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Organic Production: Horticultural Crops (0-3-0): Practice: Session Plan

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Seed Treatment

Aim: To familiarize with seed treatment through organics in horticultural crops

Purpose:

1. eradicate seed borne pathogens or protect from soil borne pathogens,
2. optimize ease of handling and accuracy of planting (reduce gaps in stand or the need for thinning of seedlings, particularly when mechanical planters are used), and
3. Improve germination rates.

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Organic seed treatment

- In conventional production, seed is often treated with chemical fungicides which reduce seed and seedling losses due to seed borne and soil borne disease. There are some seed treatments, such as priming, pelletizing, and the use of hot water or NOP-compliant protectants, that can be used by organic farmers to improve seed performance.
- Pelleted seed is useful in head lettuce production because of the need for precision seeding, but is less advantageous for thick sowings of loose-leaf lettuce in bed production.

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Priming

- Primed seed has absorbed just enough water to dissolve germination inhibitors and activate the early stages of germination. Primed seed is therefore in a suspended state of growth, so it germinates faster and more uniformly over a broader temperature range, reducing the likelihood of very thick or thin plant stands. Priming results in earlier seedling establishment, which can aid in fending of the attack of damping-off pathogens to which germinating seedlings are particularly vulnerable.

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Pelleting

- A seed pellet is a coating, usually of clay mixed with other inerts, that streamlines the size, shape, and uniformity of a small, non-round seed such as those of lettuce, carrots, onions, and many herbs and flowers. Ideally, the pelleting materials are somewhat permeable to oxygen and absorb water quickly so that the pellet splits immediately upon hydration. Conventional pelleting techniques using synthetic inert materials are not approved for organic use, but there are now several pelleting materials on the market that are approved for use on organic farms.

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Seed Health Treatments

- This is a broad category of treatments that includes hot water, biological and plant extracts, bleach disinfection, and biological (microbes). These treatments can improve seed and seedling health by eradicating seed borne pathogens from the seed or protecting germinating seeds from attack by soil borne pathogens.

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Hot water treatment

- The use of hot water treatment to eradicate seed borne diseases, particularly those caused by plant pathogenic bacteria, is well-established. The typical procedure consists of: 1) warming the seed in 100°F water, 2) heating the seed for 20-25 minutes, depending on the crop species, in a 122°F water bath, 3) cooling the seed for 5 minutes in cold water, and 4) rapid drying. As the disease is seed borne, hot water treatment (dipping the seeds in hot water at 53 °C for about 30 minutes) is a good precaution.

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Plant extracts and oils

- However, plant oils such as thyme, cinnamon, clove, lemongrass, oregano, savory, and garlic show some potential to suppress damping-off, and thyme oil is in use in Europe as a seed treatment. Pure soybean or mineral oils have been shown to reduce storage molds of maize and soybean. Further research on the disease suppressive potential of these oils is necessary to determine the viability of essential oil-based seed treatment protocols.

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Bleach disinfection

- Bleach (sodium hypochlorite) can be used to surface-disinfest seeds as an alternative to hot water. Bleach will eliminate pathogens on the seed surface but will not eliminate pathogens beneath the seed coat. Sodium hypochlorite is allowed for use on organic farms to disinfect wash water, provided that the levels not exceed the maximum residual contamination levels of the Safe Drinking Water Act, which currently is 4 ppm expressed as chlorine.

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Biological seed treatments

1. Seed treatment with *Azospirillum* or *azotobacter* can save 20 to 30 kg N/ha or PSB along with optimum nutrition can give good yield.

2. Method by which *Trichodermaviride* is used:

Seed treatment: The seed has to be washed first to get rid of any chemical fertilizers and pesticides. TV culture @ 4 gm per kilo of seed is mixed with starch to make a sticky paste. The seed is mixed with the paste and then dried in the shade. The dried seed is sown immediately thereafter.

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- ***Seedling treatment***: Twenty grams of TV is mixed in a litre of water. Seedlings of brinjal, chili, tomato, cabbage, etc., are immersed in the water for five minutes before they are transplanted to the main field.
- ***Nursery treatment***: About 50 gm of TV culture is mixed with 500 gm of vermicompost or compost and mixed with the soil for each 64.8m2 of land.

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3. **Using cow dung solution** : Treating paddy seeds in a cow dung solution enhances their germination. Take ½ kg of fresh cow dung and two litres of cow urine and dilute them with five litres of water. Soak 10–15 kg seeds first in water for 10–12 hours and then in the cow dung solution for 5–6 hours. Dry the seeds in the shade before sowing them in the nursery.

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4. **Using sweet flag extract** : Dissolve 1.25 kg of sweet flag rhizome powder in six litres of water. Tie the seeds in small bags and soak them in the extract for half an hour. Dry the seeds in the shade before sowing. Treatment of rice seed with amrutpani/panchagavya/cow pat pit manure/jeevamrut is also effective.