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Application Potential of Fish Waste in Improving Compost Quality

Maryam Soltani[1], Morteza Yousefzadi*[2], Narges Amrollahi Biuki[1], Musa Keshavarz[1], Abdolmajid Mirzaalian Dastjerdi[3]

[1]Faculty of Marine Science and Technology, Hormozgan University, Hormozgan, Iran

[2]Faculty of Science University of Qom, Qom, Iran

[3]Faculty of Agriculture and Natural Resources, Hormozgan University, Hormozgan, Iran

***Corresponding author: morteza110110@gmail.com**

Introduction

Utilizing fish waste as an organic fertilizer in agriculture offers economic and ecological benefits. Fish waste is rich in essential nutrients such as nitrogen, phosphorus, proteins, fatty acids, vitamins, and minerals, making it suitable for diverse fertilizers, particularly beneficial for organic farming. The adverse effects of excessive chemical fertilizer use on ecological balance and food safety have led to a shift towards environmentally friendly solutions. Embracing biologically based organic fertilizers, including those derived from fish waste, is crucial for achieving ecological harmony within agricultural systems. This approach aligns with the principles of organic farming, emphasizing natural processes and biological systems. By integrating plant, animal, and marine resources, fish waste-derived compost contributes to enhancing soil fertility and the overall quality of agricultural products. Fish waste compost is enriched with vital nutrients, making it a sustainable and resourceful addition to organic agriculture.

Material and Methods

The study aimed to improve salinity conditions by producing compost from fish waste. Fish waste, including bone and cartilage, was collected from a canned fish factory in Bandar Abbas and rinsified. Wood waste was used to enhance the soil's C/N ratio. Compost was produced using the windrow method, layering fish waste, agricultural soil, and wood waste in a 3:1:1 ratio. The process continued for two months, maintaining moisture levels and aerating to stimulate microbial activity. A greenhouse experiment was conducted to examine the impact of the compost on turnip

plants. Results showed a positive effect on plant growth and performance, particularly with the 50 % compost concentration. Soil samples were also analyzed for cadmium content and catalase enzyme activity.

Result and Discussion

The study investigates the impact of fish waste compost on turnip plants. The results show that the 50 % compost treatment significantly increased the weight of glands and leaves, with the highest gland weight (15.60 g) and leaf weight (5 g) observed. The compost also increased leaf count, with a 6-fold increase at higher levels. The compost application did not alter proline concentration in leaves but slightly increased it in glands. Catalase enzyme activity in both leaves and glands decreased with compost application. The addition of 50 % compost improved soil properties, with notable changes in soil acidity, electrical conductivity, organic matter, and organic carbon. The compost treatment led to a significant reduction in soil cadmium concentration, with the lowest concentration observed in the 50 % compost treatment on day 30. The study aligns with previous research indicating the positive impact of compost on soil and plant characteristics.

Conclusions

In summary, the utilization of fish waste compost appears to enhance growth indicators, weight, and dry matter of both leaves and glands, increase proline concentration, and ultimately elevate the levels of nutrients and essential elements in turnip plants. The study also demonstrates that fish waste compost, enriched with humic substances, effectively immobilizes and reduces the absorption of significant cadmium amounts by the soil. The enzymatic activity of catalase increased with compost addition, attributed to the improved microbial growth environment.

Keywords: Compost, Heavy metals, Catalase, Proline, Radish, Fish waste.