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ABSTRACTS OF PAPERS

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Innovation: our driver for a profitable and ecologically balanced sugar beet production

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Application of mealworm FRASS fertiliser in sugar beet production: Step towards profitable and ecologically balanced sugar beet production

To address the growing demand for sugar, sugar beet production must be increased. However, conventional chemical fertilisers, essential for root growth and yield quality, are environmentally harmful due to factors like greenhouse gas emissions and organic pollution. To address this issue, we need to consider eco-friendly organic alternatives, such as FRASS, which is the residue from mealworm larval excrement. FRASS is rich in essential nutrients (ESN), including nitrogen (N), phosphorus (P), and potassium (K). In our study, we aim to explore the potential of FRASS as an environmentally innovative fertiliser for sugar beet production, given the increasing popularity of mealworm farming. In a field experiment, we compared the efficacy of pre-sowing fertilisation on two sugar beet varieties using three different models of two fertiliser concentrations (N:P:K 80:60:40 & N:P:K 40:30:20): pure mealworm FRASS, a combination of FRASS and mineral fertiliser, and pure mineral fertiliser (NPK). Our goal was to maintain the same level of ESN between NPK fertilisers and FRASS. To achieve this, we calculated that 2 t/ha of FRASS are required to match the N:P:K 80:60:40 ratio, while 1 t/ha of FRASS suffice for N:P:K 40:30:20. For trials involving combined fertilisers, we adjusted the FRASS quantity to maintain consistent ESN levels with pure FRASS/NPK, halving the FRASS amount previously used. In NPK fertilisers, the same nutrient sources were used: $CO(NH_2)_2$ for N, $(NH_4)(H_2PO_4)$ (MAP) for P, and KCl for K. Results indicated no significant difference in sugar content between the treatment groups and the control. However, there were significant variations in sugar yield and root yield. The most effective treatment for sugar yield was the combination of NPK in N:P:K 80:60:40 concentration and FRASS. In contrast, for root yield, both combinations of N:P:K 40:30:20 and FRASS, and N:P:K 80:60:40 with FRASS, were equally effective. These findings suggest that FRASS has potential as a partial or complete alternative to NPK fertilisers.