

## COMPOST MAKING FROM PARTHENIUM

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As a weed crop it has a property to absorb more and more nutrients from the soil and hence, it is rich in nutrients. The term weed is applied to any plants that grow and reproduce aggressively and invasively and it competes with crop plants for light, air, moisture and nutrients. Presence of weeds is a constraint and the effect is further accentuated by their improper management. *Parthenium hysterophorus*, 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, even though growing near to it. It is known to cause asthma, bronchitis, dermatitis, and hay fever in man and livestock. However, the plant has positive qualities. The *Parthenium* has medicinal value viz. Homeopathic, Allopathic and some traditional. It is important to find alternative weed management techniques or some eco-friendly technologies so as to minimize loss in crop production and least disturbance to the ecosystem. Composting effectively reduces the viability of the weeds and it also allows the safe reuse of the nutrients and organic matter available in the weed material. Compost of *Parthenium* weed has been made with good results. But a concern is also associated with it and that is the effectiveness of the method in destroying weed seeds, while preparing compost.

### Introduction

For management of the disease crop rotation, deep ploughing, burning of stubbles and removal of volunteer can be followed. Protective fungicides like mancozeb are applied in moderate attack while in severe attack metalaxyl (0.2%) foliar spray can be adopted. Systemic fungicide has residual problems so reliance on them is harmful. In other hand case of phytotoxicity and reduced germination is also reported from seed treatment with metalaxyl under Rajasthan conditions. Weeds have always been a problem in annual and perennial cultivation and in developing countries about 25% of the yield is lost to weed competition (Akobundu, 1987).



**Parthenium hysterophorus plant**

Agricultural practices keep the successional stages of a plant community in its early stages (Altieri, 1995). They are also species that are best suited to survive and proliferate in the fields where we choose to grow a specific crop and interfere with our interests. If we do not remove them they usually compete very well and reduce the yield of our crops (Altieri, 1995). Congress grass (*Parthenium hysterophorus* L.) is an exotic weed comes under Asteraceae family, accidentally introduced in India, 1955 in Pune through the imported food grains (Dhawan and Dhawan, 1996). It has become naturalized and is spreading at an alarming rate all over India (kumar et al., 2009) and can adopt any climate very easily. It is commonly called as Congress grass, White top, Carrot weed in India, while it popularly called as Gajar ghas due to its carrot plant like appearance. 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 hysterophorus* compost contains two times more nitrogen, phosphorus and potassium than Farm Yard Manure (FYM) (Channappagoudar, 2007). 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 technology, but amongst the waste management strategies it is gaining interest as a suitable option for manures with economic and environments 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.

### **How *Parthenium* Spreads?**

*Parthenium hysterophorus* L. is spreading very fastly in grass land and has become an obnoxious. It mainly spreads through its seeds. The weed has the potential of producing as high as 154000 seeds/m<sup>2</sup> and a single plant can produce about 15000 - 25000 seeds. The seeds are very light in weight and easily carried or transported by wind, water or through various human activities.



***Parthenium hvsteronphorus* flower**

*Parthenium* has the capacity to grow again from the cut or broken parts. Its allelopathic effects coupled with the absence of natural enemies like insects and diseases are two important factors responsible for its rapid spread in India

**Harmful Effect of *Parthenium*:**-*Parthenium* has serious threaten effect on human beings and livestock. It is considered as greatest cause of dermatitis, asthma, nasal-dermal, nasal-bronchial disease. In general it is poisonous, allergic weed which reduces the aesthetic value of gardens and parks. Pollen of *Parthenium* spread through air causes greater



loss in the cattle yield and gives bitter taste to the milk of cattle.

### **Advantages of *Parthenium***

*Parthenium* can be used for several purposes like anti-feedant, anti-repellent and phago-stimulant for insects; for preparation of biogas, paper and composite *etc.* By application of *Parthenium* as a compost it becomes eco-friendly for human beings as well as for standing crop and grazing animals. Another major objective is it minimizes the utilization of chemical fertilizers which has bad impact on soil texture and pollute our whole biosphere. It increases the agricultural productive yield in comparison to other chemical fertilizer and minimizes the water requirement to the crop due to enormous power of water holding capacity.

### **Utilization of *Parthenium* to Make Compost**

*Parthenium* can be most effectively used in compost making. The compost should only be prepared by pit method. In NADEP method (where compost is made over the ground in structure made of bricks) or open pit or heap methods, seeds of *Parthenium* are not killed. If such compost is used in crops, it will add thousands of seeds of *Parthenium*. To overcome the shortcomings of NADEP method, *Parthenium* compost should be prepared by pit method developed by Directorate of Weed Research. By this method, good quality compost devoid of *Parthenium* seeds is prepared. In this anaerobic method, seeds are completely killed due to rising of high temperature inside the pit.

### **Method to Make Compost from *Parthenium***

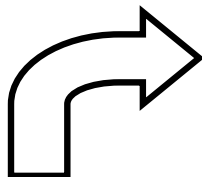
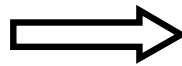
It is always recommended to collect the *Parthenium* biomass before flowering for making compost by pit method. But it is not practically possible to collect only flowerless plants as all the stages of *Parthenium* are available at any time due to non-dormancy of seeds which may germinate on the availability of water. Therefore farmers are bound to uproot plants of every stage of *Parthenium* during weeding in their fields. Following procedure can be followed for making *Parthenium* compost:

- Make a pit of 3 × 6 × 10 feet (depth × width × length) at a place where water does not stagnant. Pit size can be altered but depth cannot be altered. Pit site is very important while preparing the compost from *Parthenium* weed that is it should be elevated place so that runoff water should not pours in the pit.
- Cover the side wall and surface of pit with stone chips to stop the leaching of essential nutrients of compost to the soil surface.
- If stone chips are not available make soil surface compact to reduce pore size of soil surface of pit surface.
- Arrange about 100 kg dung, 10 kg urea or rock phosphate, soil (1-2 qtl) and one drum of water near the pit.
- The entire collected *Parthenium* weed from such field was spreaded around 50 kg on the bed of pit.
- Over this, sprinkle 500 g urea or 3 kg rock phosphate.



- If possible add *Trichoderma viridi* or *Trichoderma harziana* (kind of fungi cultured powder) 50 g per layer.
- The entire above constituent will make one layer.
- Like this one layer, make several layers till the pits is completely filled up to one feet above of ground surface in dome shaped.
- While making layers, apply pressure by feet to make weed biomass compact.
- If there is no soil with *Pathenium* roots, then add 10-12 kg of loamy soil on each layer.
- When pit is full with above layers, then cover it with cow dung, soil and husk.
- After 4-5 months we can get well decomposed compost.

We can get 37-45 kg of compost from 100 kg of green quintals of *Pathenium* biomass



### Compost preparation by pit method

## Enrichment of Compost

When we obtained decomposed compost from pit then we find several stem that gives impression of un-decomposed *Pathenium* plant but they are completely decomposed. Allow to dry compost in shady and dry places during such process wet compost become dry and crumpled. If *Pathenium* stems are present then beat them with stick to convert them into tiny pieces. Sieve that compost with 2 × 2 mesh size. Generally weed compost is poor in phosphorous content (0.4 - 0.8) addition of phosphate makes the compost more balanced and other aspect is that it supplies nutrients to the microorganism for their multiplication so makes faster decomposition of organic waste and reduces the nitrogen loss of compost. Addition of PSB, nitrogen fixer quality of compost is further improved by the secondary inoculants of the Azotobactor, Azospirillum, Lipoferum, Pseudomonas species in the form of water suspension or in the form of culture broath of bio-fertilizers product can be sprinkled when weed is completely decomposed (Chauhan and Joshi, 2010). For commercialization make packets for kitchen garden and agricultural purpose.

## Nutrient Composition of *Pathenium*

The *Pathenium* compost two times more nitrogen, phosphorous and Potassium than FYM (Farm yard manure) compost is one of the fastest and effective ways to recycle these organic material in which the organic waste can be stabilized into compost. High concentration of macro and micro nutrients such as N, P, K, Fe, Mn, Cu and Zn in composted *Pathenium* may increase crop yields.

**Table: Showing nutrient composition of different bio-fertilizer**

Type of bio-fertilizer	N%	P%	K%	Ca%	Mg%
Pathenium compost	1.05	0.84	1.12	1.00	0.55
Vermi compost	1.61	0.69	1.31	0.64	0.43
FarmYard Manure	0.45	0.30	0.54	0.60	0.29

**Source:** Directorate of weed research (Kumar *et al.*, 2005)

## Precautions

- Pit should be in open and shady upland.
- Cover the pit with mixture of soil, dung and husk.
- Check the moisture level in compost. If there is dryness in the pit. Make a few holes and pour water to the pit and close the poles.
- If you find fresh germination of *Pathenium* near the pit where weeds are collected to fill up the pit, destroy them otherwise they may contaminate the compost after flowering.
- During the process the temperature up to 60-70 °C due to which seeds are killed.
- While it may take about four to five months to prepare the compost in warm climate. In cold region it takes more time.

## Amount for Use

During basal dressing of the field:

- In crops apply 2.5-3.0 t/ha.
- In vegetables crops apply 4-5 t/ha.

## Conclusion

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 good source of employment and income for villagers.

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