



Physiological Seed Enhancement Techniques

Deepti Prabha¹ and J. S. Chauhan²

¹Assistant Professor*, ²Professor and Head, Dept of Seed Science & technology,
School of Agriculture, HNBGU, Srinagar, Garhwal (Uttarakhand), India

*Email of corresponding author: deepti_prabha@rediffmail.com

Seed is a basic input in agriculture. Quality of seed can be deteriorated due to many reasons as environmental conditions not favourable at the time of seed formation, mishandling during harvesting, processing and storage and unsuitable storage conditions with high moisture and temperature which increases seed ageing. The quality of the seed can be improved by seed enhancement technique. One such technique is seed priming which could improve seed germination and germination synchrony in plants. This article gives an overview of the different priming techniques.

Introduction

Seed Quality Enhancement Defined as Post harvest treatment that improve germination or seedling growth or facilitate the delivery of seeds and other materials required at the time of sowing. Although seed quality is governed by genetic make-up, the quality of seeds may deteriorate in subsequent stages like harvesting, threshing, processing and storage period. Retention of seed germination always forms the important consideration in agricultural practices. Poor seed handling condition gives rise to deterioration of seed quality and results in the loss of viability. Also this greatly affects seed vigor, which ultimately gives poor performance in field and the seed is not able to meet the quality standards prescribed for that crop. Hence, some physical and chemical operations are performed with the seeds between processing to storage time to overcome these problems. One such technique is priming. Seed priming is the physiological enhancement technique by which controlling the hydration level within the seeds so that the metabolic activity necessary for germination could occur but radicle emergence is prevented.

Seed enhancement improves hygiene and mechanical properties, breaking of dormancy, synchronize germination, apply of nutrients and impart stress tolerance. Physiological seed enhancement techniques has been categorized into following ways:

1. Pre-hydration - Seed hydration is the process of soaking seeds in water or dilute solution of growth regulating compounds to induce early germination, better root growth and seedling growth and also enhances the yield potential of the crop variety. It is of two types:-

a). Seed fortification- It is pre hydration technique where seeds are soaked either in water or dilute solution of bioactive chemicals such as micro nutrients, growth regulators, vitamins and seed protectants.

b). Seed infusion- It is a method of impregnation of seeds with bioactive chemicals through organic solvents instead of water this technique of infusion which helps to avoid the damage caused to the seed due to soaking in water. Hence this method is highly suitable to the seeds that suffer from soaking or seed coat injury (pulses).

2. Priming- It is based on the principle of controlled Imbibition, to a level that permits pre germination metabolism to proceed, but prevents actual emergence of radical. It is of following types-

a). Hydro priming (drum priming)- It is achieved by continuous or successive addition of a limited amount of water to the seeds. A drum is used for this purpose and the water can also be applied by humid air. 'On-farm steeping' is the cheap and useful technique that is practiced by incubating seeds (cereals, legumes) for a limited time in warm water.

b). Halo priming-Halo priming involves the use of salts of chlorides, sulphates, nitrates etc. This priming makes seeds to improve their performance under salt stressed conditions.

c). Bio priming- It is a process of biological seed treatment that refers to combination of seed hydration (physiological aspect of disease control) and inoculation (biological aspect of disease control) of seed with beneficial organism to protect seed with the help of beneficial fungi and bacteria.

d). Osmo conditioning – Osmo conditioning is the standard priming technique. Seeds are incubated in well aerated solutions with a low water potential, and afterwards washes and dried. The low water potential of the solutions can be achieved by adding osmotica like mannitol, polyethyleneglycol (PEG) etc.

e). Solid Matrix Priming or matri conditioning - It is the incubation of seeds in a solid, insoluble matrix with a limited amount of water. This method confers a slow imbibition. Matric carriers are Calcinated clay, Vermiculite, Peat Moss, Sand, Micro-Gel, etc.

Conclusion

The productions and timely supply of quality seeds to the farmers are most crucial and challenges the technology. Good quality seed acts as a catalyst for realizing the potential of all other inputs in agriculture. Without good seed, the investment on fertilizers, water, pesticides and other inputs will not pay the desired dividends. Therefore, production of quality seed and maintenance of high germination is of utmost significance in the seed program. In this way, seed enhancements technology has a core objective plays a significant role in improvising the seed performance.