

## **New Technology for Postharvest Drying and Storage of Seeds**

In seed production, after harvesting and threshing if proper care is not taken in seed drying and storage, seed quality deteriorates in terms of colour, luster, growth of pathogens, vigour as a result leads to low germination percentage. To avoid these losses, the farmers and seed companies should have to store the seed properly. Seed quality and storability potential mainly depends on moisture content of seed. If prescribed seed moisture content is maintained in different crops seeds, the seed quality parameters can be protected, and seed can be stored for longer periods. For instance, the prescribed safe seed moisture content for cereals in general is 12%, for oil seeds 9% and for vegetable seeds it is 7%.

Most horticultural seeds are locally produced or self-saved and are stored without facilities for drying them to moisture contents that greatly extend their storage lives. They store this seed in either gunny/jute or cloth bags or open earthen pots in which the seed is exposed to ambient environmental situations. As such the seed quality deteriorates at a faster rate, because the moisture content of the seed equilibrates with the air relative humidity during storage. For example, if the relative humidity is 75%, the seed moisture content varies from 13-15% in different crops. When seed is stored at this moisture content, quality deteriorates rapidly.

In tropical climates, generally the atmospheric relative humidity is about 75% along with temperatures above 30° C. In these climatic conditions, seed loses its vigour and viability within few months. Apart from tropical climates, in coastal areas and areas nearer to rivers, the relative humidity of air is more than 80%, and farmer-saved seed deteriorates very rapidly in these environments, too. However, the establishment of controlled environments (low humidity and air conditioning) for storage for seed requires huge investments and recurring energy expenditures.

In order to overcome the above mentioned problems, a less expensive desiccant seed drying and storage method is jointly being developed by the University of California, Davis and Acharya N.G. Ranga Agricultural University, Hyderabad with financial assistance of HortCRSP and USAID. Farmers can store seed at moisture contents less than 7 percent in any type of environment, especially in tropical and subtropical regions, by following this method. With this technique, farmers can maintain seed moisture content below 7% (or at ultra dry conditions) during storage.

Therefore the farmers, seed growers and seed industry can effectively store seeds for sowing in the next season without losing the quality and viability. This method is simple and low cost, hence small farmers can also practice it to store their seed safely.

Materials needed:

- 1) Zeolite beads
- 2) Air-tight seed container
- 3) Oven
- 4) Paper bag or thin cloth or metal can with openings

The zeolite beads are made up of aluminosilicate materials with a microporous structure that specifically absorbs water and reduces the relative humidity in a closed container to near 0%. As a result, seed in a container with the beads can be dried rapidly and maintain a low moisture content. As long as the seeds (and beads) are maintained in a closed air-tight container that is not porous to water, the seed can be stored for long periods. If they become saturated with water, the beads can be repeatedly regenerated and can be used for many years. These beads are reactivated by heating at over 200°C temperature for one or two hours in an oven to remove the absorbed water. After heating, the beads are to be transferred immediately into the air-tight container; otherwise the beads will absorb moisture from the air, so that they can't absorb moisture from the seed. Therefore, if the farmers follow this procedure carefully, seed can be stored for longer periods with little loss of quality.

The following sequential procedure has to be followed for storing the seed and to so control the moisture content.

1. Equal quantities of seed and zeolite beads are to be used, e.g., a1:1 bead seed ratio.
2. Activate the beads at >200°C for 1 hr, in oven, and put in air-tight container and cool.
3. Pour the required quantity of seed in a plastic container that is to be air-tight.
4. Take equal quantity of zeolite beads in an open thin muslin cloth or perforated plastic or paper bag and place it in the plastic container having seed, and seal the whole unit perfectly air-tight.
5. The sealed plastic container can be kept in any place in the farmer's house, but preferably in a cool location away from direct sunlight.

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