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Selected aquatic weed management by vermicomposting

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Abstract

The present study deals with the management of aquatic weeds like *Trapa natens* Linn.,*Utricularia gibba* Linn., *Jussiaea repens* Linn., *Hygrophila auriculata* (Schum.) Heine., *Chara zeylanica* Willdenow and *Nitella furcata* Agardh, in vermicomposting using *Eisenia foetida* earth worms. Higher NPK and micronutrients in them indicate its good quality as organic fertilizer, which is less expensive, unpolluted and eco friendly.

***Key words*:** vermicomposting, aquatic weeds, weed management, micronutrient, macrophytes.

Introduction

Aquatic weeds are considered as big menace not only in India but all over the world from reducing fish production, deterioration of water quality, for hindering free flow of water, spreading mosquito, snails and human diseases (Gupta, 1987). Nearly 40% of freshwater ecosystems became unproductive by the luxurious growth of aquatic weeds and several intensive methods were adopted to control the aquatic weeds (Singh, 2000). Specific bio agents were also adapted and complete eradication was impossible (Majid, 1986). Gajalakshmi *et al*, (2001) and Sannigrahi *et al*. (2002) have adapted technology to utilize aquatic weeds into beneficial vermicompost and applied to different species of vegetables which would be very useful to motivate farmers for better crop production (Sannigrahi, 2009). Keeping these in view, an experiment was carried out to prepare vermicompost from *Trapa natens* Linn., *Utricularia gibba* Linn., *Jussiaea repens* Linn., *Hygrophila auriculata* (Schum.)Heine., *Chara zeylanica* Willdenow and *Nitella furcata* Agardh, the common aquatic weeds of Kanyakumari district.

Materials and methods

The above mentioned fresh water aquatic weeds were collected and cut into small pieces (3-6 cm length). They were kept separately in cement tanks of size 60 cm x 30 cm x 30cm with 1:2 ratios of aquatic weeds and dried cow dung. All the tanks were filled separately with the respective weeds. They were kept in shade and allowed for decomposing. Watering was done to keeps the tanks always in moisture condition. After complete decomposition, introduced 100 *Eisenia foetida* earth worms in each tank and water was sprinkled everyday to maintain the optimum moisture level. When the compost turned dark blackish brown granules, watering was stopped and the vermicompost was ready for harvesting. From each tank, 200 gm of vermicompost was taken and the chemical constituents were analysed. The total nitrogen was estimated following Kjeldahl digestion method (Bremmer and Mulvancy,1982). The available phosphorus and potassium were calculated by calorimetric and flame photometric method (Bansal and Kapoor, 2000), pH by Systronic pH meter, zinc, copper and iron concentrations were analysed by atomic absorption spectrophotometric (AAS) method.

Result and discussion

The macronutrient constituents of vermicompost are shown in Fig 1. Macronutrients are essential elements and nitrogen is the basic component of nucleic acid, protein and other organic molecules. In the present observation it ranged from 9.4% in *Jussiaea repens* used vermicompost to the maximum of 13.7% in *Trapa natens* used vermicompost. Similar observations were made from duck weed (Wong *et al.,* 1977), sewage sludge (Bury *et al*., 2009) black gram pod (Kannan *et al.,* 2011) used vermicompost. Vasanthy and Kumara Swamy (1999) and Padmavathiamma *et al.,* (2008) reported that it was mainly by the nitrogenous products of earthworms. Similarly phosphorus and potassium contents were more in *Chara zeylanica* (25.2 % Phosphorus and

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14.9% potassium). The present observation corroborates with the findings of Kasthuri *et al.* (2011); Estherrani (2007) and Kittumath *et al.* (2007) from different organic waste used vermicompost. Uma and Malathi (2009) have reported 120.5 ppm of nitrogen, 18.39 ppm of phosphorus and 50.90 ppm of potassium from the organic waste used vermicompost. Lohani (2005); Rakshil *et al* (2008) and Ansari (2009) have reported high NPK content from the aquatic weeds used vermicompost.

The micronutrient constituents of vermicompost are shown in Fig.2. Micronutrients were also in higher levels. *Jussiaea repens* produced 139 ppm of zinc, U*utricularia gibba* showed 39.4 ppm of copper and 713.8 ppm of iron content as maximum. The present findings are in agreement with the report of Jeyabal and Kuppusamy (1999), Suthur (2007); Kostecka and Kannuezak (2008) from paddy straw, groundnut shell, and duckweed used vermicompost. *Eisenia foetida's* good growth in aquatic weed beds indicates that these organic matters are palatable to them. Several researchers reported that the nutrient composition of vermicompost varied in their micronutrient levels depending upon the waste materials used during the feeding process of earthworms (Paola and Ceppi, 2008). From this study it can be concluded that vermicomposting of aquatic weeds is a positive biotechnological approach to produce an eco -friendly nutrient rich manure.

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Fig. 1 NPK concentration of vermicompost from aquatic different weeds.

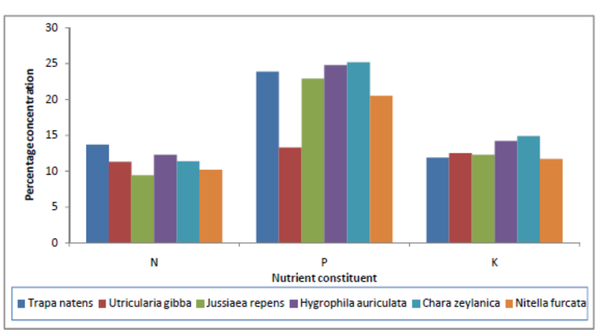
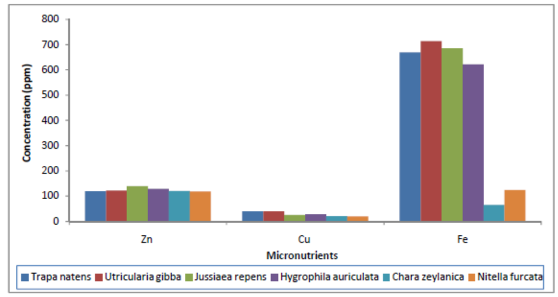


Fig. 2 Micronutrients of vermicompost from different aquatic weeds



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