

## ASSESSMENT OF NITROGEN, PHOSPHOROUS AND POTASSIUM CONCENTRATIONS IN DIFFERENT RAW MATERIAL VERMIWASH

**P.G.I.L. Dilani<sup>\*</sup> and P. Loganathan**

*Department of Bioscience, Faculty of Applied Science,  
Vavuniya campus of the University of Jaffna, Sri Lanka  
<sup>\*</sup>lakshi0309@gmail.com*

The study was carried out from November 2014 to April 2015 within the premises of Vavuniya Campus of University of Jaffna. The main objective of this study was to analyze nitrogen, phosphorus and potassium (NPK) concentrations of vermiwash (VW) prepared with different raw materials. Study was targeted on several other objectives such as to seek the handiness of recycling vegetable waste and mango leaves through VW preparation, to prepare VW from green plant species which cause trouble in the environment.

Five plastic barrels were used to establish the vermi-bed. A tap was fixed at one horizontal limb of the container. Then, a base layer of small gravels was placed. Over that a layer of fine sand was placed. Then, a layer of top soil was added and it was covered with a layer of cow dung. Excess amount of water was sprayed and allowed to drain-off. After that the tap was closed. Four different types of raw materials, namely vegetable waste, mango (*Mangifera indica*) leaf litter, parthenium (*Parthenium hysteroporus*) and water hyacinth (*Eichhornia crassipes*) were used for the preparation of VW. Control unit was maintained. In control, only top soil and cow dung bed were used without adding any extra feeding material. Locally available Earth worms (EWs) were collected from an open land field of Agriculture School in Vavuniya, where livestock wastewater discharges. Fifty surface and subsurface local EWs were introduced in to each vermi-bed. After 60 days of processing, 4.5 L of VW from each unit was collected after passing 5 L of water into each unit. Three samples from each Vermiwash preparation unit and control were collected for physiochemical analysis. Physiochemical characteristics of different raw material driven VW were analyzed using one-way ANOVA. Significant differences were observed between different raw material driven VW and control, including available  $\text{NO}_3^-$  - nitrogen ( $P \leq 0.0001$ ), available  $\text{PO}_4^{3-}$  - phosphorous ( $P \leq 0.0001$ ), exchangeable potassium ( $P \leq 0.0001$ ). Highest concentrations of nutrients were recorded in Parthenium VW (highest  $\text{NO}_3^-$  - N) and Vegetable waste VW (highest  $\text{PO}_4^{3-}$  and highest  $\text{K}^+$ ). The pH of VW was slightly alkaline (7.6 – 8.4). Vermiwash with 1:5 dilution (V/V) was lying within a range of 7.1 - 7.4. Near neutral range of 5.5 - 8.5 is suitable for crop foliar spraying solutions. EC range of 0.5 – 1.5 dS/m in soil indicates suitable condition for cropping. Electrical Conductivity (EC) of different types of VW with 1:5 (V/V) dilutions was confirmed range from 0.7 – 1.4 dS/m.

This study confirmed feasibility of VW preparation with environmentally troublesome weeds (Parthenium and Water hyacinth). The vermiwash contains considerable concentrations of nutrients in it. Vermicomposting is increasingly becoming popular as an organic solid waste management strategy. The preparation of VW with selected raw material confirmed alternative solution for controlling vegetable waste and mango leaf litters because there is no garbage after prepared VW. The amounts of nutrients in VW will be sufficient to apply for leafy vegetables where low chemical fertilizer applications are prescribed. There is still a requisite of continuing study in this field ahead to, compare the effectiveness of VW application on crop growth with recommended chemical fertilizer application. That will find whether VW replace the chemical fertilizers fully or partially; and to confirm relationship between nutrients concentration in pure raw materials and after it is proceeded in to Vermiwash.