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Nutrient density and mineral content of radishes grown in black soldier fly frass-enriched compost

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More sustainable food production methods are needed for the future, especially considering the challenges of climate change. *Hermetica illucens* (L.), also known as black soldier fly (BSF), shows promise as a tool in the circular economy, as it can convert organic waste into protein-rich feedstocks (Lui et al., 2022). Moreover, a byproduct of BSF is frass, which is a mix of excrement and exoskeletons (rich in minerals, fats, and proteins) that could be an effective fertilizer for food crops (Lopes et al., 2022). Limited information is available about the impact frass has on nutrient density of foods grown in frass-enriched compost.

This study evaluates the growth (weight and height), mineral content (Mg, Mn, Zn, Fe, Cu) and nutrient density (% BRIX) of radishes (*Raphanus sativus* cv. Diana) grown in a range of frass concentrations (0-25% frass). Significant growth was found with all frass concentrations ($P < 0.001$), with optimal growth at 10% frass. Leaf BRIX, and whole plant Fe decreased ($P < 0.001$) at all frass concentrations compared to the control. No significant mineral increases were observed except for Mn ($P < 0.001$) in the leaves and roots with all frass concentrations, and Zn ($P < 0.001$) in the roots with 25% frass. Although added frass increased the growth of the radishes, this was offset by decreases in most minerals and consistent with BRIX values. These results indicate more research is needed to evaluate how frass-enriched compost impacts the growth and nutrient density of food crops.

Keywords: Frass, nutrients, radish, *Hermetica illucens*, fertilizer

References

- Liu, T., Klammersteiner, T., Dregulo, A.M., Kumar, V., Zhou, Y., Zhang, Z. and Awasthi, M.K., 2022. Black soldier fly larvae for organic manure recycling and its potential for a circular bioeconomy: A review. *Sci. Total Environ.* 833, 155122.
- Lopes, I.G., Yong, J.W. and Lalander, C., 2022. Frass derived from black soldier fly larvae treatment of biodegradable wastes. A critical review and future perspectives. *Waste Manage.* 142, 65-76.

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