

# Potential use of *Parthenium* (*Parthenium hysterophorus* L.) as compost

R. D. Chitale\* and B. S. Mali

*P. G. Research Centre, Department of Botany  
Tuljaram Chaturchand College of Arts, Science and Commerce,  
Baramati 413 102 Dist. Pune (M.S.) India*

(Received 19 July, 2019; accepted 7 September, 2019)

## ABSTRACT

*Parthenium hysterophorus* L., being a declared invasive weed is threatening the biodiversity and human health in several areas of India. Several researchers have documented the allelopathic effect of this weed. Therefore, *Parthenium* management would remain a great concern of the century. However, several studies proposed that *Parthenium* can be used as a green manure, compost, soil ameliorate that may improve physical, chemical and biological properties of the soils and is a source of readily available plant nutrients. To assess the manurial value of *Parthenium* and its composting value, a composting experiment was conducted and compared with other organic wastes. Appreciable quantity of nutrients in *Parthenium* can be utilized to nourish the crops after composting. Hence besides burning or destroying *Parthenium*, it's a better way of eradicating is through exploit utilization for better crop production.

**Key words:** Compost, FYM, *Parthenium*.

## Introduction

Congress grass (*Parthenium hysterophorus* L.) is an exotic weed comes under Asteraceae family, accidentally introduced in India, in 1955 in Pune through the imported foodgrains (Dhawan and Dhawan, 1996). It has become naturalized and is spreading at an alarming rate all over India (Sivakumar *et al.*, 2009) and can adopt any climate very easily. It is one of the ten feared noxious weed species in the world. It is a defamed plant in view of its toxic and allergic properties, since it causes health problems to man and domestic animals (Sivakumar *et al.*, 2009). It is harmful to all the living beings; it has nearly destroyed all the useful crops and plants, growing near to it. It is known to cause asthma, bronchitis, dermatitis, and hayfever in man and livestock (Narasimhan *et al.*, 1977). At present it is one of the

most troublesome and obnoxious weed of wasteland, forest, pasture, agricultural lands in India and spreading rapidly in India (Bakthavathsalam and Geetha, 2004). Several attempts have been made for its prevention, eradication and control, but to date without success (Kavita and Nagendra, 2000) and hence attracting the attention of all. The economic use is impaired by its toxic effect that is why the composting from rich nutrient content of *Parthenium* plant might be a useful alternative to be used as a soil conditioner. The *Parthenium* compost contains two times more nitrogen, phosphorus and potassium than Farm Yard Manure (FYM) (Channappagoudar, 2007; Angiras, 2008). In spite of enough quantity of various essential macro and micro plant nutrients, composting of *Parthenium* is not practiced by farmers.

Composting cannot be considered a new technol-

\*Corresponding author's email: rd.chitale@gmail.com

ogy, but amongst the waste management strategies it is gaining interest as a suitable option for manures with economic and environmental profit (Kishor *et al.*, 2010). Hence in present work we tried to use huge amount of locally available *Parthenium* as a source of composting to make it suitable for agriculture and tried for a better way of eradicating it by utilizing for better crop production.

## Materials and Methods

To assess the manorial value of *Parthenium* and its composting value, a composting experiment was conducted. The organic wastes tried were *Parthenium*, wheat straw and sugarcane trash. Composite culture consisting of *Trichoderma viride* was used as inoculants for hastening the process of composting.

The unflowered plants of *Parthenium hysterophorus* were uprooted from road side near to college campus of Tuljaram Chaturchand College, Baramati (M.S.) India.

Wheat straw was collected from nearby field while sugarcane trash was taken from nearby sugarcane juice centre. *Trichoderma viride* cultures were prepared in our Department.

The heap method of composting was used for compost preparation. The pit of size 1m × 2m × 0.75m was prepared in Botanical Garden of our College. The modified protocol from Patil and Jadhav (2008) was used. Firstly the wastes were chopped into bits of about 10cm length. One layer of the waste was spread above which the inoculum was spread. The organic waste was spread and the process of layering was repeated till a minimum of 1 m height was reached. Water was sprinkled in the stacking process to maintain 60 per cent moisture. The heaps were kept under semi aerobic condition and plastered with paste of wheat straw, dung and soil (1:1:10 kg) at the top. After one month, a turning was given and the moisture content maintained. In about 45 to 50 days, good quality compost was obtained.

For the assessment of the manorial value of *Parthenium* and its composting value the (100-200 g) taken and collected in plastic bag. The sample then analysed for organic carbon, total N, P and K percentage in Krishi Vidyan Kendra, Baramati. Organic carbon content was determined by wet oxidation method (Walkley and Black, 1934). Nitrogen, Phosphorus and Potassium content were analyzed by using the method of Toth *et al.* (1948).

## Results and Discussion

The compost from *Parthenium* showed higher N, P and K percentage when compared to farm yard manure (FYM) values. The calculated manorial value is shown in Table 1.

The inorganic nutrients in *Parthenium* plants exhibited its significance of its utilization as compost in agriculture. The total N, P and K content of *Parthenium* compost was higher than farm yard manure. Similar result was also observed by Gupta *et al.*, 1986; Biradar *et al.*, 2006; Channappagoudar, 2007; Angiras, 2008 and Kishor *et al.*, 2010.

The Organic Carbon content was also found to be higher when compared with that of farm yard manure. A similar result was also reported by Sivakumar *et al.*, 2009.

Beside burning or destruction of this agricultural waste the composting of *Parthenium* serves for a dual purpose of eradication of the weed as well as for a better utilization as compost for better crop production and can be a good source of employment and income for villagers.

## Conclusion

*Parthenium hysterophorus* L., a perennial weed commonly called as carrot weed, congress grass, etc. and one of the ten feared noxious weed species in the world. It is considered as extremely prolific weed and worst in crop cultivation. It is harmful to all the living beings; it has nearly destroyed all the useful crops and plants, growing near to it. It is known to cause asthma, bronchitis, dermatitis, and hay fever

**Table 1.** Manorial value of FYM and *Parthenium* compost

Types of organic manure	Nitrogen (%)	Phosphorus (%)	Potassium (%)	Organic Carbon (%)
Compost from <i>Parthenium</i>	1.05	0.84	1.11	12.68
FYM	0.5	0.2	0.5	3-5

in man and livestock. Besides damaging properties it can be used in favour of human beings. The *Parthenium* has medicinal value viz. Homeopathic, Allopathic and some traditional. As a weed crop it has a property to absorb more and more nutrients from the soil and hence, it is rich in nutrients. Up-rooting of the plant in early stage, i.e. before flowering from field and burning it in soil produce superior quality organic manure.

## References

- Angiras, N.N. 2008. *International Parthenium Research News [IPRN]* Vol. 1 No. 5
- Bakthavathsalam, R. and Geetha, T. 2004. Reproductive influence of the earthworm, *Lampitoma auritii* cultured in different media of paddy chaff and weed plants materials. *Environment & Ecology*. 22 (3) : 574-578.
- Biradar, D.P., Shivakumar, K.S., Prakash, S.S. and Pujar, T. 2006. Bionutrient potentiality of *Parthenium hysterophorus* and its utility of green manure in rice ecosystem. *Karnataka J. of Agri. Sci.* 19 : 256-263.
- Channappagoudar, B.B., Biradar, N.R., Patil, J.B. and Gasimani, C.A. 2007. Utilization of weed biomass as an organic source in sorghum. *Karnataka J. Agric. Sci.* 20 (2) : 245-248.
- Dhawan, S.R. and Dhawan, P. 1996. Regeneration in *Parthenium hysterophorus* L. *World Weeds*. 2 : 244-249.
- Gupta, A.P., Antil, R.S. and Gupta, V.K. 1986. Effect of pressmud and zinc on the yield and uptake of zinc and nitrogen by corn. *J. Indian Soc. Soil Sci.* 34 : 810-814.
- Kavita, G. and Nagendra, B. 2000. Effect of vermicompost of *Parthenium* on two cultivars of wheat. *Ind. J. Ecol.* 27 : 177-180.
- Kishor, P., Maurya, B.R. and Ghosh, A.K. 2010. Use of uprooted *Parthenium* before flowering as compost: A way to reduce its hazards worldwide. *International J. Soil Sci.* 5 (2) : 73-81.
- Narasimhan, T.R., Ananth, M., Naryanaswamy, M., Rajendra Babu, M., Mangala, A., Subba Rao, P. V. 1977. Toxicity of *Parthenium hysterophorus* L. *Curr Sci.* 46: 15-16.
- Patil, M. and Jadhav, J.K. 2008. *Parthenium* and its uses. Part 5: Agro-one newspaper. Dt. 5-8-2008.
- Sivakumar, S., Kasthuri, H., Prabha, D., Senthilkumar, P., Subbhuraam, C. V. and Song, Y. C. 2009. Efficiency of composting *Parthenium* plant and Neem leaves in the presence and absence of an oligochaete. *Eisenia fetida*. *Iran. J. Environ. Health. Sci. Eng.* 6 (3) : 201-208.
- Toth, S.J., Prince, A.T., Wallace, A. and Mikkelsen, D.S. 1948. Rapid quantitative determination of eight minerals in plant tissue by systematic procedure involving use of a flame photometer. *Soil Sci.* 66 : 459-466.
- Walkley, A.G. and Black, I.A. 1934. An examination of Degtjareff method for determining soil organic matter and a proposed modification of the chromic acid titration method. *Soil Sci.* 37 : 29-37.