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SOME PROPERTIES OF RICE STRAW COMPOST AS AFFECTED BY PREPARATION METHODS.

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ABSTRACT

The experiment was carried out during the months from (June – August), in 2007 at the Agricultural Researches Station, Faculty of Agriculture, Mansoura University. This work aimed to study the effect of cutting rice straw and the various additions on some chemical and physical properties of rice straw compost at different periods during composting(60,75and 90days).

Relevant data revealed that ,the total organic carbon, total nitrogen and C/N ratio of the composted rice straw was significantly affected by cutting and different additive of urea (0, 10.13 , 15.46 and 24.54 g urea /Kg) , lime with (10g/kg and without adding) , super phosphate 15g/Kg and clay soil (100g/kg) at the periods of composting. The pH value and EC value of the composted rice straw was significantly affected by cutting , different additive of urea and lime at the periods of composting .Treatment of fine rice straw (L1) gave the greatest bulk density and water holding capacity, However, the treatment of high tall rice straw (L2) gave the lower values at the three periods. In addition, relevant results suggested cutting rice straw and addition some additives such as urea and lime to improve some chemical and physical properties of rice straw compost.

Keywords; chemical and physical properties, lime, rice straw compost.

INTRODUCTION

In Egypt the cultivated area with rice reached about 1.6 million feddans in the season of 2007 that which produced about 3.6 million tons of rice straw . Non-optimal use of rice straw by burning results in increasing born of severe air pollution known as " black cloud" over Cairo in autumn season and that the high proportion of suspended particles in the air (PM_{10}), according to annual monitoring data of Egyptian Environmental Affairs Agency (EEAA), (2007). One of the most important bad effects resulting from the burning of rice straw on the soil is the death of all living organisms beneficial to the soil and burning of organic material in the surface layer of soil, which resulted in reducing fertility of agricultural land. Open burning of rice straw in the field is the incomplete combustion in nature hence large amounts of pollutants are emitted, including toxic gases (carbon monoxide (CO), volatile organic compound (VOCs), and carcinogenic polycyclic aromatic hydrocarbons) and fine particles.

Rice straw compost is most commonly applied to paddy fields to improve soil fertility and increase rice yield. Application of rice straw compost to paddy field soil generally increases microbial number, microbial biomass, and enzyme activity (Hayano *et al.*. 1995).

Using compost in crop fertilization also would reduce the need for some inorganic fertilizers and would help to bring area producers into regulatory compliance. The composting process will use the carbon in the straw and the nitrogen in the manure to produce a quality soil amendment free of weed seeds, herbicides and pathogens. Moreover, the nutrients removed in crop production will be returned to the soil, thus improving soil fertility and demonstrating true sustainability (Cynthia A. Daley, 2005).

Benefits of compost application in agriculture mainly result from its content of organic matter, plant nutrients, promoting plant growth and inhibiting root pathogens/soil-borne plant diseases (Alvarez *et al.*., 1995 and Perner *et al.*., 2006).George *et al.*, (2004) suggested that Organic farming is a whole-system approach to optimizing the natural fertility resources of a farm. It works through traditional practices of recycling farm-produced livestock manures, composting, crop rotation, green manuring, and crop residue management. Secondarily, organic agriculture looks to local waste products-manures, food and seafood processing wastes, to supplement soil fertility economically.

Haggag (1994) suggested using additive activators of ammonium sulphate (20.5%N) at the rate of 0.7% N, calcium super phosphata (15.5%P2O5) at the rate of 0.11% P2O5, lime, manure and soil. There additive led to decrease C% and increase N% which were reflected in decreasing the C/N ratio where the differences reached to the level of significance.

Zewiny (2001) studied the using of different combinations of farmyard manure (FYM), banana residues (BR) and filter mud (FM) with and without additives barley wastes (BW), bagasse ash (Ba), Rock phosphate (RP) and dolomite (DO) ,for making compost and found that organic carbon and C/N ratio were decreased during compost. However, total ash, total nitrogen ,fulvic acids and degree of humification were increased during composting.

El- Hammady *et al.*, (2003) make rice straw compost was composted using different accelerating amendments such as bacterial decomposers (mixed liquid culture of Bacillus ssp and Streptomyces ssp); bacterial decomposers with Organic manure (chicken, cattle and farm yard manures) and chemical activators (Ammonium sulphate and superphosphate) with full and half recommended doses. Composting process extended for 8 weeks. After two months total nitrogen, C/N ratio, P, K, Generally, total nitrogen was increased 3 to 7 fold, but C/N ratio decreased 5 to 17 fold compared with rice straw.

Composting is considered to be an important approach for treating a wide variety of organic solid wastes. However, plenty of factors, such as moisture content, oxygen supply and biodegradability of the composting materials, can directly affect composting process. Other factor like pile settlement can also indirectly hinder the successful composting. Pile settlement starts as soon as a composting pile is built, which leads to a reduction in the local porosity and permeability. Such an occurrence can significantly affect the efficiency of oxygen supply, water evaporation and heat ventilation rates in a composting pile (McCartney and Chen, 2001; Barrington *et al.*., 2003 and Chang and Veeken, 2004).

Raabe (2001) concluded that, Composting works best if the moisture content of materials in the pile is about 50 percent. Too much moisture will make a soggy mass, and decomposition will be slow and will smell. If the organic material is too dry, decomposition will be very slow or will not occur at all.

Korany (2001) found that , moisture is necessary to support the metabolic processes of the microbes. Water provides the medium for chemical reactions transport nutrients and allows the microorganisms to move about. In theory biological activity is optimal when the materials are saturated. It ceases entirely below 12-15% moisture content. However, the optimum results required a moisture around 55% (Bertran *et al.*., 2004).

Fauci *et al.*.,(1999) and Vuorinen and Saharinen (1999) , reported that there is an increase of total nitrogen during composting of dairy cattle and pig manure mixed with sphagnum and a little barley straw and composting of biosolids, manure, bedding ,ash and wood chips feedstocks.

Carbon and nitrogen, negative relationship was found between C/N ratio and microbial activity on a composting systems treating pulp and paper biosolids (Larsen and McCartney, 2000).

Sommer (2001) reported that the compost with a porous tarpaulin or compacting the compost reduced emission losses to 12-18% of total –N compared with a loss of 28 % during composting of untreated deep litter.

Sasaki *et al.*, (2003) found that, adjustment of the pH value during the compost fermentation was also important for progression of the oil degradation. When the pH value was not controlled, the pH value decreased quickly and reached about 2 and the oil degradation was stopped. Adding caustic lime to the raw materials caused the pH value of the compost to stabilize at approximately.

The following research aims to study the effect of cutting rice straw and the various additions on some chemical and physical properties of rice straw compost at different periods during composting.

MATERIALS AND METHODS

The current study was carried out at the Agricultural Researches Station, Faculty of Agriculture, Mansoura University.

This experiment laid out during the months from (June – August), in 2007.

1-Materials:

1-1- Rice straw:-

Rice straw (RS) was obtained from El Shawamy village far from Mansoura city about 30 Km North.

The collected rice straw (RS) was chopped into two lengths:

1- Fine L1 (less than 2 cm).

2-High tall L2 (70 -80 cm).

1-2-Additives

1- Nitrogen fertilizer (urea, 46.5 %).

2- Phosphate fertilizer (ordinary super phosphate, 15.5% P_2O_5).

3- Lime ($CaCO_3$).

4- Clay soil surface sample, (0-30cm), the source of microbial, which collected from orchard of Agricultural Research Station of Mansoura University. The soil is clayey in texture; pH was 7.7 and EC was1.56 dSm^{-1}.

1-3- Compost experiment:

Sixteen mixtures were prepared by weight bases using rice straw with and without adding the following combination of additives:

1-Nitrogen fertilizer (Urea 46.5%) by four levels.

C0: No additive urea.

C1: additive urea (46.5 %) 10.13 g to reacd C/N ratio 50/1.

C2: additive urea (46.5 %) 15.46 g to reacd C/N ratio 40/1.

C3: additive urea (46.5 %) 24.54 g to reacd C/N ratio 30/1.

2- Phosphate fertilizer (ordinary Super phosphate 15g P2O5).

3- Clay soil (100g).

4- Lime (CaCo3) with (10g and without adding).

A1 without adding and A2 with adding (CaCo3)

1Kg of each rice straw was composted in plastic container. Moisture initially adjusted to 60% of water holding capacity and remained at 50 to 60% during composting period. All of piles were received clay soil (100g) , the soil was as a source of microbial and ordinary Super phosphate 15g P2O5 was as a source of Phosphate fertilizer . half of piles were received lime (CaCo3) 10g and rect of piles were without adding lime (CaCo3). Urea (46.5%) as a source of nitrogen fertilizer, quarter (1) of piles did not receive urea (C0) , quarter (2) of piles had addition of urea (46.5 %) 10.13 g to bring C/N ratio 50/1 (C1) , quarter (3) of piles had received urea (46.5 %) 15.46 g to read C/N ratio 40/1(C2) and quarter (4) of piles were adjusted by urea (46.5 %) 24.54 g to bring C/N ratio 30/1 (C3).

The piles were turned out twice weekly and samples taken at three periods i.e.; 60, 75 and 90 days. Hence these samples were analyzed for total organic carbon, total nitrogen, C/N ratio, water holding capacity, bulk density, and pH value.

Compost material pH was measured in 1:20 organic material: water suspension according to (Cottenie *et al.*. 1982).Electrical conductivity was measured in 1:20 organic material: water extract using conductivity-meter after shaking for 1 hour and filtration (Cottenie *et al.*. 1982)..Total nitrogen content in the samples was converted to NH4 by digestion with concentrated H2SO4 in the presence of salicylic acid and a catalyst mixture. NH3 was determined after steam distillation by capture in an excess boric acid solution and titrated with N/70 HC1(Jackson 1958). Bulk densities of compost were determined using the core method according to Vomocil (1965).Water holding capacity (W.H.C) was determined by using the described principles and notes of (Dewis and Freitas, 1970).

Soil analysis:Soil pH was determined in saturated sample by the methods described by (Richard, 1954) as on soil paste.Electrical conductivity was measured in 1:5 soil water extract using conductivity-meter (Jackson, 1958).

Statistical analysis :analyses of variance (ANOVA) for the data of the greenhouse experiment were tested for significance and T test at 5% level of probability to test the difference between various treatments.

RESULTS AND DISCUSSION

Changes in some chemical and physical prooerties of rice straw and their mixtures during composting:

Chemical properties:

1- Total organic carbon

Data in Table (1) reveal that Total organic carbon of the composted rice straw was significantly affected by cutting at the different periods of composting. Treatment of fine rice straw (L1) gave the lower total carbon (26.66, 26.45and 26.15 %) However, the treatment of high tall rice straw (L2) gave the greatest values (41.17, 39.13 and 38.11%) at the three periods respectively.

Also, data in the same Table show that addition of lime gave the highest mean value of total organic carbon (36.22, 35.13 and 34.46%) with (A2C0) while, the lowest mean value of this attribute were (31.82 , 30.75 and 29.93%) with (A1C3) at without addition of lime at the three periods, respectively.

Data in the same Table show that addition of urea gave different mean values of total organic carbon. At the end of composting the mean values of this attribute were (33.83, 32.62, 32.45and 29.93%) with (A1C0 , A1C1,A1C2 and A1C3) at without addition of lime also, the mean values of this attribute were (34.46, 32.39, 31.09and 30.31%) with (A1C0 , A1C1,A1C2 and A1C3) at with addition of lime , respectively.

Table1: Impact of treatments on TC% at three periods.

Treatments \ Periods	1st	2nd	3rd
Cutting length			
L1	26.66	26.45	26.15
L2	41.17	39.13	38.11
F Test	**	**	**
Additives			
A1C0	35.53	34.52	33.83
A1C1	33.97	33.03	32.62
A1C2	33.28	32.69	32.45
A1C3	31.82	30.75	29.93
A2C0	36.22	35.13	34.46
A2C1	35.02	33.14	32.39
A2C2	33.62	32.05	31.09
A2C3	31.89	31.05	30.31
F test	*	*	*
LSD 0.05	0.18	0.08	0.28

L1: Fine rice straw, L2: High tall rice straw, C0: No additive urea, C1: Additive urea 10.13 g/ kg, C2: Additive urea 15.46 g/ kg, C3: Additive urea 24.54 g / kg, A1: Without adding lime and A2: With adding lime.

This decrease in Total organic carbon during composting are due to mineralization of composting materials. These data are in accordance with that found by Eghball *et al*.., (1997), who found that the carbon loss during composting ranged from 46 to 62 % for beef cattle feedlot manure. Moreover, it ranged from 12% to 39% for dairy cattle and pig manure mixed with sphagnum and a little barley straw (Vuorinen and Saharinen, 1999).

2. Total Nitrogen

Data in Table (2) reveal that Total nitrogen of the composted rice straw was significantly affected by cutting at the different periods of composting. Treatment of fine rice straw (L1) gave the greatest total nitrogen (1.3, 1.54 and 1.61%).However, the treatment of high tall rice straw (L2) gave the lower values (1.25, 1.35 and 1.46 %) at the three periods respectively.

Also, data in the same Table show that addition of lime gave the lowest mean value of total nitrogen (0.76 , 0.82 and 0.93 %) with (A2C0) while, the highest mean value of this attribute were (1.66, 1.87 and 2.09%) with (A1C0) at without addition of lime at the three periods, respectively.

Data in the same Table show that addition of urea gave different mean value of total nitrogen. At the end of composting data the mean values of this attribute were (0.97, 1.37, 1.74 and 2.09%) with (A1C0 , A1C1,A1C2 and A1C3) without addition of lime also, increase the mean values of this attribute were (0.93, 1.45, 1.74 and 2.01%) with (A1C0 , A1C1,A1C2 and A1C3) with addition of lime , respectively.

The present results are in accordance with those reported by (Korrany .2001), Zewiny (2001) and Al-Agamy (2006).All increases rice straw as a result of the higher bio-oxidation of the easily decomposable carbonaceous substances,(Estefanous *et al.*.,1996).

In addition, Kaloosh (1994).found that the increase in total nitrogen during the composting process may be due to loss in the weight of composted materials, beside the stimulation of N2- fixers activity grown on the products of cellulose decomposition.

Table 2: Impact of treatments on TN% at three periods.

Treatments \ Periods	1st	2nd	3rd
Cutting length			
L1	1.3	1.54	1.61
L2	1.25	1.35	1.46
F Test	**	**	**
Additives			
A1C0	0.90	0.93	0.97
A1C1	1.16	1.25	1.37
A1C2	1.46	1.58	1.74
A1C3	1.66	1.87	2.09
A2C0	0.76	0.82	0.93
A2C1	1.18	1.33	1.45
A2C2	1.39	1.61	1.74
A2C3	1.65	1.76	2.01
F test	*	*	*
LSD 0.05	0.15	0.08	0.23

In this respect Fauci *et al.*.,(1999) and Vuorinen and Saharinen (1999), who reported that there is an increase of total nitrogen during composting of dairy cattle and pig manure mixed with sphagnum and a little barley straw and composting of biosolids, manure, bedding ,ash and wood chips feedstocks.

3-C/N ratio

Data in Table (3) reveal that C/N ratio of the composted rice straw was significantly affected by cutting at the different periods of composting. Treatment of fine rice straw (L1) gave the lower C/N ratio (23.47, 20.95and 18.39 %) However, the treatment of high tall rice straw (L2) gave the greatest values (35.16, 31.41 and 26.77 %) at the three periods respectively.

Also, data in the same Table show that addition of lime gave value of C/N ratio at the end of composting data (16.73 %) with (A2C3) while, value of this attribute were (16.18%) with (A1C3) at without addition of lime.

Data in the same Table show that addition of urea gave different mean values of C/N ratio. At the end of composting data the mean values of this attribute were (33.29,23.35,19.83 and 16.18 %) with (A1C0 , A1C1,A1C2 and A1C3) without addition of lime, also, the mean values of this attribute were (34.84 , 22.46 , 17.92 and 16.73 %) with (A1C0 , A1C1,A1C2 and A1C3) with addition of lime , respectively.

Similar observation are obtained by (Hanafy *et al.*., (1990); Lannotti *et al.*., 1994; Abou El-Naga *et al.*, (1997); El-Halwagi *et al.*, (1998); Allam, (1999); Mohamed,(1999) , Korrany, (2001) , Zewiny (2001) and Al-Agamy (2006) . The decrease in C/N ratio during composting is accomplished by microorganisms, which use the carbonaceous materials as their C source and nitrogenous materials as N source (Korrany, 2001).

During composting, C is lost to the atmosphere mainly as CO2, whereas N is lost mainly as NH3 gas. However, the loss of C as CO2 exceed the loss of N as NH3, resulting in C/N ratio decrease (Rechcigl, 1995).

At the end of composting ,almost all the composted substrates are reached to value about 15, which will be in suitable from for application to the soil., Jimenez and Garcia (1992) considered that a C/N ratio lower than 12 for municipal solid waste compost indicates a good degree of maturity.

Table 3: Impact of treatments on C/N ratio at three periods.

Treatments \ Periods	1st	2nd	3rd
Cutting length			
L1	23.47	20.95	18.39
L2	35.16	31.41	26.77
F Test	*	*	*
Additives			
A1C0	38.74	36.09	33.29
A1C1	28.92	26.58	23.35
A1C2	24.65	22.11	19.83
A1C3	22.01	20.12	16.18
A2C0	46.81	41.01	34.84
A2C1	28.9	24.56	22.46
A2C2	23.67	19.43	17.92
A2C3	20.79	19.52	16.73
F test	*	*	*
LSD 0.05	1.04	1.01	1.06

4. pH value:

Data in Table (4) reveal that pH value of the composted rice straw were reduced at the end of composting (7.7) in (L1) fine rice straw, while in (L2) high tall rice straw(7.9) from the initial values.

Also, data in the same Table show that the value of pH as affect by lime addition .The greatest values of the pH value were found (8.3, 8.2 and 8) in (A2C3) with addition of lime at the three periods .While the lowest values of the this attribute were attained (7.7 , 7.6 and 7.5 %) in (A1C0) without addition of lime at the three periods, respectively.

Data in the same Table show that addition of urea gave the different mean values of pH value . At the end of composting the mean values of this attribute were (7.5 : 7.8)with (A1C0 : A1C3) without addition of lime also, increase the mean values of this attribute were (7.6:8) with (A1C0 :A1C3) with addition of lime , respectively.

Similar results were reported by Estafanous *et al.*. (1996), Allam (1996) and Korrany, (2001).

Table 4: Impact of treatments on pH value at three periods.

Treatments / Periods	1st	2nd	3rd
Cutting length			
L1	7.95	7.8	7.7
L2	8.05	7.9	7.9
F Test	NS	NS	NS
Additives			
A1C0	7.7	7.6	7.5
A1C1	7.9	7.8	7.7
A1C2	8 0	7.9	7.7
A1C3	8.1	7.9	7.8
A2C0	7.9	7.8	7.6
A2C1	8.1	8.0	7.9
A2C2	8.2	8.1	7.9
A2C3	8.3	8.2	8.0
F Test	NS	NS	NS
LSD 0.05	--	--	--

5. Electrical conductivity (EC):

Data in Table (5) reveal that EC value of the composted rice straw was significantly affected by cutting at the different periods of composting. Treatment of fine rice straw (L1) gave the greatest EC value (1.56, 1.62 and 1.69 dsm-1) However, the treatment of high tall rice straw (L2) gave the lower values (1.53, 1.58 and 1.67 %) at the three periods, respectively.

Also, data in the same Table show that the addition of lime gave the highest mean value of EC value (1.74, 1.79 and 1.84 dsm-1) in (A2C3) while, the lowest mean value of this attribute were (1.27, 1.37 and 1.49 dsm-1)with (A1C0) at without addition of lime at the three periods, respectively.

Data in the same Table show that addition of urea gave the different mean value of EC . At the end of composting data reduced increase the mean values of this attribute were (1.49, 1.55, 1.70 and 1.82

dsm-1) with (A1C0 , A1C1,A1C2 and A1C3) at without addition of lime also, increase the mean values of this attribute were (1.54, 1.67, 1.77 and 1.84 dsm-1) with (A2C0 , A2C1,A2C2 and A2C3) at with addition of lime at three periods, respectively.

The significant increases in the electrical conductivity of composted rice straw could be related to the relatively high concentrations of urea and other ions related during the rapid mineralization of organic matter. El-Nadi *et al.* .(1995) showed that the high values of EC recorded during the decomposition may be due to the increase of released soluble inorganic and organic ions during mineralization process .The obtained results are in agreement with those obtained by Neilssen *et al.*.,(1997), Abdel –Wahab (1998) , Allam (1996) and Korrany, (2001) .

Table 5: Impact of treatments on EC dsm-1 at three periods.

Treatments \ Periods	1st	2nd	3rd
Cutting length			
L1	1.56	1.62	1.69
L2	1.53	1.58	1.67
F Test	*	*	*
Additives			
A1C0	1.27	1.37	1.49
A1C1	1.47	1.49	1.55
A1C2	1.57	1.62	1.70
A1C3	1.70	1.77	1.82
A2C0	1.33	1.39	1.54
A2C1	1.56	1.60	1.67
A2C2	1.66	1.74	1.77
A2C3	1.74	1.79	1.84
F Test	*	*	*
LSD 0.05	0.24	0.19	0.10

Physical properties:

1. Bulk density:

Data in Table (6) reveal that bulk density of the composted rice straw was significantly affected by cutting at the different periods of composting. Treatment of fine rice straw (L1) gave the greatest bulk density (0.26, 0.29 and 0.30 g cm-3) However, the treatment of high tall rice straw (L2) gave the lower values (0.12, 0.14 and 0.15 g cm-3)at the three periods, respectively.

Also, data in the same Table show that addition of lime gave the lowest mean values of bulk density were (0.16, 0.17 and 0.18 g cm-3)with (A2C0) while. A1C0 gave (0.16, 0.18 and 0.20 cm-3) in the 1st, 2nd and 3rd period, respectively. The highest mean values of this attribute were (0.24, 0.26 and 0.28 g cm-3) in (A1C3) at without addition of lime at the three periods, respectively.

Data in the same Table show that addition of urea gave different mean values of bulk density. At the end of composting data the mean values of this attribute were (0.20, 0.21, 0.24 and 0.28 g cm-3) with (A1C0, A1C1,A1C2 and A1C3) without addition of lime also, the mean values of this attribute were (0.18, 0.20, 0.24and 0.26 g cm-3) with (A1C0 , A1C1,A1C2 and A1C3) at with addition of lime at three periods, respectively.

The variation in the bulk density values of both length of rice straw (L1 and L2) could be due to cutting. Particle size of the waste and water holding capacity may have an important influence on bulk density throughout the composting period (Allam, 1999).Abdel –Wahab, (1998) indicated that composting a mixture of wheat straw and faba bean gradually increased the bulk density from 0.13 to 0.33 g cm-3.Results obtained by Korrany, (2001) and
N, Dayegamiye *et al.*., (1997) showed also that the bulk density of composted plant residues and cattle manure increased with increasing composting period.

Table 6: Impact of treatments on BD (g cm^{-3}) at three periods.

Treatments \ Periods	1st	2nd	3rd
Cutting length			
L1	0.26	0.29	0.30
L2	0.12	0.14	0.15
F Test	*	*	*
Additives			
A1C0	0.16	0.18	0.20
A1C1	0.18	0.19	0.21
A1C2	0.21	0.23	0.24
A1C3	0.24	0.26	0.28
A2C0	0.16	0.17	0.18
A2C1	0.17	0.19	0.20
A2C2	0.20	0.22	0.24
A2C3	0.23	0.26	0.26
F Test	*	*	*
LSD 0.05	0.06	0.07	0.08

2. Water holding capacity (W.H.C):

Data in Table (7) reveal that water holding capacity of the composted rice straw was significantly affected by cutting at the different periods of composting. Treatment of fine rice straw (L1) gave the greatest values of water holding capacity (282.49, 288.88 and 294.05 %) However, the treatment of high tall rice straw (L2) gave the lower values (149.06, 156.40 and 161.78 %) at the three periods, respectively.

Also, data in The same Table show that addition of lime gave the lowest mean values of water holding capacity were (194.16, 200.04 and 208.10%) with (A2C0) while, the same treatment of lime (A1C0) gave higher values (197.89, 203.33 and 208.77) at the 1st, 2nd and 3rd period, respectively.The highest mean values of this attribute were (242.98 , 249.65 and 252.80 %) in (A1C3) at without addition of lime at the three periods, respectively.

Data in the same Table show that addition of urea gave different mean values of water holding capacity. At the end of composting period, mean values of this attribute were (208.77, 227.02, 232.98and 252.80%)

with (A1C0 , A1C1,A1C2 and A1C3) without addition of lime also, the mean values of this attribute were (208.10, 222.91, 229.84 and 240.87 %) with (A1C0 , A1C1,A1C2 and A1C3) with addition of lime at three periods, respectively.

Results obtained by Haggag (1994) who show that all additives improved significantly the water holding capacity (WHC) by increasing the values over the untreated compost.

Table 7: Impact of treatments on WHC % at three periods.

Treatments \ Periods	1st	2nd	3rd
Cutting length			
L1	282.49	288.88	294.05
L2	149.06	156.40	161.78
F Test	**	*	*
Additives			
A1C0	197.89	203.33	208.77
A1C1	215.21	221.83	227.02
A1C2	218.66	226.10	232.98
A1C3	242.98	249.65	252.80
A2C0	194.16	200.04	208.10
A2C1	209.36	218.15	222.91
A2C2	216.72	224.28	229.84
A2C3	231.22	237.72	240.87
F Test	**	**	*
LSD 0.05	4.72	5.00	6.59

Conclusion

It can be concluded that fine rice straw (L1) gave the greatest bulk density and water holding capacity, However, the treatment of high tall rice straw (L2) gave the lower values at the three periods. In addition, relevant results suggested cutting rice straw and addition some additives urea and lime to improve some chemical and physical properties of rice straw compost.

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تأثير طرق التحضير على بعض خواص كمبوست قش الارز

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****جهاز شئون البيئة**

أجريت تلك الدراسة بهدف إنتاج الكمبوست باستخدام قش الأرز و دراسة تأثير التقطيع و الاضافات المختلفة على جودة الكمبوست لإعتبارة من أهم المخلفات الزراعية إنتاجا ويعتبر من ملوثات الهواء الجوى فى حالة حرقة خلال فترة الحصاد والتي تسبب فى ظهور السحابة السوداء و أجريت هذة الدراسة خلال أشهر يونية ويوليو وأغسطس من عام ٢٠٠٧ بالمزرعة البحثية بقسم علوم الاضى بكلية الزراعة جامعة المنصورة .و تم أختيار قش الارز كاحد المخلفات الزراعية و إستخدام تربة زراعية كمحفز ميكروبى و استخدام اليوريا كمصدر للنيتروجين لضبط نسب مختلفة من C/N ratio ، و سماد سوبر سوبر فوسفات كمصدر للفوسفور واستخدام الجير وضبط الرطوبة عند ٦٠ % وتم عمل كومات من قش الارز مع التقليب كل أسبوع مرتين وضبط الرطوبة عند ٦٠% وتم اخذ عينات من كومة قش الارز بعد ٦٠ و ٧٥ و ٩٠ يوم من بدء عملية التخمر لتقييم التغييرات الطبيعية والكيماوية خلال عملية الكمبوست و كانت التجربة تحتوى على ١٦ كومة .وتتلخص النتائج المتحصل عليها كالتالي بالنسبة للتغيرات الكيميائية فى كمبوست قش الأرز أثناء مراحل نضجة أن الكربون العضوى الكلى أعطى أقل قيم له تحت تأثير التقطيع و بالنسبة للنيتروجين الكلى إختلفت حسب معدل إضافة اليوريا (بدون يوريا – يوريا 10.13 جرام و ١٥,٤٦ جرام و 24.54 جرام يوريا) وبالنسبة لقيم C/N ratio سجلت أقل قيم للمعلامات المقطعة تحت أضافة أعلى معدل لليوريا وأعطت أعلى معدلات لل pH للمعلملات المعاملة بالجير وكذالك إضافة الجير أعطت أعلى قيم للتوصيل الكهربى وأرتفعت قيم الكثافة الظاهرية و القدرة على حفظ الماء تحت تأثير التقطيع وإعلى معدل لإضافة اليوريا .