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COMPARATIVE ASSESSMENT OF HYDROPONIC AND GEOPONIC CULTIVATION SYSTEMS FOR SUSTAINABLE SPINACH, LETTUCE AND TOMATO CULTIVATION

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ABSTRACT

India being a developing nation, majority of its population is dependent on agriculture for livelihood but due to an alarming increase in population over few decades a tremendous pressure is raised on the farming community to meet the food requirements of the growing population, but we cannot deny the fact that sources of useful resources are depleting day by day and therefore we need to focus on alternative resources so that in future we can avoid the condition of food scarcity. Hydroponics could be one such alternative. Soil-free cultivation is recognized as hydroponics, is a resourceful farming technique that chiefly aims at blossoming plants in a land free habitat. It is a very unique method that is acquiring admiration due to its potential to give rise to excessive yields of crops in very less time and use very little expenditure. India is a developing country where its populations is constantly increasing at an alarming rate and to top it all, the fertility of the cultivable fertile soil is also gradually decreasing, and it is assumed that soon in near future it might become negligible, as a consequence, we need to depend on other technologies besides geoponics. In the present study, we focussed on the studies on comparative assessment of hydroponics and geoponics cultivation. The setup of hydroponics and geoponics was maintained at the Department of Microbiology DLSPG college Bilaspur Chhattisgarh during the rainy season of 2023. We used hydroponics solution, vermiwash and pure water as growth mediums, the assessment was carried out with three plant varieties viz: tomato, lettuce, and spinach. During the rainy season as we only wanted to test the efficacy of this technique within a short period of time, and it was found that hydroponics proved to be more effective than geoponics in all the three mediums as the growth rate in hydroponics cultivation was much higher than in geoponics cultivation system.
Keywords: Geoponics, Hydroponics, Traditional Cultivating System Vermiwash, Nutrient Solution A&B

Introduction

The world's population is striving really hard to climb at a steady pace and in its effort to do so, the resources steadily decline and moreover current data suggests that, it is possible to reach 9.5 billion population in 2050, the current number of populations is recently six billion, with a per capita land area of 0.25 hectares, while the projected 2050 population is expected to be 9.5 billion. The use of chemical fertilizers for preventing crop damage has raised many health issues, though the crop production has increased but at the cost of human health. Thus, there is a requirement to look in for an alternative method for increasing crop yield that will have less health impact on the community (Syed *et al*., 2021). Thus, there is a requirement to opt for an effective, cheap, environmentally friendly approach for the farming of crops so that it affects a wholesome environment that will cause less health hazards (Pandey *et al*., 2009).

Hydroponic farming is recognized as a soil-less farming that utilizes mineral solutions instead of relying on soil for plant growth. It uses a nutrient-rich liquid, called the root nutrient solution, as the source of plant life. It is a scientific answer to the challenges of rising food demand while lessening the farmland availability. The process of cultivating plants in water