



Integration of Traditional Night Soil Compost with Fertilizers for Sustaining Soil Health

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Article History

Received: 5. 09.2022

Revised: 13. 09.2022

Accepted: 18. 09.2022

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INTRODUCTION

Agriculture is the principal activity of the people in dry temperate zone of Himachal Pradesh. However, because of the loss of top soil and plant nutrients caused by heavy snowfall, landslides and soil erosion, poor soil fertility is a major impediment to long-term farming in these areas. Confronted with such circumstances, the native population traditionally depend upon organic manure made from human and animal excreta. Night soil (human feces) has been regarded as a valuable resource since ancient times and is utilized as manure in agriculture. When used properly, it can assist to prevent soil deterioration and water scarcity in dry temperate areas like Lahaul valley. Compost from night soil lowers input costs, which eventually boosts farmers' income. The use of chemical fertilisers will be reduced, which will improve the soil's structure and aggregation as well as preserve surface and ground water from contamination. Night soil compost is used in agriculture which helps in improving soil biological characteristics as it contains various beneficial microorganisms, helps to improve soil fertility and crop productivity.

Night soil compost

Night soil compost is a type of bulky organic manure that is rich in plant nutrients and organic materials. It is prepared from human excreta in which fecal material is covered with 'fot' composed of a dry mixture of sheep/cattle dung, kitchen ash, sand, and dry grasses/leaves which becomes a night soil compost. It has an average of 5.5 percent N, 4.0 percent P₂O₅, and 2.0 percent K₂O on an oven-dry basis.

Preparation of traditional night soil compost

In the Himachal Pradesh district of Lahaul and Spiti, locals construct traditional dry toilet facilities on the first floor of homes that are connected to their living rooms. The night-soil falls through a 12-by-6-inch rectangular hole in the toilet floor to the ground level i.e. defecation room, where composting is done.

The use of water in these toilets is absolutely forbidden in order to prevent excess moisture content during composting. After defecating, villagers cover the faeces with other materials, locally known as fot (dry cattle dung, kitchen ash, dry grass or leaves). This fot serves two main purposes: it increases the nutrients in the compost and deters flies and unpleasant odours.

World Health Organization Guidelines for the safe use of human excreta as a night soil compost

WHO publishes a number of recommendations and suggestions in an effort to reduce the health concerns associated with utilizing night-soil as fertilizer. To assure safety in instances when it is challenging to raise the temperature of the compost heap, the WHO suggests "prolonged storage" with ambient temperatures of 2-20° C. According to their report, One and a half to two years of preservation will "eradicate bacterial pathogens; will lower viruses and parasite protozoa below concern limits,". In addition, WHO also suggests a number of safety measures to "reduce exposure" to risk. Wearing personal protection, such as boots, gloves, and a facemask, as well as employing tools or equipment not intended for other uses, are precautions for people who are dealing with night soil compost. In addition, children should also not be allowed near any sites where night soil is being prepared, treated, or applied.

Effect of integrated use of night soil compost with fertilizer on soil health

The long-term productivity of the soil depends on maintaining its greatest levels of physical, chemical, and biological properties. Soil health is negatively impacted by the single application of excessive inorganic fertilizers in agriculture. Thus, the incorporation of night soil compost adds an adequate amount of organic matter that improves soil conditioning and serves as food for the soil microbial population, ultimately preserving soil health and improving the biological properties of soil

by increasing the population of beneficial microorganisms. The soil organic carbon included in night soil compost serves as a good source of energy for soil microbes, encourages their growth, and consequently affects their distribution. The integrated use of night soil compost with fertilizers enhances the proportion of micropores, increasing the water-holding capacity and infiltration rate, decreasing the bulk density (less compaction) and improving the aggregate stability which ultimately improves the physical properties of soil. The use of night soil compost reduces the possibility of a conflict between environmental protection, sustainable development, and economic expansion.

CONCLUSION

The escalating discharge of human waste could lead to eutrophication and system deterioration, which would lower the quality of drinking water. The use of untreated night soil may pose certain health implications which can be overcome by proper management e.g., composting. By proper composting of night soil, it is a sustainable option to improve structure and quality of soil and therefore promote sustainable agriculture development. Night soil compost is a rich nutrient source and, when supplemented to the soil, increases its fertility. Night soil compost has also been reported to stimulate plant growth through the release of certain plant growth-promoting substances like indole acetic acid production and siderophore production which increase the availability of nutrients. Therefore, the integral use of fertilizer along with night soil compost is one of the pathways for improving soil health while sustaining the physical, chemical and biological properties of soil and maintaining soil health.

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