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DECONTAMINATION TECHNIQUES IN PROTECTED CULTIVATION

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In India greenhouse technology is still in its budding stage. The crops cultivated in protected structures are having high productivity due to less competition and optimum growing conditions. Several climatic parameters like humidity, temperature and CO_2 can be adjusted according to the plant optimum growing conditions. Depending upon the type of cladding materials used the light transparency into the greenhouse influences and the light that was entrapped in the greenhouse and maintains the temperature in the greenhouse (Nimje and Shyam, 1991). The ideal and optimum climatic factors that were maintained in the greenhouse are not only favourable to plant growth and development but also favourable to diseases that infect the growing crops. There are different ways through which a number of pathogens may enter in the greenhouse and cause the disease incidence. Airborne pathogens enters through main doors and air space and zoospores may enter by means of irrigation water and can be easily grown in growing medium and hence necessary actions has to be taken in order to remove these harmful pathogens.

Sterilization before Planting

Sterilization of soil and soil-less culture Soil Sterilization is an important process of destroying pathogens, pests and weeds. Soil sterilization method may be physical, chemical or ionic in nature.

Methods of Sterilization

There are two methods of sterilization one is physical and the other is chemical method of sterilization.

i. Physical Agents

Steam sterilization:

The process of steam sterilization involves application of steam for 30 minutes i.e till the coldest spot in the patch reaches 180°F (Warncke and Krauskopf. 1983).

Methodology: The root media should be pasteurizing and should not loosed before be dry but should be at capacity (vapsa) field condition. Steam generator or main steam Tine in the greenhouse through low-pressure hosepipe used for steam application. It is distributed in beds buried perforated through buried for I.2m pipes. For 0.9m wide bed one row is boiler tubes, beds, two rows are used. Old rain gutter, holes (3-6 mm) irrigation pipes etc can be used with pair of in every 15 cm diameter drilled on opposite sides at to pipe. distribute steam, with plugged end of the pipe. Covers are placed over media during pasteurization to each steam in close contact to raise the temperature. Three types of covers viz. polyethylene, vinly and neopropene-coated nylon fabric are available. Depending on soil temperature, 6 to 8 hours are required for steam sterilization.

Limitations:

Two types of toxicity problems can occur as a result of steam pasteurization. One is manganese toxicity and other is ammonium toxicity. It is very expensive method

ii. Chemical methods:

Various chemical agents are used for soil sterilization as given below:

Formaldehyde (Formalin)

Formalin, is an aqueous solution, containing 37-40% formaldehyde, which has a poor penetration and diffusion ability. It should be mixed with water in 1:10 proportion. It is used at the rate of 7.5 lit for 100 sq m i.e.v 37.5 lit of Formalin is required for 500-sq.m area. Planting is done after two weeks of drenching, this method is not effective against nematodes and it should not to be used in a standing crop (O'Neill, and Green, 2010).

Methyl bromide

Liquid formulations contain about 25 % methyl bromide by weight in a solvent. It is a liquid under pressure and turns into gas when released. It is extremely hazardous to humans.

The gaseous methyl bromide Contains 2% chloropicrin as a warning agent. It is available in 454-680(1-112- pound) cans or cylinder and is used at the rate of 0.6kg/m (Pizano, M., 2002).

Chloropicrin

This fumigant, also known as tear gas, is a popular choice for carnation crops because of its sensitivity to methyl bromide. It is used at the rate 3-5 cc (cubic centimetre per cubic feet chloropicrin is injected in greenhouse soil by hand injector. Chloropicrin should not be used at media temperature below 15 °C and the exposure time of one to three days is required. Media should be aerated for at planting least seven to ten days before (McSorley *et al.*, 2004).

Dazomet (Basamid granules)

Microgranular soil fumigant contains 98% Dazomet, which releases biologically active gases mainly methyl isocyanate, which penetrates between soil particles. It is a micro granular soil fumigant containing 98% Dazomet leaves no degraded and harmful residues as the gases are mineralized after treatment. It is rate of 40 applied at gms/ m² (Gassauer, E., 1980).

Easy Method of Application

Prepare-the soil to fine tilth in the usual manner. Irrigate and leave for one week to activate the soil organisms (e.g. nematode, fungi, bacteria, and weed deeds) Prepare seedbeds with friable crumb structure after one week.

a) Spread basamid uniformly on the surface of the seedbeds at rate of 40gms/sqm. Incorporate basamid immediately in to soil to depth of 45 cm. by using spade or rotavator or any suitable implements. Ensure that's basamid mixes thoroughly and uniformly.

b) Press the seeds bed by rolling over with heavy loaded drum or wooden plank or use, a roller, if available. Irrigation with water can, rolling, followed by irrigation, would seal the soil and prevent the active gases from escaping. Keep the soil under moist condition. After 5 days looses the soil to 45cm depth with the implements, which is used for incorporation of basamid. Leave the seedbed for 2-3 days to allow the escape to toxic gases. Conduct a germination test and if found is normal, sowing should be undertaken.

Conclusion

To get expected yields along with the climatic factors and nutritional factors the decontamination techniques also to be followed. Pathogens have great potentiality to decrease the growth and yield of the crops and can adversely affect the returns causing a great loss to the farmer. Hence the above discussed methods had to be followed. Chemicals like formalin, methyl bromide and dazomet have great use in the decontamination and thereby eradicates the harmful pathogens that can affect the plant growth.

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