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Use of *Panicum maximum* as a Source of Biofertiliser and Biochar on Crop Response of *Raphanus sativus* L. in Organic Cultivation

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Abstract

Panicum maximum is an alien invasive perennial weed becoming a threat to environment and agriculture in Sri Lanka. Its control is extremely difficult and expensive due to its heavy dispersion ability. Plant growth promoting rhizobacteria (PGPR) associated with *Panicum maximum* root system are having the ability to produce various phytohormones that improve root growth, adsorption of water and minerals that eventually support successful plant growth. Biochar is a soil amendment that enhance the nutrient retention capacity and reduce the total fertiliser requirements by reducing the loss of nutrients via leaching and high cation & anion exchange capacity. Above ground parts of the *P. maximum* can be used to produce biochar. This research was conducted to evaluate the possibility of using PGPR associated with *P. maximum* roots as a simple and low cost bio-fertiliser preparation and use of biochar made from *P. maximum* as a soil amendment that could be helpful in controlling *P. maximum* as well as organic agriculture promotion in Sri Lanka. Pieces of *P. maximum* roots and roots washed solution were two forms of biofertilisers. Vegetative growth, yield and quality of the crop *Raphanus sativus* L. (Radish) grown in an organic system was evaluated by applying two forms of biofertilisers and biochar into the soil. Six treatment combinations of biochar and bio-fertiliser were tested as a pot trial in a polytunnel. A significant highest number of leaves and highest yield parameters were observed in radish grown with root pieces of *Panicum maximum* without biochar. Further it exhibited significantly better sensory properties for radish quality compared to other treatments. It was concluded that root pieces of *P. maximum* can be used as the source of bio-fertiliser to enhance vegetative growth, yield and quality of radish in organic agriculture. Significant short term effects were not apparent with *P. maximum* biochar application.

Keywords: Bio-fertiliser, biochar, *Panicum maximum*, PGPR, radish, roots

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