of adhesive materials :

–Must have the affinity for both seed coat and selected filler material.

–Should have the required degree of water solubility for easy emergence.

–Should have required strength and plasticity to prevent dusting and breakage.

–Should have the appropriate viscosity for each application.

Filler materials : These are used as a protectant for a seed eg. *Rhizobia* including lime, gypsum, dolomite, and rock phosphate, clay minerals, dried blood, poultry manure, moss etc.

Properties of filler materials :

–Must be porous

–Easily weaken or break down

–Low cost

–Fine size of particles (150-300 mesh sieve).

Benefits :

–Pelleted seeds have uniform size and shape.

–It reduce the problem to become jammed or stuck in mechanical planters

–Allowing growers to accurately singulate and efficiently plant direct-seeded crops.

– Accurate seeding and seed spacing makes thinning stands easier or even unnecessary

–Makes easier to handle in case of small seeded crops, such as lettuce, carrots.

–Singling of seed by prevention of clogging

–Attraction of moisture

–Supply of growth regulation nutrients

–Stimulation of germination

–Influence of micro-environment

–Saving of chemicals/fertilizers applied to soil

–Supply of oxygen

–Protects seed at aerial seedling by improving ballaistic ability.

Polymer seed coating remove the problem of dust-off: Seed dressing with pesticides relies on the pesticide dust or residue from an aqueous or powder application to adhere to the seed coat. Pesticide dust-off are detrimental to non-target organisms including humans, wildlife and beneficial insects and neighboring crops.. In addition, uniform dressing among seed lots or within a seed lot may be difficult to obtain, therefore, excessive amounts of pesticides are usually applied in order to obtain the desired seed quality *i.e.* germination and vigour following seedling.

New seed coating techniques have contributed to reduced pesticide contents per seed and reduced cost because of improved seed adherence. Polymer seed coating or film coating depends on coating agents, ex. chemically modified celluloses and proprietary polymers, to deliver and release pesticides following seeding. These seed coatings provide uniform coverage from seed to seed and are highly effective at minimizing pesticide dust-off. However, critical to the advancement of new seed coating polymers is assurance that there is compatibility between the polymer and seed germination, plant growth and timely delivery of the pesticides.

Conclusion : Seed pelleting is an important process to reduced seed rate and thining practices during seed production. Pelleted seed do not jammed or stuck in mechanical planters that make easier sowing. In case of small seeded crops, such as lettuce and carrots which are difficult to handle during sowing time, seed pelleting makes easier to handle during sowing. So seed pelleting is not only enhance the seed quality it also reduced the cost of seed production.