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Effect of vermicompost application on bioactive properties and antioxidant potential of MD2 pineapple fruits (Article) (Open Access)

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Abstract

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Vermicompost is an organic waste produced from earthworms that can enhance the soil condition and is rich with essential plant nutrients, thus increasing produce quality and shelf life. In this study, a one-year field trial was conducted to elucidate the effects of vermicompost supplementation on the composition of bioactive compounds and antioxidant activities of pineapple (Ananas comosus var. MD2) fruits, compared to control and application of chemical fertilizer. Based on the results, pineapple fruits produced from plants supplemented with chemical fertilizer showed the strongest radical scavenging properties against 2,2-Diphenyl-1-picrylhydrazyl (DPPH) and 2,2 ^{0} -azinobis(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS), followed by vermicompost and control plants. Application of chemical fertilizer and vermicompost also produced fruits with a very high content of chlorophylls and β-carotene compared to control plants. However, the amounts of bioactive compounds present in fruits produced with chemical fertilizer are higher than in fruits produced with vermicompost. Total phenolics content and Ferric Reducing Antioxidant Power (FRAP) reducing power were lowest in fruit extracts produced from pineapple plants supplemented with vermicompost. These results suggested that vermicompost cannot completely replace chemical fertilizer for the production of fruits with a high content of phytoconstituents but could be used as an additional supplement to reduce environmental pollution and ensure agricultural sustainability. © 2019 by the authors.

Author keywords

Ananas comosus | Bioactivity | Organic agriculture | Phytochemical | Plant nutrient | Sustainability | Vermicompost

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