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From Pest to Prosperity: An Eco-Friendly Technology for Turning Parthenium Trash into Treasure

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Abstract
Parthenium hysterophorus (L). is an internationally important invasive annual weed which become notorious in the eyes of public due to its numerous negative effects. Parthenium presents significant challenges in both cropped and non-cropped areas due to its opulent growth, tendency and capacity to compete with valuable plants. This weed has been linked to many health issues like dermatitis and respiratory allergy and it has allelopathy effects (toxin-parthenin) which causes a considerable reduction in crop output. *Parthenium hysterophorus* has fresh biomass about 5-20 kg/m^2 and 35 million land is infested by it. As a result, parthenium management would continue to be a major issue for the country. A significant amount of agricultural production losses can be attributed to parthenium, and regular application of synthetic chemical fertilizers exacerbates soil problems. One appropriate and affordable way to replenish soil nutrients could be through parthenium composting. Several studies suggested that parthenium can be utilized as compost, green manure, and a soil ameliorant to potentially enhance physical, biological, and chemical characteristics, by providing two times more easily accessible plant nutrients than farm yard manure. Farmers are worried that applying compost derived from biomass produced from Parthenium may cause additional weed germination in their crops, but scientifically prepared compost is balanced biofertilizer which is safe and beneficial to crop productivity and soil health. The effect of Parthenium compost is later but better. A better way of reducing parthenium's negative effects is to turn waste into wealth by turning it into compost.

Key words: Biomass, Compost, Plant Nutrients, Parthenium, Parthenin.

Introduction
Parthenium hysterophorus is a flowering plant from the family Asteraceae. It is indigenous to the American tropics. It is also known as carrot weed, congress grass in India. Because of its resemblance to a carrot plant, it is also known as "gajar ghas". In 1954, public law 480 was passed to provide food grains to developing countries in order to eliminate starvation and malnutrition. Through this law india also imported wheat from USA (1950's). It is believed that parthenium also imported in India along with wheat as contaminants (Dhawan1996). After this, It extensively expanded across India. Parthenium first became noticeable in Pune, Maharashtra, in 1956, and since then, it has spread across India like wildfire. One of the noxious weeds currently found in India's wastelands, forests, grasslands, and agricultural areas is *Parthenium hysterophorus* (L). which is spreading quickly throughout the country (Bakthavathsalam et al 2004). *Parthenium hysterophorus* (L). is an internationally important invasive which become notorious in the eyes of public due to its numerous negative effects. Parthenium presents significant challenges in both cropped and non-cropped areas due to its

opulent growth, tendency and capacity to compete with valuable plants. Now more than 35 Mha land is infested with this weed. This weed's biological characteristics include a brief life cycle (4-6 weeks), intense flowering that continues until senescence, high seed production (10,000–100,000 seeds/plant), low seed weight, resistance to environmental stress during dormancy, and an impressive capacity for regeneration. This weed has been linked to many health issues like dermatitis and respiratory allergy and it has allelopathy effects (toxin-parthenin) which causes a considerable reduction in crop output. But still parthenium have some potential. The positive effect of parthenium is neglected due to numerous bad effect. It has been successfully converted into biochar, which enhances the quality of the soil by raising carbon from microbial biomass and basal respiration, raising the activities of dehydrogenase and catalase, and lowering the stress caused by soil erosion and hydrolytic enzyme activity. After the era of green revulation we are increasing the use of chemical fertilizer day by day which decrease the fertility gradually. Therefore bio fertilizer is boon for soil health. parthenium has a fresh biomass of 5-20kg/m2.by the use of that fresh biomass biofertilizer is made. It actually increase the productivity of land by weeding out as well as increase the income when it is sell in market as compost. This article aims to examine the challenges posed by P. hysterophorus as a weed and identify potential solutions.

"Unraveling Parthenium's Seed Secrets: A Silent Invasion"

Parthenium is a difficult and aggressive weed that poses major risks to people and livestock due to its resilient nature and ability to disperse seeds. It is spreads through its light weighted seeds. It has ability of produce 1.54lakh seeds/m2 and a plant has potential to produce 15000-25000 seeds. **A Light and Wind-Borne Journey of parthenium completes through wind,water and human activities.** Parthenium can regenerate from a cut and broken part. this ability and absence of natural enimies further facilates parthenium in india.

"Health Hazards and Ecological Threats: A Weed with Deadly Consequences"

Parthenium is harmful to everything from allergies to aesthetics because of its invasiveness, aggressive growth and spread, competition with other crops, livestock toxicity, and impact on soil health. This weed has been linked to many health issues like dermatitis and respiratory allergy and it has allelopathy effects (toxin- parthenin) which causes a considerable reduction in crop output. The reason behind the un masking effect of parthenium is **Sesquiterpene lactones, which are toxins found in all parts of the plant, including pollen and trichomes (SQL). Parthenin, a major sesquiterpene lactone, is a bitter glycoside found in P. hysterophorus. The major culprits behind the menacing role of parthenium is parthenin, ambrosin and hymenin.in addition to its negative effects, it also leads to a number of other issues, such as blocking of public spaces and diminishing the aesthetic value of parks, gardens, and residential neighbourhoods.**

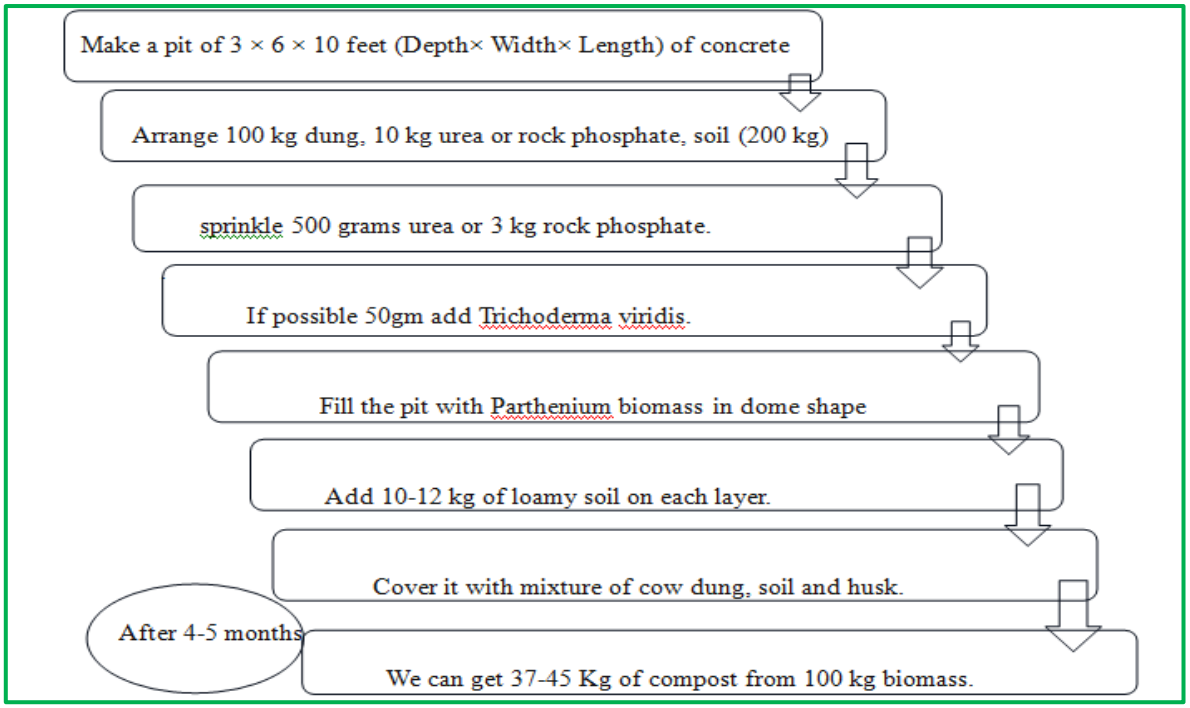
From Weeds to Woes: issues with the taming of invader

Parthenium's quick growth, resilience, and seed dispersal mechanisms make it difficult to control and manage infestations. But one can partially managed parthenium by physically, mechanically, biologically and chemically. However, some researchers hypothesized that in order to achieve effective management, integrated and ongoing efforts may be necessary as traditional control methods may not be sufficient. Here comes the potentiality of parthenium compost.

"From Weed to Resource: Towards Sustainable Parthenium Control

Making compost is a suitable and sustainable way to manage parthenium. Trouble can be turned into treasure with this environmentally friendly solution that promotes harmony in the environment.

Composting process



Precaution

- Pit should be in open and shady upland.
- If you find fresh germination of Parthenium near the pit where weed was collected to fill up the pit, destroy them otherwise they may contaminate the compost after flowering.
- Check the moisture level of compost. If there is dryness in the pit, make a few holes and pour water in the pit and close the holes.

Farmers Fear

Farmers think if they use compost made by parthenium biomass, there will be more germination of this weed in their fields. If parthenium compost made with flowered parthenium by NADEP or open pit or heap method contained more numbers of viable seeds of parthenium. Compost made by scientific way is safe and does not have viable seeds hence good for soil health and crop productivity. According to the various scientist Best method for parthenium composting is Conventional Sunken pits with aerobic condition.

Benefits

The effect of parthenium compost is later but better. Compost made of parthenium is a kind of biofertilizer that is safe for the environment, people, and crops. Compared to other manure, parthenium compost is a balanced biofertilizer that contains higher levels of phosphorus, potassium, and nitrogen. It also contains a few vital micronutrients. the application of parthenium compost in agricultural fields can enhance soil fertility and is a cost-effective, environmentally friendly form of biofertilizer. Different studies indicate that compared to farm yard manure, parthenium compost offers twice as many readily accessible plant nutrients.

Types	N%	P%	K%	Ca%	Mg%
Parthenium compost	1.05	0.84	1.11	0.90	0.55
Farm Yard Manure	0.45	0.30	0.50	0.59	0.28

"Promoting Parthenium Composting: Government Awareness Initiatives"

In order to promote parthenium composting as a sustainable method of waste management, governments have passed laws and regulations. Strict guidelines on the disposal of parthenium through conventional means, subsidies for composting facilities, and incentives for farmers and communities involved in composting are a few examples of these measures.

Conclusion

Parthenium is a hidden treasure.it has a great potential but its potentiality is masked by its numerous bad effect. Keeping the potentiality of parthenium in mind go for parthenium composting. Be the part of solution not the pollution for our next generation. A better way of reducing parthenium's negative effects is to turn waste into best by turning it into compost.In conclusion, the invasive *Parthenium hysterophorus* presents a myriad of challenges, ranging from health hazards to ecological threats and agricultural productivity losses. However, recognizing its hidden potential, there is a promising solution in the form of parthenium composting. This eco-friendly technology transforms the weed from a pest into a valuable resource for sustainable agriculture.

The composting process, especially through scientifically proven methods like Conventional Sunken pits with aerobic conditions, offers a safe and efficient way to manage parthenium biomass. Contrary to farmers' concerns, when done correctly, parthenium compost is a balanced biofertilizer that enhances soil health and crop productivity. Studies indicate that it provides twice the readily accessible plant nutrients compared to traditional farm yard manure.

Despite initial skepticism among farmers, government initiatives aimed at promoting parthenium composting through strict regulations, subsidies, and incentives highlight its importance in waste management. The composting approach not only addresses the challenges posed by parthenium but also contributes to environmental sustainability and the overall well-being of both agriculture and society.

In essence, turning the trouble of parthenium into treasure through composting is a step toward a greener and more prosperous future. By understanding and harnessing the potential of parthenium, we can mitigate its negative impacts and contribute to a healthier ecosystem for generations to come.

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