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*Shaping Lives...
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Center for Smart Agriculture

Production management of medicinal and aromatic crops



Module 3: Land preparation
Session 13: Soil sterilization



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Soil Sterilization

Importance of soil sterilization:

It provide quick relief of soils from substances and organisms harmful to plants such as: Bacteria, Viruses, Fungi, Nematodes and other pests.

Further positive effects are:

- All weed and weed seeds are killed
- Significant increase of crop yields
- Relief from soil fatigue through activation of chemical – biological reactions.
- Blocked nutritive substances in the soil are trapped and made available for plants.
- Alternative to Methyl Bromide and other critical chemicals in agriculture.



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Types of sterilization

A. Heat Sterilization

- Heat is used to destroy all forms of life present in soil.

ii) Dry heat sterilization:

- It is one of the earliest form of sterilization used.
- Dry heat utilizes hot air that is either free from water vapour or has very little of it, and where this moisture plays a minimal or no role in the process of sterilization.



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Hot-air convection sterilizers

Generally there are 2 type of hot-air convection sterilizers:

A) Gravity Convection

B) Mechanical Convection

A) Gravity Convection Process: air is heated, it expands and possesses less density (weight per volume) than cooler air. Therefore the heated air rises and displaces the cooler air (the cooler air descends). It produces inconsistent temperatures within the chamber and has a very low turnover.



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Mechanical Convection Process

B) Mechanical Convection Process:

- It contains a blower that actively forces heated air throughout all areas of chamber.
- The flow created by the blower ensures uniform temperatures and the equal transfer of heat throughout the load.
- It is more efficient. Instruments used for dry heat sterilization
- Hot Air Oven
- Incineration or Burning
- Flamming
- Radiation
- Microwave
- Bunsen burner
- Glass Bead Sterilizer



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Citronella

Land Preparation

The plant has been found to grow well under varying soil conditions but sandy loam soil with abundant organic matter is the most suitable.

Heavy clay and sandy soils are not conducive to the good growth of this plant. Citronella thrives well in a wide range of soil pH ranging from 5.8 to 8.0.

However, a pH of around 6.0 is the most suitable. The plants are reported to grow well at altitudes between 1000-1500m.

The land is brought to a fine tilth by ploughing and harrowing and the field is laid out in 6m x 6m size beds, providing irrigation channels. Ridges and furrows are made at 60cm intervals.



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Methods of sterilization

Steaming with superheated steam

Surface Steaming

Sheet Steaming

Steaming with hoods

Depth steaming with vacuum

Combined Surface and Depth Injection of Steam



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Thank You