**SHORT COMMUNICATION**

# PROSPECTS OF UTILIZING WATER CABBAGE (*LIMNOCHARIS FLAVA* (L.) BUCHENAU) BIOMASS AS AN ALTERNATE ORGANIC MANURE SOURCE

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**Abstracts :** Water cabbage (*Limnocharis flava* (L.) Buchenau) (Malayalam name: *Malamkoovalam / Nagapola*), an aquatic invasive alien weed was introduced as an ornamental plant in India. Now it has invaded vast tracts of low lying wetland system in Kerala and has become a serious threat to paddy cultivation. The weed clogs irrigation tanks and drainage channels, resulting in poor drainage. The luxuriant vegetative growth coupled with the fast spreading root systems extract large quantities of nutrient elements from the soil. Sannigrahi *et al.* (2002) reported that large scale utilization is the only way to control noxious aquatic weeds which require no tillage, fertilizer or nourishment for their proliferation. Non availability of good organic source at cheaper rates is another serious problem faced by farmers interested in organic crop production. Information on quality of the weed biomass as a source of manure would motivate farmers to manage such weeds through utilization. The present study was conducted to assess the possibility of utilizing the luxuriant weed biomass of water cabbage through vermicomposting.

**Keywords :** Water, cabbage, utilization, fertilizer

## INTRODUCTION

The experiment was conducted at College of Agriculture, Vellayani, Thiruvananthapuram, Kerala during 2012. Water cabbage plants were collected from the field and vermicompost was prepared using standard techniques, with weed biomass alone or weed biomass mixed with crop residues in 1:1 proportion on weight basis. The weed plants collected were shade dried for 7 days and were chopped to 5 to 7 cm size. The weed biomass alone or combined with the crop residue was mixed with cow dung in the ratio 8: 1 (water cabbage / water cabbage + crop waste: cow dung) on weight basis. The composting was done in cement rings of 1.0 m diameter and 30 cm depth. Earth worms (*Eudrilus eugeniae*) were introduced after 10 days when the thermophilic stage of composting was over. Adequate moisture was maintained by watering regularly and fortnightly turning was given for proper aeration. The compost maturity was judged by its physical appearance such as the development of dark brown to black colour with uniformly disintegrated structure and C: N ratio. The N content (Modified microkjeldahl method), P content (Vanado-molybdo phosphoric yellow colour method), K content (Flame photometer method), and Fe, Mn and Zn content (Diacid digestion method) were estimated for compost samples (Jackson, 1973; Chesnin and Yien, 1951). Heavy metal content in the digested sample (DTPA extractant) were determined by using Atomic Absorption Spectrophotometer and expressed as ppm (Lajunen, 1992).

## RESULT AND DISCUSSION

The physical characteristics of the vermicompost prepared from water cabbage biomass were found promising. The product developed greyish brown colour when composted alone while the compost had brownish black colour when composted along with crop residues. The product did not have any foul smell and had an earthy or humus like odour when composted alone or as 1:1 combination with crop residue. When the weed biomass was vermicomposted alone, the composting required 80 days for maturity while mixed with crop residue (1:1) the compost was ready by 50 days. The recovery percentage was 33 and 45 percent respectively. The population of earthworms in the former was also lower. The NPK content, EC and pH were favorable for using the product as an alternate organic source (Table.1). Moreover, there was no weed seed germination when random samples from the compost were tested for weed seed germination.

The chemical analysis of the product revealed that the content of copper in vermicompost was much higher than the maximum permissible limit of 400 ppm as described by Canadian Council of Ministers of the Environment (2005) (Table 2). However concentration of the other heavy metals were quite less than the limits prescribed for vermicompost internationally. Thus it might be inferred that the luxuriantly growing weed is promising for bioremediation but its use as an organic manure is debatable due to the very high content of some of the heavy metals.

**Table 1.** Chemical properties of water cabbage vermicompost

| Material | pH | EC | OC% | N% | P% | K% | C:N Ratio | C:P Ratio |
|---|---|---|---|---|---|---|---|---|
| Before composting | 6 | - | 48 | 1.6 | 0.13 | 2 | 30:1 | 369:1 |
| Weed biomass alone | 7.12 | 4.2 | 32.2 | 1.4 | 0.48 | 1.3 | 23:1 | 67:1 |
| Weed : crop residue (1:1) | 7.59 | 0.2 | 32.4 | 1.8 | 0.44 | 1.17 | 18:1 | 73.6:1 |

**Table 2.** Micronutrient composition of water cabbage vermicompost (ppm)

| Elements | Weed biomass alone | Weed : crop residue (1:1) |
|---|---|---|
| Iron | 2820 | 2990 |
| Manganese | 1175 | 1135 |
| Copper | 18435 | 10965 |
| Zinc | 220 | 195 |
| Lead | 0.007 | 0.021 |
| Mercury | 0.054 | 0.023 |
| Cadmium | 0.1 | 0.11 |
| Nickel | 0. 04 | 0.05 |
| Chromium | 0.15 | 0.13 |
| Cobalt | 0. 015 | 0.01 |

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