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Soil Solarization- A step towards sustainable crop production

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Introduction

The usage of chemicals for the control of pests and diseases is increasing at an alarming rate. Its drawbacks include not only the huge cost and labour involved but also its effect on the crop, soil, and human health. Chemical controls are curative controls. Our approach must be preventive. The aim should be to prevent the diseases and disorders that too with a technique that is suitable for a wide area, is cost-effective and environment friendly. Soil solarization is one of those cultural practices that aims towards safe and sustainable protection, and thus the production of crops.

What is soil solarization?

Soil solarization is one of the components of integrated practices of disease and pest control. It is an accurate example of optimum utilization of renewable resources; here the solar energy for agricultural purposes, especially in warm months.

Soil solarization as the name suggests is a soil disinfestation method that merely works on the principle of passive solar heating of soil by creating the greenhouse effect. The heat is trapped, and due to an increase in temperature and the presence of soil moisture, the steam formed is used to kill soilborne pathogens and weed seeds in the treated area.

How does it work?

Soil solarization which is also known as plasticulture, is a cultural practice in which clear, transparent, or black sheets are spread over the partially moist and friable soil (Picture 1). The sheets are usually secured from the sides by putting soil on their sides. Due to the bright sunny days, the sunlight is captured in these plastic films, and steam is formed which increases the temperature and leads to the inactivation and ultimately death of soil-borne pathogens. It is a cost-effective and environment-friendly method by which the use of

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chemical fumigants such as formalin or methyl bromide can be restricted. In contrast to soil fumigation, no or minimal chemicals are used thus being a better option.

Why it should be used?

1. The reckless usage of pesticides such as weedicides, herbicides, and insecticides is spurting at an alarming rate. The residual effect of these chemicals remains in the soil as well as the crop plant that is treated, which ultimately leads to deterioration of soil as well as human health. Opting for an eco-friendly technique of Integrated Pest and Disease Management i.e.,Soil Solarization can be a way out.
2. It is a cost-effective method, which requires no heavy installations.
3. It is a non-chemical approach.
4. It can be used for small-scale kitchen gardens to large-scale field/farm areas.
5. It is a labour extensive practice.
6. It improves soil health and thus, crop productivity.
7. It leaves no residue.
8. No fumes/gaseous particles are released into the air.
9. It works against myriads of soilborne pathogens.
10. As compared to chemical approaches, the rebounding of pathogens is low in soil solarization techniques.

Picture 1. Soil solarization through plastic sheets for vegetable production

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Conclusion

Soil solarization is a soil disinfestation method that works on the principle of solar heating of soil by creating the greenhouse effect. The transparent or black sheets are spread over the partially moist and friable soil which trap the solar heat.Due to an increase in temperature and the presence of soil moisture, the steam formed killsthe soilborne pathogens and weed seeds in the treated area. It is a cost-effective and environment-friendly approach which restricts the use of harmful chemical fumigants.