

BIO-FERTILIZER FORMATION THROUGH A WEED (WATER HYACINTH) USING VERMITECHNOLOGY AT KEETHAM LAKE, AGRA, (U.P.) INDIA

ATUL TIWARI

Department of Biotechnology,
Dr. M.P.S. Group of Institutions,
Dr. B.R. Ambedkar University,
AGRA (U.P.) INDIA

Received : 28.07.16; **Accepted** : 25.09.16

ABSTRACT

Water hydrinth weed is used to solve the problem of Keetham Lake, Vermicom post is used as biofertilizer.

Figure : 00

References : 03

Tables : 03

KEY WORDS : Agra, Biofertilizer, Keetham Lake.

Introduction

Water hyacinth is the major chronic problem of Keetham Lake in Agra district. Water hyacinth is an unwanted floating aquatic weed. Water hyacinth can be used as a Biofertilizer with the help of vermitechology. After drying process of water hyacinth, mixed with cow dung and use of earthworms for decomposition of residue.

After a constant time interval of 60 days, vermicompost was ready to use as a fertilizer. It is dark black colour and has a good amount of Organic matter (21.55%), Organic Carbon (12.5%), Nitrogen (21.55%), Megnesium (80.16ppm), Zinc (22.14 ppm), Phosphate and Potash in good quantity. These vermicompost used as an organic fertilizer in the field and increase fertility of soil and also solve the chronic problem of Keetham Lake.

Extended Summary

Water hyacinth³ is an unwanted free-floating aquatic herb and very commonly found in village and lake. Water hyacinth is a native of tropical America and introduced in 1884 in India. Water hyacinth grows in water and completes its cycle atleast a part in water.

Water hyacinth constitute a worldwide problem as they invade aquatic habitats used by man for irrigation, transportation, recreation, drinking and other public purposes. They also prevent fishing in island waters and they impede

the fish production by reducing the nutrients and oxygen supply. The recreational value of lakes tanks streams etc. is reduced as the water becomes dirty with an undesirable odour. Many lakes in the world's tropics are covered with such dense mats of hyacinth.

Aquatic weeds are still regarded by many people as a menace because they are not yet aware of the great potential and economic value of these profusely growing uncomfortable plants.

The Keetham Lake is fully covered with water hyacinth. Keetham Lake is situated in Sur Surovar wild life Sanctuary. The Sur Sarovar wild life Sancturary is a small wetland in central India, close to the city of Agra. It was primarily used as a reservoir for drinking water for the city of Agra during the hot summer season when the Yamuna river's water level falls very low. Many migratory birds come to this sanctuary in the months of Dec. to Feb.

During the winter season Keetham Lake is heavily infested with water hyacinth. Nearly 80-90% of the Lake is covered with weeds particularly water hyacinth. Water drawn through Agra canal comes to Sur Sarovar Sanctuary right from Okhla carrying water hyacinth along with it. Due to large amount of water hyacinth, the water level in Keetham decreases continuously due to process of *Siltation*. If water hyacinth wis used in making the vermncompost and green manure, this chronic problem of Keetham lake will be solved.

For the preparation of vermicompost from water hyacinth stepwise study was planned with following steps:

(a) Selection of site

The site chosen (Keetham Lake) for the preparation of vermicompost production is rich with water hyacinth.

(b) Material used

(i) Platform

The platform with dimension 3 feet wide and 8 feet long is required. The platform must be either of concrete or cemented.

(ii) Water hyacinth and Cow Dung

Dry water hyacinth and one week or more old cow dung is used for vermicompost.

(iii) Earthworm

Earthworms are cold-blooded and nocturnal animals, these live in the earth, hence called the earthworm. Approximate 40 species of earthworms are found in India¹.

Mostly *Accima fateda* is used in making vermicompost. These are reddish brown in color and 3-4 in long in size and 0.5 – 1.0 g in weight. They eat at least 90% organic matter and 10% soil. They mature in four week; one earthworm give 2-3 cocoon in one week and 3-4 eggs are present in one cocoon. Earthworm reproduces 250 young ones in six month.

Method for making vermicompost

- ❖ First the plants of water hyacinth were taken out from the pond, which is situated in the Keetham and spread on the ground in the direct sunlight to make it dry.
- ❖ A vermicompost bed was prepared by brick and concrete / cement. The beds were made in the places where the sunrays do not fall directly. Beds were covered with hut like structure of get proper shade.
- ❖ Dry water hyacinth and cow dung were put on platform in the ratio of 1:1.
- ❖ The vermicompost bed was covered with covering material like jute bags and water was sprinkled on it so as to ensure a optimum moisture conditions upto 30-40%. The water sprayed regularly at twice or thrice a day. This composition and moisture is best suited for survival of earthworms.

TABLE -1: Observation of water hyacinth weight.

S. No.	Date	Temp.	Weight of water hyacinth
1.	02.04.2003	35°C	10 Kg
2.	04.04.2003	35.2°C	2.500 Kg
3.	06.04.2003	35°C	1.200 Kg

Observation

The samples were collected after interval of 15 days in 60 days process and after testing the result were recorded in following head:

Drying process of water hyacinth in the presence of direct sunlight, the weight of water hyacinth decrease according to time.

After 4-6 days the weight of water hyacinth decreased from 10 kg to 1.2 Kg (Table-1)

50% dry water hyacinth mixed with 50% cow dung was put on the platform. After constant time interval the physical characteristics of composition is changed as follows:

- a) After 15 days, there is no change in no. of earth worm, but colour was changed into light due to decomposition status.
- b) After 30 days, the colour was dark brown and also earthworms slightly increase in number and decomposition starts.
- c) After 45 days, the colour do composition was light black and no. of earthworm was also increased largely, decomposition of composition was initiated and it was also going to convert into semi humus.
- d) After 60 days, the vermicompost had dark black colour and it was fully decomposed No. of earthworm was also increased.

Result

After 60 days, the vermicompost was fully decomposed. A chemical analysis of vermicompost (water hyacinth and dung) was made (Table 2). After 60 days of testing, the following nutrients were present in vermicompost:

Organic carbon 12.5%, organic matter 21.55%, Nitrogen 21.55% Phosphate and Potash

TABLE - 2 : Physical properties of vermicompost

S.No.	Physical Characteristics	Duration			
		15 days	30 days	45 days	60 days
1	Colour	Light brown	Dark brown	Light Black	Dark Black
2	Increase in no of Earthworms	No change	Slightly change	Large increase	Maximum Increase
3	Decomposition Status	Minimum change	Slight change	Semi change	Full decomposed

TABLE - 3 : Presence of Nutrients

S.No.	Nutrient	Amount
1.	pH	8.17
2.	Organic Carbon	12.5%
3.	Organic matter	21.55%
4.	Nitrogen	2.155%
5.	Magnesium	80.16 ppm
6.	Zinc	22.14 ppm

in good quantity (Table-3).

Discussion

The water hyacinth is one of the great

problems for aquatic life and water available for drinking. The BOD of the water is very much affected through these weeds. So water hyacinth can be removed and used in manufacture of vermicompost with the help of cow dung and earthworms. It has been found that water hyacinth is very good for manufacture of vermicompost. It has good amount of organic carbon (12.5%), organic matter (21.55%), Nitrogen (2.155%), Magnesium (80.16ppm), Zinc (22.14 ppm), Phosphate and Potash in good quantity.

Organic matter contributes increase in fertility or productivity of soil through its positive effect on the chemical, physical and biological properties of the soil. Water holding capacity (WHC) is also increased by the application of organic matter. Nitrogen increases the vegetative growth protein content in food and field crops. Potassium also stimulated the root formation of plants.

At last we can say that aquatic weed (W.H.) used in vermicompost solve the chronic problem of Keetham Lake and ponds in the area.

References

1. RADHA, D. AND KALE (1998) "Earthworm – Cinderella of Organic Farming".
2. SHARMA, A.K. (2004) A hand book of Organic Farming, Agrobios, Jodhpur, p 193.
3. SUBRAMANIAM, S., MOHAMED, A. AND KUMAR, R. JAYA (1991) "All About Weed Control", Kalyani Publication, New Delhi. p. 238.