

## **Biochemical test for seed quality assessment**

### **Seed Testing**

Seed testing is determining the standards of a seed lot *viz.*, physical purity, moisture, germination and ODV and thereby enabling the farming community to get quality seeds.

The Seed Testing Laboratory is the hub of seed quality control. Seed testing services are required from time to time to gain information regarding planting value of seed lots. Seed testing is possible for all those who produce, sell and use seeds.

## **Objective & Importance of Seed Testing**

Seed testing is required to achieve the following objectives for minimising the risks of planting low quality seeds.

To identify the quality problem and their probable cause

To determine their quality, that is, their suitability for planting

To determine the need for drying and processing and specific procedures that should be used

To determine if seed meets established quality standards or labelling specifications.

To establish quality and provide a basis for price and consumer discrimination among lots in the market. The primary aim of the seed testing is to obtain accurate and reproducible results regarding the quality status of the seed samples submitted to the Seed Testing Laboratories.

## **Mechanical method**

The reduction of sample size is carried out by the mechanical dividers suitable for all seeds except for chaffy and fuzzy seeds.

## **Objective of mechanical dividing**

To mix the seed sample and make homogenous as far as possible. To reduce the seed sample to the required size without any bias.

The submitted sample can be thoroughly mixed by passing it through the divider to get 2 parts and passing the whole sample second time and 3rd time if necessary to make the seeds mixed and blended so as to get homogenous seed sample when the same seeds are passed through it into approximately equal parts.

The sample is reduced to desired size by passing the seeds through the dividers repeatedly with one half remain at each occasion.



### **Boerner divider**

It consists of a hopper, a cone and series of baffles directing the seeds into 2 spouts. The baffles are of equal size and equally spaced and every alternate one leading to one spout. They are arranged in circle and are directed inward. A valve at the base of the hopper retains the seeds in the hopper. When the valve is opened, the seeds fall by gravity over the cone where it is equally distributed and approximately equal quantity of seeds will be collected in each spout. A disadvantage of this divider is that it is difficult to check for cleanliness.



## **Soil divider**

It is a sample divider built on the same principles as the Boerner divider. Here the channels are arranged in a straight row. It consists of a hopper with attached channels, a frame work to hold the hopper, two receiving pans and a pouring pan. It is suitable for large seeds and chaffy seeds.



## **Centrifugal or Gamet divider**

The principle involved is the centrifugal force which is used for mixing and dividing the seeds. The seeds fall on a shallow rubber spinner which on rotation by an electric motor, throw out the seeds by centrifugal force. The circle or the area where the seeds fall is equally divided into two parts by a stationary baffle so that approximately equal quantities of seed will fall in each spout.

## **Random cup method**

This is the method suitable for seeds requiring working sample upto 10 grams provided that they are not extremely chaffy and do not bounce or roll (e.g.) *Brassica* spp. Six to eight small cups are placed at random on a tray. After a preliminary mixing the seed is poured uniformly over the tray. The seeds that fall into the cup is taken as the working sample.

## **Modified halving method**

The apparatus consists of a tray into which is fitted a grid of equal sized cubical cups open at the top and every alternate one having no bottom. After preliminary mixing the seed is poured evenly over the grid. When the grid is lifted, approximately half the sample remains on the tray. The submitted sample is successively halved in this method until a working sample size is obtained.

## **Spoon method**

This is suitable for samples of single small seeded species. A tray, spatula and a spoon with a straight edge are required. After preliminary mixing, the seed is poured evenly over the tray. The tray should not be shaken thereafter. With the spoon in one hand, the spatula in the other and using both small portions of seed from not less than 5 random places on the tray should be removed. Sufficient portions of seed are taken to estimate a working sample approximately but not less than the required size.

## **Hand halving method**

This method is restricted to the chaffy seeds. The seed is poured evenly on to a smooth clean surface and thoroughly mixed into a mound. The mound is then divided into 1/2 and each half is mound again and halved into 4 portions. Each of the 4 portions is halved again giving 8 portions. The halved portions are arranged in rows and alternate portions are combined and retained. The process is repeated until the sample of required weight is obtained.



## **Purity separation**

The working sample after weighing is separated into its components *viz.*, pure seed, other seed crop, weed seed and inert matter.

### **Pure seed**

The seeds of kind / species stated by the sender. It includes all botanical varieties of that kind / species. Immature, undersized, shrivelled, diseased or germinated seeds are also pure seeds. It also includes broken seeds, if the size is  $>1/2$  of the original size except in leguminacea, and cruciferae where the seed coat entirely removed are regarded as inert matter.

### **Other crop seed**

It refers to the seeds of crops other than the kind being examined.

### **Weed Seed**

It includes seeds of those species normally recognized as weeds or specified under Seed Act as a noxious weed.

### **Inert matter**

It includes seed like structures, stem pieces, leaves, sand particles, stone particles, empty glumes, lemmas, paleas, chaff, awns, stalks longer than florets and spikelets.

### **Method of purity separation**

Place the sample on the purity work board after sieving / blowing operations and separate into other crop seeds and inert matter. After separation, identify each kind of weed seeds, other crop seeds as to genus and species. The names and number of each are recorded. The type of inert matter present should also be noted.



Seed blower for impurity separation