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Short Communication

Culture of Earthworm *Lampito mauritii* Kinberg, 1867 in Fish Pond Sludge and Cardboard

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Abstract. The earthworms, *Lampito mauritii* Kinberg, 1867 were treated with fish pond sludge (FPS) and card board (CB) mixture in different feedstock concentrations (5%, 10%, 15%, 20%, 25%, 50%, 75% & 100% FPS) for the period of 63 days in July-September, 2011. The parameters such as initial and final biomass, survival rate of earthworms were noted at constant moisture and pH level. Among the eight treatments; 15% FPS with 85% of CB was found most suitable for vermicomposting.

Keywords: earthworm, fish pond sludge, vermicomposting

Earthworms are considered as an important component of soil ecosystem; they convert organic waste materials to a highly valuable soil amendment (Datar *et al.,* 1997). The worms are also used in vermicompost technology where they process biodegradable materials like leaves, sewage water, municipal waste, household garbage, livestock manure, non-toxic solid and liquid waste of the industries into natural organic fertilizer (Edwards and Fletcher, 1988). Some workers suggested the recycling of fish pond waste as organic fertilizer for agriculture purpose as it is enriched with organic matter, nitrogen, phosphorus, as well as macro and micro-nutrients (Marcet *et al.,* 2010; Mizanur *et al.,* 2004; Mazzarino *et al.,* 1998).

Present study is aimed to process fish pond sludge (FPS) into organic fertilizer for agriculture crop by using earthworms. *Lampito mauritii* were introduced in eight different FPS treatments in association with cardboard (CB) as feedstock showed significant production of earthworm biomass in 15% FPS and 85% CB.

The study was carried out in Aquaculture Laboratory of PCSIR Labs-Karachi, for the period of 63 days in July-September, 2011. The specimens of earthworm were dug out from the garden soil and adult stages were sorted out; identification of species was done using the description of Parshad (1916). Used corrugated CB boxes were shredded in small pieces, FPS was collected from the Tilapia (*Oreochromis* spp.) pond located at PCSIR Labs. and refrigerated. Eight different feedstock treatments were prepared with CB and FPS in ratios ranging from 5%, 10%, 15%, 20%, 25%, 50%, and 75%, whereas 100% contained only FPS, a control setup which comprised of just an ordinary soil was also maintained with same number of earthworms. Circular 1 L glass containers (diameter 14 cm, depth 12 cm) were filled with 500 g each of feedstock material. In each container 25 earthworms were inserted and covered with nylon net cloth to provide aeration, and kept in dark place. Moisture content was maintained from 68-70% in each container during the experiment by sprinkling water with a hand spray when required while pH was also maintained from 7.5 to 8.5. Each container was checked regularly to observe the earthworm survival rate and biomass; the number of cocoons and larvae if present were also noted; organic carbon was estimated from each container by the method of ASTM (2000).

Table 1 shows the observation taken in 8 different treatments (mixture of FPS and CB) and control setup in terms of earthworm survival, biomass, cocoon production and larval numbers. The estimates of organic carbon in each setup are also given in Table 1, which is lowest in control (10.3 g/kg), whereas highest in 100% FPS (27.6 g/kg) treatment. The total biomass of *L. mauritii* in all setups ranged from 9.15-11.97 g initially while 7.35-25.42 g finally. The percentage

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Table 1. Results obtained after using earthworms *Lampito mauritii* (Kinberg, 1867) with different treatments

Feedstock treatment concentration	Organic carbon (g/kg) mean±S.D.	Earthworm biomass (g) (n=25) Mean±S.D.		Percentage increase/decrease in the total biomass	No. of cocoons	No. of larvae
		Initial	Final			
5 % FPS+ 95 % CB	12.2±0.25	10.78±0.13	20.48±0.46	89.98 (22±0.35)	30	14
10 % FPS+ 90 % CB	13.7±0.29	11.97±0.24	21.53±0.52	79.86 (22±0.34)	48	23
15 % FPS+ 85% CB	15.5±0.35	9.83±0.21	25.42±0.55	158.6 (25±0.46)	63	33
20 % FPS+ 80 % CB	16.5±0.63	10.14±0.27	19.13±0.54	88.65 (21±0.64)	56	28
25 % FPS+ 75 % CB	18.8±0.58	9.48±0.34	17.60±0.43	85.6 (20±0.24)	46	24
50 % FPS+ 50 % CB	20.9±0.74	9.88±0.37	16.50±0.37	67.0 (18±0.28)	37	19
75% FPS+ 25% CB	23.7±0.72	9.15±0.31	11.65±0.31	27.32 (13±0.33)	30	9
100 % FPS+ 0 % CB	27.6±0.89	9.35±0.22	7.35±0.21	-21.4 (10±0.22)	28	6
Control	10.3±0.25	10.98±0.15	14.0±0.55	27.5 (15±0.41)	35	16

increase or decrease in the total biomass given in Table 1 shows loss of 21.4% biomass with 100% FPS. The control setup which is of normal soil showed 27.5% increase in biomass of *L. mauritii*. The setup with CB mixtures exhibited increase and the total biomass was highest (158.6%) in the setup with 15% FPS and 85% corrugated cardboard. Number of cocoons and larvae were found abundant in 15% FPS feedstock treatment, whereas decreased gradually in other treatments (Table 1). The results revealed that FPS in combination with CB favours earthworm growth.

Development of earthworm culture in different medium has been studied by various researchers. Datar *et al.* (1997) observed that high percentage of moisture in soil is important for the high survival rate of earthworms. Hand *et al.* (1988) assessed the suitability of cow slurry with paper waste which provided results of greater earthworm growth and cocoon production. Neuhauser *et al.* (1980) used sewage instead of cow slurry for vermicomposting and reported higher growth of earthworm. Some worm grower claim that corrugated cardboard stimulates worm reproduction (Georg, 2004). Muthukumaravel *et al.* (2008) used cow dung and vegetable waste in different experiments for the growth of earthworms. Present study has been carried out for the first time by using fish pond sludge (FPS) in combination of corrugated cardboard. The preliminary observation showed earthworm (*L. mauritii*) encouraging growth rate and high survival rate. It may be suggested that FPS in combination of the CB can be utilized for earthworm culture which eventually can be used for soil treatment. However, it requires further studies focused in this direction before such setup is planned.

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