Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

J P P Journal of Pharmacognosy and Phytochemistry

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2015; 4(2): 199-201
Received: 01-05-2015
Accepted: 03-06-2015

Rabia Badar
Associate Professor, Department of Botany, Jinnah University for Women, Nazimabad, Karachi-74600, Pakistan

Tahreem Zamir
BS III Student, Department of Botany, Jinnah University for Women, Nazimabad, Karachi-74600, Pakistan

Bisma Batool
BS Final Student, Department of Botany, Jinnah University for Women, Nazimabad, Karachi-74600, Pakistan

Nida Yaseen
BS III Student, Department of Botany, Jinnah University for Women, Nazimabad, Karachi-74600, Pakistan.

Maria Kaleem
BS III Student, Department of Botany, Jinnah University for Women, Nazimabad, Karachi-74600, Pakistan

Wajiha Mushtaque
BSIII Student, Department of Botany, Jinnah University for Women, Nazimabad, Karachi-74600, Pakistan.

Hina Khurshid
BSIII Student, Department of Botany, Jinnah University for Women, Nazimabad, Karachi-74600, Pakistan.

Harmain Khalid
BSIII Student, Department of Botany, Jinnah University for Women, Nazimabad, Karachi-74600, Pakistan.

Syeda Sadaf Altaf
BSIII Student, Department of Botany, Jinnah University for Women, Nazimabad, Karachi-74600, Pakistan.

Anum Hasan
BSIII Student, Department of Botany, Jinnah University for Women, Nazimabad, Karachi-74600, Pakistan.

Correspondence:
Rabia Badar
Associate Professor, Department of Botany, Jinnah University for Women, Nazimabad, Karachi-74600, Pakistan.

Comparative effects of composted and uncomposted Organic wastes on Chickpea growth

Rabia Badar, Tahreem Zamir, Bisma Batool, Nida Yaseen, Maria Kaleem, Wajiha Mushtaque, Hina Khurshid, Harmain Khalid, Syeda Sadaf Altaf, Anum Hasan

Abstract
Organic matter serves as a very significant source of plant nutrients. Intensively misused soils want an exterior resource of stabilized organic matter, such as compost, in order to counteract progressive soil organic matter deterioration. The present study demonstrated the effects of composted and uncomposted organic wastes on growth of chickpea plants. Peanut shells and saw dust were used as organic wastes as treatments at the rate of 10tons/ha. All treatments were promoted the physical and biochemical parameters of experimental plants. Composted organic materials enhanced more growth as compared to uncomposted materials. Organic soil amendments can improve soil fertility and plants growth.

Keywords: Soil fertility, Organic wastes, Compost, Growth, Chickpea

1. Introduction
Damage of soil quality is associated to soil organic matter depletion that is amplified by constant cropping without rotations, regular soil tillage and huge use of both inorganic chemical fertilizers and non-selective pesticides [1]. Soil compost alterations contribute to the common soil quality recovery and enhancement of plant growing conditions [2]. By providing several ecosystem services, including restoration of soil carbon stocks, intensification of microbial activity and biodiversity and renovation of plant nutrition and natural soil suppressiveness [3].
The use of composted organic waste as fertilizer and soil modification not only results in an economic value to the small-scale farmer but it similarly decreases pollution due to reduced nutrient run-off, and N leaching[4]. Compost does a number of things to advantage the soil that synthetic fertilizer cannot do. First, it augments organic matter, which develops the way water interacts with the soil. In sandy soils, compost performances as sponge to support hold water in the soil that would then drain down below the range of plant roots, defending the plant against drought.
Chickpea (*C. arietinum* L.) is the third maximum grown grain legume in the world next bean and soybean. The agronomical status of chickpea is established on its extraordinary protein concentration (approx. 19.3–25.4%) for the human and animal nutrition, being used more and more as an alternative protein source. Additionally, it is also extensively used as fodder and green manure [5, 6]. The present study described the effect of composted and uncomposted peanut shells and sawdust on the growth of chickpea plants.

2. Material and Methods
The present research work conducted in department of botany, Jinnah University for Women in complete randomized design. Peanut shells and sawdust used as organic material. First both organic materials aerobically composted with Trichoderma harzianum for one month. After one month composting five treatments were used as experimental setup. Treatments are as follows, T1= control, T2= composted peanut shells, T3= uncomposted peanut shells, T4= composted sawdust, T5= uncomposted sawdust at the rate of 10tons /ha. Chickpea was used as experimental plant. After 15 days plants were harvested for physical and biochemical analysis. Root & shoot lengths, root & shoot fresh and dry weights were measured as physical parameters while % carbohydrate [7] and % protein [8] as biochemical parameters.
Results of present pot experiments are expressed as mean ± standard deviation (SD). The data was analyzed by using *One-way* ANOVA followed by LSD (least significant difference) test through SPSS 16 (version 4). The differences were considered significant at $p<0.05$ when treatments' mean compared with control.

3. Results

The results indicated that all four treatments increased root lengths of chickpea plants but composted sawdust significantly increased root length of experimental plants (table, 1). Similarly all treatments also promoted shoot lengths but composted peanut shells significantly increased maximum shoot length of chickpea plants (table, 1). As concerned with fresh and dry weights of experimental plants both composted and uncomposted sawdust significantly enhanced fresh and dry weights of chickpea plants (table, 1). Composted peanut shells also increased fresh weight of plants (table, 1).

Table 1: Comparative effects of composted and uncomposted organic wastes on physical parameters of Chickpea

S.no	Treatments	Shoot length (cm)	Root length (cm)	Fresh weight (g)	Dry weight (g)
1	Control	18.33 ± 4.01	6.73 ± 1.91	1.75 ±.27	0.30 ±.04
2	Composted Peanut shells	25.03d ± 3.30	9.06 ±.80	2.17 d ±.11	0.45 ±.04
3	Uncomposted Peanut shells	20.93 ± 3.15	10.56 ±2.69	1.79 ±.36	0.35 ±.15
4	Composted sawdust	22.56 ± 3.68	11.90 d ±5.04	2.24 d ±.08	0.52 d±.07
5	Uncomposted sawdust	21.43 ± 2.29	10.26 ±1.72	2.16 d±.14	0.49d ±.12

Each value is the mean ± S.D (standard deviation) of 3 replicates. Means bearing superscripts in each column are significantly different with respective control at $p<0.05$(LSD).

Table 2: Comparative effects of composted and uncomposted organic wastes on Carbohydrate and Protein contents of Chickpea

S.no	Treatments	% carbohydrate	% Protein
1	Control	0.16 ±.03	0.24 ±.09
2	Composted Peanut shells	0.26 d ±.03	0.30 ±.15
3	Uncomposted Peanut shells	0.19±.05	0.29±.01
4	Composted sawdust	0.24 ±.08	0.39 ±.08
5	Uncomposted sawdust	0.18 ±.02	0.35 ±.06

Each value is the mean ± S.D (standard deviation) of 3 replicates. Means bearing superscript in each column are significantly different with respective control at $p<0.05$(LSD).

Both organic wastes in composted and uncomposted form promoted carbohydrate and protein content of experimental plants (Table, 2). Maximum significant increase in carbohydrate content was seen with the treatment of composted peanut shells and maximum increase in protein content was seen by the treatment of composted sawdust (Table, 2).

4. Discussions

The use of agrochemicals causes the degradation of cultivable land and increasing agricultural pollution, hence creating the unhealthy situation. In order to balance this situation organic farming might be practice in which instead of using of chemicals, natural resources such as organic matters, minerals and microbes are used [9].

Organic manure is a key component of the soil and crop yield because it carries out many functions in agro ecosystem [10]. Organic farming is one of such strategies that not only ensures food safety but also adds to the biodiversity of soil [11]. In present study all treatments promoted growth and biochemical parameters of experimental plants as compared with control. Composted organic materials used in study showed better results as compared with uncomposted materials. These results are in accordance with Badar *et al*., 2015 (b) [12] which also showed positive effect of organic manures on plants' growth. Composted peanut shells significantly increased shoot lengths, fresh weight and carbohydrate content of chickpea plants while increased root lengths, dry weight and protein content non-significantly. Khomami in 2015 [13] also reported that the use of peanut shells composts increases growth of the marigold and *Viola tricolor* plants in comparison to control. Alidoust, *et al*. (2012) [14] also indicated the promontory effect of peanut shells compost on plants growth. Effect of organic manures such as compost on growth and yield of crop was also studied and result into increased productivity [15, 16]. Badar *et al*., (2015, a) [17] also reported the beneficial effects of organic fertilizers on growth of cowpea plants. In 2014, Ibrahim and Erum [18] reported that different agro wastes applications as organic fertilizers increased the carbohydrate contents of green grams. Both organic and bio fertilizers increased maximum content of carbohydrate in experimental plants [19].

Application of saw dust both composted and uncomposted also sowed best results such as composted saw dust significantly promoted root lengths, fresh and dry weights of experimental plants. Composted organic manures by creating a more favorable environment for root growth and nutrient availability, increased plant growth and dry matter [20] and [21] While uncomposted saw dust significantly promoted fresh and dry weights of chickpea plants. Significant effect of saw dust compost on diameter and height resulted in significant increase of total dry matter production also showed by Palanivell *et al* in 2013 [22]. Composts with low density [23] function as bulking agent and hence they improve soil structure by loosening it and increase the porosity for aeration and root penetration in soils [24]. This may have enhanced maize root penetration and aeration in the rhizosphere. Good roots growth enables them to absorb water and essential nutrients from soil solution to support and increase the crop's growth and development. Composts also provide additional macro- and micronutrients which are very essential for better plant growth.

5. Conclusion

A more sustainable agricultural practice promotes soil productivity by following techniques that preserve soil health for future generations through incorporating organic matter. Organic soil amendments can improve soil fertility, physical properties of soil, water retention, water infiltration, permeability, aeration and plant growth.

6. References

1. Pane C, Celano G, Piccolo A, Villecco D, Spaccini R, Palese AM *et al*. Effects of on-farm Composted Tomato Residues on Soil Biological Activity and Yields in a

Tomato Cropping System. Chemical and Biological Technologies in Agriculture 2015; 2:4.
2. Celano G, Alluvione F, Abdel Aziz M, Spaccini R. The Carbon Dynamics in the Experimental Plots. Use Of 13C- and 15N-Labelled Compounds for the Soil-Plant Balance in Carbon Sequestration. In: Piccolo A (Ed) Carbon Sequestration in Agricultural Soils. A Multidisciplinary Approach to Innovative Methods. Springer, Düsseldorf 2012; 107-144.
3. Pane C, Spaccini R, Piccolo A, Scala F, Bonanomi G. Compost Amendments Enhance Peat Suppressiveness To Pythium Ultimum, Rhizoctonia Solani And Sclerotinia Minor. Biol Cont 2011; 56:115-124.
4. Nyamangara J, Bergstrom LF, Piha, Giller KE. Fertilizer use efficiency and Nitrate Leaching in a Tropical Sandy Soil. J. Eniviron. Qual 2003; 32:599-606.
5. Togay N, Togay Y, Cimrin KM, Turan M. Effect of Rhizobium inoculation, sulfur and phosphorus application on yield, yield components and nutrient uptake in chick pea (Cicer aretinum L.). African Journal of Biotechnology. 2008; 7(6):776-782.
6. Namvar A, Seyed Sharifi R, Sedghi M, Asghari Zakaria R, Khandan T, Eskandarpour B. Study on the effects of organic and inorganic nitrogen fertilizer on yield, yield components and nodulation state of chickpea (Cicer arietinum L.). Communications in Soil Science and Plant Analysis. 2011; 42(9):1097-1109.
7. Yemm EW, Willis AJ. The estimation of carbohydrate in the plant extract by Anthrone reagent. J. Biol. Chem. 1956; 57:508-514.13.
8. Bradford MM. A rapid and sensitive method for the quantitation of microgram quantities of protein utilizing the principle of protein-dye binding, Anal Biochem 1976; 72:248-254.
9. Ahmad AH, Qadir I, Mahmood N. Effect of Integrated Use of Organic and Inorganic Fertilizers on Fodder Yield of Sorghum (Sorghum Bicolor L.). Pak. J. Agri. Sci., 2007; 44(3).
10. Hammad HM, Ahmad A, Laghari KQ, Abbas F, Nasim W, Farhad W *et al*. Organic farming in wheat crop under arid condition of Pakistan.Pak. J. Agri. Sci. 2011; 48(2), 97-102.
11. Megali L, Glauser G, Rasmann S. Fertilization with beneficial microorganisms decreases tomato defenses against insect pests. Agron Sustain Dev, doi: 10.1007/s13593-013-0187-0, 2013.
12. Badar R, Khan M, Batool B, Shabbir S. (b) Effects of organic amendments in comparison with chemical fertilizer on cowpea growth. International Journal of Applied Research 2015; 1(5):66-71.
13. Ali Mahboub Khomami. The Possibility Using the Composted Peanut Shells in the Growth of Marigold and Viola tricolor Plants. Journal of Ornamental Plants. 2015; (5)1:61-66.
14. Alidoust M, Torkashv MA, Khomami M. The effect of Growth medium of peanut shells compost and nutrient solution on the growth of Dracaena. Annals of Biological Research 2012; 3(2):789-794.
15. Ghadge SA, Naikwade PV, Jadhav BB. Utilization of problematic weed for improved yield of fenugreek, Indian Stream research Journal. 2013; 3(4):1-8.
16. Fatahi E, Mobasser HR, Akbarian MM. Effect of organic fertilizer on wet weight, dry weight and number of leaves in cowpea. J Nov. Appl Sci. 2014; 3(4):440-443.
17. Badar R, Malik H, Ilyas A. (a) Influence of organic, inorganic and biofertilizers on physical and biochemical parameters of Vignaunguiculata. International Journal of Advanced Research. 2015; 3(1):738-748.
18. Ibrahim S, Mumtaz E. Application of agro-waste products as organic and value added biofertilizer for improving plant growth. Jpcs 2014; (8):35-41.
19. Badar R, Aslam I, Ibrahim S, Shabbir S. Comparative effect of composts with and without microbial inoculants on the growth of Vigna radiate. IJAPBC 2014; 3(1):100-105.
20. Kaplan M, Kocabas I, Sonmez I, Kalkan H. The effects of different organic manure applications on the dry weight and the essential oil quantity of sage (Salvia fruticosa Mill.). Acta Horticulturae 2009; 826:47-152.
21. Valiki SRH, Ghanbari S. Comparative examination of the effect of manure and chemical fertilizerson yield and yield components of rosemary (Rosemarinus officinalis L.) 2015; 6(2):29-37.
22. Palanivell P, Susilawati K, Ahmed OH, Majid NM. Compost and Crude Humic Substances Produced from Selected Wastes and Their Effects on Zea Mays L. Nutrient Uptake and Growth. The Scientific World Journal 2013; Volume 2013, Article ID 276235, 15 Pages.
23. Calzolari C, Salvador P, Torri D. Effect of compost supplies on soil bulk density and aggregate stability. Results from a six years trial in two experimental fields in Northern Italy. Geophysical Research Abstracts, 2009, 11.
24. Celik I, Gunal H, Budak M, Akpinar C. Effects of long-term organic and mineral fertilizers on bulk density and penetration resistance in semi-arid Mediterranean soil conditions. Geoderma 2010; 160(2):236-243.