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# Harnessing Food Waste Derived from Kitchen Households for Sustainable Agriculture: A Study on Soil and Plant Nutrient Enhancement

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## INTRODUCTION & AIM

Growing populations necessitate sustainable agricultural practices that increase crop yields, soil health, and food protection. This study examines how kitchen waste compost (KWC), vermicompost, and chemical fertilisers affect red radish growth and soil nitrogen and mineral content.

## METHOD

The soil pH, electrical conductivity, and plant and soil micronutrients and minerals were evaluated using inductively coupled plasma optical emission spectrometry (ICP-OES) in a systematic experimental approach. C, N, P, K, Al, As, Ca, Cd, Co, Cr, Cu, Fe, Mg, Mn, Mo, Na, Ni, Pb, S, Sr, V, and Zn were examined.

## RESULTS & DISCUSSION

These results show considerable nutritional and mineral variations between soil and plant samples. For instance, 10% vegetable waste had the highest soil mean carbon content, while 10% mixed meat waste had the highest root carbon percentage. Additionally, 10% mixed fruits and vegetables and vegetable waste increased shoot and shoot+root carbon. Soil with 50% mixed carbohydrate had the most nitrogen, while that with 10% yielded the most root nitrogen. Shoot nitrogen was highest at 10% of vegetable and fruit waste, and shoot+root nitrogen was highest in vegetable compost. Among the phosphorus sources, 25% meat compost had the highest soil content, 10% mixed carbohydrate was best for roots, and chemical fertilisers were best for shoots.

Shoot+root phosphorus was highest in 50% meat compost. For potassium, 50% meat compost was greatest in soil, 10% fruit compost in roots, 10% in shoots, and 25% in shoot+root potassium.

## CONCLUSION

This study shows that kitchen waste compost improves plant and soil quality, making it a sustainable and eco-friendly alternative to chemical fertilisers. The findings suggest using food waste as a resource in agricultural systems and choosing optimal fertilisers and concentrations to boost productivity and sustainability.

## FUTURE WORK / REFERENCES

Future work should focus on long-term effects of kitchen waste compost on soil health and crop yields, testing with different crops, and optimizing compost mixes. Investigating its impact on soil microbes, water retention, and erosion resistance is crucial. Economic feasibility, heavy metal accumulation, and potential for use in urban agriculture should also be explored.