

Extended Abstract

Track: SE (Sustainable Environment, Bio-innovations for Climate Action)

Insights into the biodegradation of *Parthenium hysterophorus* into a value added product through in-vessel composting technique

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Parthenium hysterophorus is an invasive plant that belongs to the Asteraceae family and is considered as one of the world's most devastating weeds (Bajwa et al. 2016). Various physical and reproductive features of this plant, such as smaller seed size, faster production rate, improved regeneration potential, and ecological endurance, lead to its invasiveness in diverse environments (Saini et al. 2014). It is an invasive noxious herbaceous plant with no economic use. The current study examined the biodegradation of this weed employing an in-vessel composting approach (Rotary drum composter) to get a value added product. The initial characterization of the substrate, inoculum and sawdust are illustrated in Table 1. The results of the study is as follows:

1. The thermophilic breakdown phase in the composter lasted until the eighth day of the composting process, when it reached its peak. The temperature profile is illustrated in Fig. 1.
2. The nutritional content, such as Total Kjeldahl Nitrogen (TKN), Total Phosphorus (TP), and Total potassium, were increased by 37, 40, and 50.1 percent, respectively and are depicted in Fig. 1.
3. The composter was effective in reducing the biochemical content, such as lignin, hemicellulose, and cellulose, in the final compost by 43.5, 50.7, and 57.3 percent, respectively.

As a result, the study's findings demonstrated that composting *P. hysterophorus* can yield a nutrient-rich compost product that might be employed as a soil conditioner in agricultural applications.

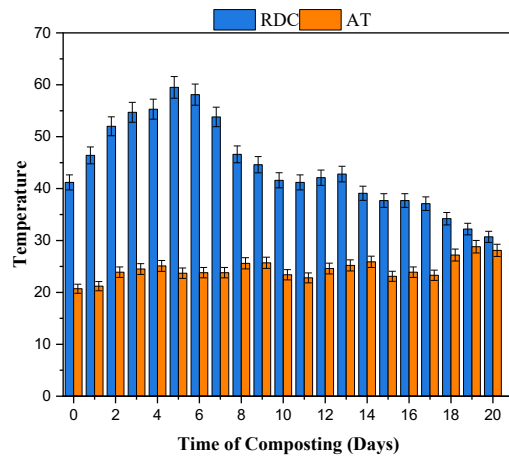
More results will be presented in the full length paper.

References

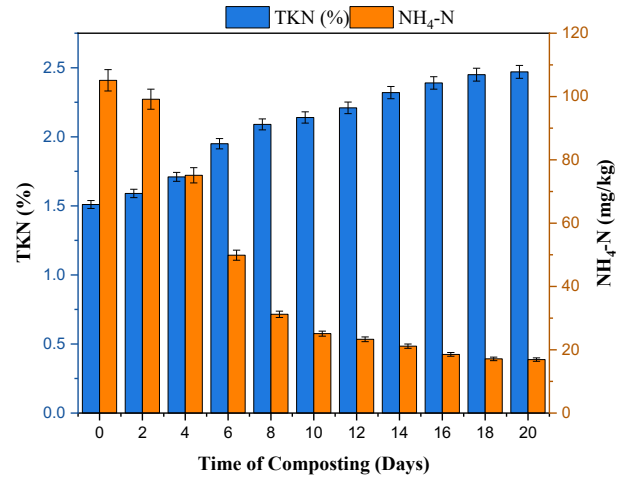
- Saini A, Aggarwal NK, Sharma A, et al (2014) Utility Potential of *Parthenium hysterophorus* for Its Strategic Management. Adv Agric 2014:1–16. <https://doi.org/10.1155/2014/381859>
- Bajwa AA, Chauhan BS, Farooq M, et al (2016) What do we really know about alien plant invasion? A review of the invasion mechanism of one of the world's worst weeds. Planta 244:39–57. <https://doi.org/10.1007/s00425-016-2510-x>

Table 1. Initial characterization of substrate, inoculum and saw dust

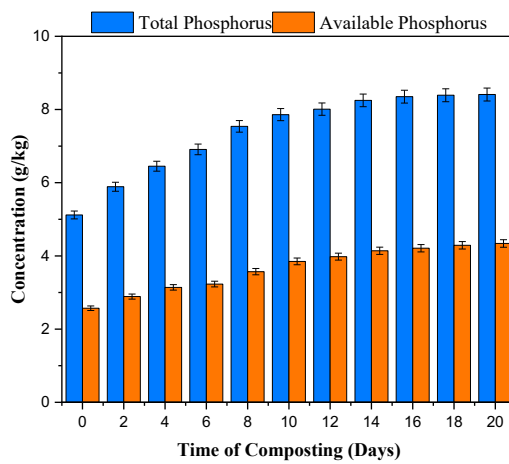
Initial Characterization		<i>P. hystrophorus</i>	Cow dung	Saw dust
sBOD (mg/L)		786 ± 21	132 ± 12	252 ± 19
sCOD (mg/L)		3113 ± 43	543 ± 29	498 ± 31
pH		5.98 ± 0.12	6.9 ± 0.4	6.03 ± 0.2
EC (dS/m)		6.5 ± 0.27	4.1 ± 0.03	0.9 ± 0.01
Moisture content (%)		71.3 ± 2.12	82.1 ± 2.56	12.5 ± 1.76
% Volatile Solids		74.2 ± 4.2	81.4 ± 3.45	83.2 ± 4.61
Ash Content		25.8 ± 1.21	18.6 ± 2.09	16.8 ± 3.15
% TOC		41.2 ± 4.76	45.2 ± 2.33	46.2 ± 3.67
% TN		1.22 ± 0.09	1.49 ± 0.07	0.34 ± 0.01
TP (g/kg)		4.03 ± 0.79	4.56 ± 0.28	1.98 ± 0.09
AP (g/kg)		1.3 ± 0.2	2.89 ± 0.32	0.98 ± 0.02
C/N Ratio		33.7 ± 2.03	30.3 ± 1.54	135.8 ± 12.76
Na ⁺ (g/kg)		2.1 ± 0.33	1.67 ± 0.52	2.48 ± 0.89
K ⁺ (g/kg)		23.2 ± 3.33	0.43 ± 0.01	0.83 ± 0.08
Ca ²⁺ (g/kg)		4.67 ± 1.51	2.46 ± 0.77	8.12 ± 2.65
Lignin	Acid Insoluble	15.21%		
	Lignin (%)			
	Acid Soluble	3.97%		
	Lignin (%)			
Cellulose (%)		34.6%		
Hemicellulose (%)		30.3%		



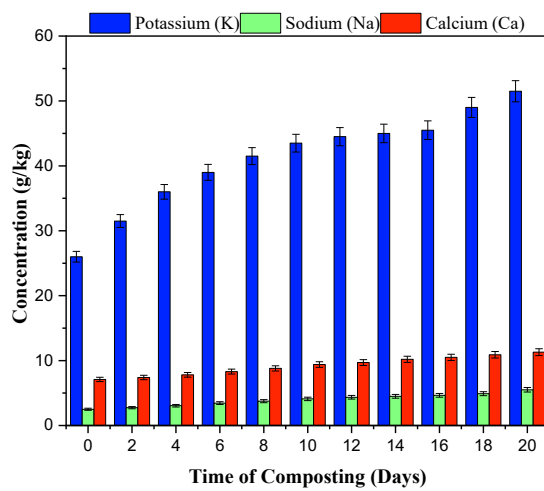
(a) Temperature Profile



(b) Nitrogen profile



(c) Phosphorous profile



(d) Macronutrients profile

Fig. 1. Temperature and Nutritional profile during the composting of *P. hysterophorus*