

Application of Different Fruit Peels Powder as an Organic Fertilisers for the Effective Growth of Water Spinach (*Ipomoea Aquatica*)

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Abstract. Macronutrients such as nitrogen (N), phosphorus (P) and potassium (K) are usually found in fertilisers which is essential to plant growth and development. The study reports on the utilization of different fruit peels as an organic fertiliser for the effective growth of water spinach (*Ipomoea Aquatica*). Each fruit peels of pineapple, banana and mango were collected separately from local fruit vendors. The fruit peels were cleaned, dried, and then grinded into powder individually. The chemical composition of fruit peels powder was analysed by Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES) and CHNOS analyser which NPK concentration was determined. Among three analysed fruit peels, results demonstrated that banana peels powder showed the highest concentration of K and N, which consists of 26557.86 mg/L and 1.61%, respectively. Besides that, electrical conductivity measurement and water absorption capacity of fruit peels powder was studied. Plants were grown under vary amount of fruit peels powder treatments (mango, banana, and pineapple peels application), as well as control treatments (no fertiliser application). Plant height and number of leaves per plant were analysed to investigate the effect of fruit peels powder treatment on plant growth. The application of 3 g pineapple peels powder gave the better performances in all water spinach growth parameters with mean maximum plant height of 20.83±3.01 cm, number of leaves per plant of 9 was recorded. Hence, it can be concluded that 3 g pineapple peels powder can efficiently improve the utilization efficiency of fertilizers in agricultural production.

Introduction

A fertiliser is any organic and inorganic material of natural or synthetic origin that is applied to soils or to plant tissues to supply one or more plant nutrients essential to the growth of plants. Organic fertilisers are normally produced from agriculture waste, plant or animal-based materials like manures, plant stalks, hulls, leaves, and composted materials [1]. The idea of utilising fruit by-products primarily the peels which in some fruits speak to nearly 30% of the whole weight, have gradually gained popularity particularly when analyst found that peels had way better macronutrients than other fruit's parts [2]. Several studies investigating application of different fruit peels formulation as a natural fertiliser have been carried out on plant growth. Different type of fruits peel powder has different pH; alkaline peel powder is used for reducing acidity content present in soil while acidic peel reduces salinity of soil. Previous studies have reported that citric peel powder has