

**WELCOME**

**Topic of Presentation**  
**Seed Quality Enhancement**

**Presented by**  
**Dr. Rishabh Kumar Singh**

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# Seed Quality Enhancement

“Any post harvest treatment that improves germination/seedlings emergence or facilitate the development of more number of normal, rapid, uniform and healthy seedlings in the field condition is termed as seed enhancement”. They are performed on the seeds after harvest, but prior to sowing. Enhancements are "value added" techniques performed on a given seed lot.

# Objectives of seed quality enhancement

- Improvement in seed quality
- Improvement in reliability of stand establishment
- Increase in uniformity of plant stand
- Shorten the time between planting and emergence
- Reduction in seeding rates and thinning costs
- Facilitate precision planting
- Overcome dormancy or stressful conditions
- Protect the seed from biotic and abiotic

# Type of Seed Enhancement

There are two type of seed enhancement

- A. Seed Priming
- B. Seed Coating

## A. Seed Priming

Seed priming is a controlled hydration process in which seeds are dipped in osmotic solution to imbibe water for a specific time period to allow priming the seed to complete its metabolic activities before sowing and then re-dried to original weight which prevents the actual emergence of radicle (Heydecker and Coolbear, 1977).

# Type of Seed Priming

Seed Priming is of following type

1. Hydro priming
2. Osmo priming
3. Halo priming
4. Solid matrix priming
5. Bio priming



# 1. Hydro priming

- It is a controlled hydration process that involves seed soaking in simple water and then re-drying to their initial moisture content. No chemicals are used in this technique but some cases of non uniform hydration causes uneven germination (Pill and Necker, 2001). Among the different seed enhancement techniques, hydro priming could be a suitable treatment under salinity stress and drought prone environments. It is a risk free, simple and cheap technique that's why become popular among farmers. Hydro primed seeds produced healthy seedlings, which resulted in uniform crop stand, drought resistance, early maturity and somewhat improved yield.

## 2. Osmo priming

Osmo priming involves seed hydration in an osmotic solution of low water potential such as polyethylene glycol (PEG), glycerol, mannitol under controlled acredited conditions to permit imbibition but prevent radical protrusion (Janmohanmadi et al., 2008) Osmo priming induced more rapid and uniform germination and resulted in decreased mean germination time.

### 3. Halo priming

- Soaking of seeds in salt solutions. Most commonly used salts for haloprimering are potassium chloride (KCl), potassium nitrate (KNO<sub>3</sub>), sodium chloride (NaCl), magnesium sulphate (MgSO<sub>4</sub>), potassium phosphate (K<sub>3</sub>PO<sub>4</sub>), calcium chloride (CaCl<sub>2</sub>) and potassium hydrophosphate (KH<sub>2</sub>PO<sub>4</sub>). All these salts provide nutrient like nitrogen to the germinating seed, which is required for the protein synthesis during the germination process. However, these salts rarely cause nutrient toxicity to the germinating young seedlings (Akhtavar, 2015).

## 4. Solid matrix priming

Seeds are mixed with solid carrier material viz., organic or inorganic carrier such as sand, starch, vermiculite and water in a sealed container for a definite period to bring the moisture content of the matrix just below the level required for radicle protrusion. Carrier holds the water during seed priming and the water is imbibed by the seed upto equilibrium. The seed water potential is regulated by the matrix.

## 5. Bio priming

Invigorating seed with biological agents like bacteria, fungi etc. Bio priming is a new technique of seed enhancement integrating biological (inoculation of seed with beneficial organism to protect seed) and physiological aspects (seed hydration) to promote plant growth, development and suppression of diseases. It is used as an alternative approach for controlling many seed- and soil-borne pathogens. Besides diseases control, the application of PGPR as a bio priming agent for biofertilization is an attractive option to reduce the use of chemical fertilizers (Bloemberg and Lutenberg, 2001; Vessey, 2003).

# Advantages of priming

- Faster emergence and more uniform field stand in normal as well as in stress conditions.
- Uniformity, synchrony and significant yield increase in many vegetable crops.
- Primed seeds can be rinsed and dried for restorage for short periods in a number of crops.
- Effectively overcome the serious problem of soaking injury in many legumes.

## **B. Seed Coating**

Seed coating is a technique of applying needed inputs such as organic nutrients, bio-fertilizers and pesticides on the seed to provide a self-sustaining seed unit with an improved micro-environment for germination and seedling development.

# Type of Seed Coating

Seed Coating is of following type:

1. Seed Films Coating
2. Seed Colouring
3. Seed Pelleting



# 1. Seed Films Coating

Application of precise amount of active ingredient along with a liquid material directly on to the seed surface without obscuring its shape.

## 2. Seed Colouring

Application of precise amount of dyes or pigment directly on to seed to improve its brand identity and marketability.

### **3. Seed Pelleting**

The process of enclosing the seed with small quantity of ingredients along with filler materials to produce a globular unit of uniform size to facilitate precision plantings.

# Conclusion

Seed enhancements have a wide range of commercial applications from improved crop stands through better germination rates and seedling vigour effective in crop stress management and improved crop yields together with efficient use of resources such as fertilizers, water and seeds.