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Seed treatment techniques in vegetable crops

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Abstract
Good quality seeds are the most important input in agriculture. Seed treatments, in broad terms, are the application of biological, physical and chemical agents and techniques to seed that provide protection to seeds and plants and improve the establishment of healthy crops. Diseases and pests affecting crops can have devastating consequences in agricultural and horticultural production if not properly managed. Breeding is an excellent tool to build resistances against pests and diseases in the plants. However, breeding alone does not address all of the agronomic challenges; therefore crop protection products are often needed and used for good crop management. These crop protection products can be applied during the growth of the crop but can also be added to the seed as a seed treatment. Seed treatments have played and are still playing a significant role in the history of mankind, in starving off hunger and starvation by improving the establishment of healthy crops. The importance and methods of different seed treatments of vegetable crops are discussed in this study.

Keywords: seed germination, seed treatment, viability, vigor, vegetable crops

Introduction
Seed borne infestation of insects and diseases pose devastating consequences to crop production. The concept of seed treatment is the use and application of biological and chemical agents that basically can control or contain primary soil and seed borne infestation. This helps to improve crop safety which in turn leads to good establishment of healthy and vigorous plants which results in better yields. The benefit of seed treatment leads to increased germination and ensures uniform seedling emergence. As already seen it protects seeds and seedlings from early season diseases and insect pests thereby improving crop emergence and growth. Treating seeds with *Rhizobium* also enhances the nitrogen fixing capability of legume crops and their productivity. Overall seed treatment leads to improved plant population and thus higher productivity. It is estimated that 80% of the seeds sown in our country is untreated as against 100% seed treatment practice in developed countries. Seed treatment also gives protection to the emerged seedlings from sucking insect pests. All the procedures that have been mentioned are with the use of natural products. The procedures have been explained in detail. Several procedures have been given for a single crop. The users can choose the method of treatment depending on the availability of the resource or disease / pest prevalent in their region. Now a day's Germination and pest and disease attack is a major problems in vegetable crops, with this context the different seed treatment methods that are followed in vegetable crops furnished below.

Seed treatment methods in important vegetable crops
Bhendi
- Treat seeds with 15% or 25% raw cow's milk (150 ml of milk in 850 ml of water or 250 ml of milk in 750 ml of water) for 6 hours and then sow. This will increase the germination percentage and seedling vigour. It will also reduce the intensity of the vein clearing disease and increase the yield.
- Soak seeds in cow's urine at 5% or 10% concentration (50 ml of cow's urine in 950 ml of water or 100 ml of cow's urine in 900 ml of water) for 12 hours before sowing for good germination percentage.
- Soak seeds in 1-2% of *Panchagavya* (10 – 20 ml of *Panchagavya* in 990/980 ml of water) for 6 hours before sowing. This will improve the germination and seedling vigour.

- Treat the seeds with Trichoderma viride @ 4 gms/kg of seeds.
- Treat the seeds with biofertilizers - Azospirillum and Phosphobacteria (each @ 60 gms mixed with 60 ml of rice gruel for one kilogram of seeds) and shade dry for 30 minutes before sowing.
- For summer crop, soak the seeds in water for 12 hours before sowing.
- Soak the seeds in sweet flag rhizome extract or cow's urine solution (dilution 1:5 ratio –1 part of extract or cow's urine in 5 parts of water) for 30 minutes before sowing. This will enhance the resistance against bacterial and fungal diseases.

Brinjal

- Soak the seeds in 12% raw cow's milk (120 ml of raw cow's milk in 880 ml of water) for good germination percentage and seedling vigour. The germination speed is also increased.
- Seeds should be soaked in a solution of cow's urine (1 part cow's urine + 5 parts of water) for 30 minutes prior to the sowing. This will inhibit the seed borne diseases like fruit rot and die back.
- Seeds should be bundled using a thin cotton cloth and soaked in the biogas slurry for 12 hours prior to the sowing. This will kill all the disease causing microbes and also enhance the seed vigour.
- Treat the seeds with Trichoderma viride @ 4 gms/kg of seeds or with Pseudomonas @ 10 gms/kg of seeds and then sow after 24 hours.

Bitter Gourd

- Soak the seeds in diluted cow's urine for 12 hours and in diluted cow's milk for 6 hours before sowing for good germination percentage. The dilution should be at the ratio of 1:1 (1 part of cow's urine or cow's milk with 1 part of water).
- Soak the seeds in raw cow's milk for 24 hours before sowing for good germination and yield.

Tomato

- Fumigate the seeds with Vasambu (Acorus calamus) and Vaividanga (Embelia ribes) powder. Take seeds in a metal sieve. Take hot coal in a metal plate and sprinkle Vasambu or Vaividanga powder over the hot coal and hold the sieve with seeds against the fumes in a standing position for 2 – 3 minutes. This will enhance the germination rate and protect the seedlings from fungal pathogens. For treating 100 gms of seeds 5 gms of Sweet required.
- Soak the seeds tied in a khada cloth in diluted milk solution (75 ml milk and 425 ml water) for 6 hours and then sow. This will prevent the infection of seed borne diseases and enhance germination.
- Soak the seeds in a mixture of fermented buttermilk (3 days old) and water in 1:4 ratio for 6 hours and shade dry before sowing. The practice is applicable only for 6 to 12 months old seeds. Buttermilk can be replaced by Coconut or Palmyra toddy.
- Soak the seeds in sweet flag rhizome extract (dilution 1:5 ratio – 1 part of extract in 5 parts of water) for 30 minutes before sowing. This will enhance the resistance against bacterial and fungal diseases.
- Treat the seeds with Trichoderma viride and Pseudomonas fluorescens (@ 5 gms /100 gms of seeds). This will help in the control of early blight and other pathogens.

Chillies

- Soak seeds in sweet flag extract or cow's urine at 1:5 ratio (1 part of extract or cow's urine with 5 parts of water) for 30 minutes before sowing. This will inhibit the seed borne diseases like fruit rot and die back.
- Soak seeds tied in a cotton cloth in biogas slurry for 12 hours before sowing. This will kill the disease causing microbes and enhance the seed vigour.
- Treat the seeds with Trichoderma viride @ 4gms/kg of seeds and then sow after 24 hours.

Bottle Gourd

- Soak seeds in water for 24 hours before sowing to break the dormancy and to quicken the germination.
- Soak seeds in warm water for 30 minutes before sowing. This helps in the softening of the hard seed coat.
- Soak seeds in cow's urine solution (1 part cow's urine + 5 parts of water) for 30 minutes prior to the sowing. This will inhibit the seed borne diseases.
- Treat the seeds with Trichoderma viride @ 4 gms/kg of seeds and then sow after 24 hours.

Snake Gourd

- Treat the seeds with cow dung @ 1 kg per kg of seeds for 30 minutes. This will increase the drought resistance and make the seeds germinate quickly.

Beans

- Soak the seeds in raw cow's milk for 24 hours before sowing for good germination and yield.
- Treat the seeds with powder form of Trichoderma viride @ 4 gms/kg or Pseudomonas @ 10 gms/kg of seeds. Seed treatment with Trichoderma or Pseudomonas protects the crops from disease causing microorganisms.

Root Vegetables

- Soak the seeds of beetroot and radish tied in a cotton cloth in water overnight or in warm water for 30 minutes before sowing. This will help to quicken the germination and result in fast growth and healthy plants.
- Soak seeds in a solution of cow's urine (1 part cow's urine + 5 parts of water) for 30 minutes prior to the sowing. This will inhibit the seed borne diseases.
- Treat the seeds with Trichoderma viride @ 4 gms/kg of seeds and then sow after24 hours.

Conclusion

Quality seed is the most important input for crop production. Seed treatment is one of the easy way to manage the pest incidences in crop production besides, serves purposes such as easiness in sowing, breaking dormancy, hardening the seeds, enhancing nitrogen fixation and solubilizing phosphorus. Seed treatments alone cannot always be relied on to control all diseases against which they are directed. They are not panaceas of all ills. Sometimes a seed

treatment will of itself be entirely effective in preventing disease, but more often it is only one step in a series of disease control practices.

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