

Dormancy-breaking treatments

In some seeds that are dormant at harvest, dormancy breaks down naturally over time. Other species require some form of pre-treatment. There are several methods used for specific genera.

Breaking seed-coat dormancy

Puncturing or scarifying the seed coat by piercing, nicking, chipping or filing with a knife, needle or sandpaper are preferred procedures to overcome seed-coat dormancy.

- ❑ Manual scarification is effective at any point on the seed coat, but the micropylar region should be avoided as it is the most sensitive part of the seed where the radicle is located.
- ❑ If seed-covering structures prevent growth of the embryo, remove them to allow germination.
- ❑ If the seed coat contains inhibitors that prevent or delay germination, they can be leached out by placing the seed under running water for several hours or soaking the seed in a large volume of water that is changed every six to 12 hours.
- ❑ ISTA also recommends using concentrated sulphuric acid for 2-45 minutes depending on the species to scarify the seed coat. This method is expensive and dangerous, however, and should be followed with caution.
- ❑ To remove the waxy covering and allow imbibition, place the seeds in water at 75°C for three to six minutes. Care must be taken not to use high temperatures for long periods or boil the seeds.

Breaking embryo dormancy

There are several recommended treatments to overcome embryo dormancy (see guidelines for testing germination of the most common crop species). These include pre-chilling (also called cold stratification) for temperate and high-altitude species from the tropics; preheating; application of Gibberellic acid (GA₃) at low concentrations; addition of potassium nitrate (KNO₃) to the substrate; and light.

Pre-chilling (cold stratification)

Seeds are placed in containers on a moistened germination substrate and kept at 3°-5°C in a refrigerator for seven days. For more dormant seeds, the treatment may be extended to 14 days. Once the stratification is complete, the containers are removed to incubators and seeds are allowed to germinate in recommended conditions.

Preheating

Seeds are treated at a temperature not exceeding 40°C for up to seven days with free air circulation before germination in recommended conditions.

Gibberellic acid

Germination test paper is moistened with a 0.05% solution of Gibberellic acid (GA₃), prepared by dissolving 500 mg of GA₃ in 1 l water. Germination is then continued in recommended conditions.

Potassium nitrate

A 0.2% solution of potassium nitrate (KNO₃) – prepared by dissolving 2 g KNO₃ in 1 l water – is used to moisten the germination paper at the beginning of the test. Germination is continued in recommended conditions.

Light

Light may or may not be required for germination, depending on the species. When using constant temperatures for germination of species where light is required, the tests should be illuminated for at least eight hours of every 24-hour cycle. When alternating temperatures are used, any necessary application of light should coincide with the high-temperature cycle. Light intensity should be 750-1250 lux from cool, white lamps.

Many of the methods described above are specific to genera. Recommended dormancy-breaking treatments for common crops are given in guidelines for testing germination of the most common crop species. For information on other species, refer to Ellis et al. (1985).