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Evaluation of the Physio-Chemical and Microbial Properties of Green Tea Waste-Rice Bran Compost and the Effect of the Compost on Spinach Production

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Abstract: To study the physio-chemical and microbial properties of green tea waste-rice bran compost (GRC), and feasibility of GRC as the alternative of agrochemicals for quality spinach production, five types of compost were prepared by mixing green tea waste and rice bran. The compost temperature was increased by adding rice bran to the green tea waste. The compost GC made from green tea waste alone contained a relatively large amount of nitrogen (7.55%). On the other hand, the compost RC made from rice bran alone contained a relatively large amount of minerals, such as phosphorus (0.49%), potassium (4.96%) and magnesium (2.28%). Addition of rice bran increased the total number of bacteria, viable bacteria and organic matter decomposing bacteria as well as actinomycetes population in the mature compost. The frequency of organic matter decomposing bacteria in GRC was in the following order: cellulolytic bacteria<pectolytic bacteria<lipolytic bacteria<amilolytic bacteria except RC. The growth of spinach was significantly increased over the untreated control (only soil) when GRC was applied in the field and growth pattern was depended on the nature of the composting materials. The highest fresh weight of 27.5g plant⁻¹ and 45.4g plant⁻¹ were obtained by applying the compost with 30% green tea waste+70% rice bran (GRC-3) under field condition in autumn of 2004 and 2005, respectively. The highest growth enhance effect was also obtained from GRC-3 when three spinach varieties were grown with GRC under

greenhouse condition. The amount of nitrate and oxalate in the spinach grown with GRC were ranged from 114.0 to 146.0 mg 100 g⁻¹ and 612.0 to 748.0 mg 100 g⁻¹ fresh weight, respectively. These values were below from the safety standard of health level of nitrate and oxalate for spinach. The amount of ascorbic acid, glutamic acid and iron in the spinach were increased by applying the compost. Among the five combinations of GRC, GRC-3 provided the best results in spinach production.

Keywords: [Composting](#), [Green tea waste](#), [Microbes](#), [Physio-chemical properties](#), [Rice bran](#), [Spinach](#)

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