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EFFECT OF ORGANIC MANURES APPLICATION ON N MINERALIZATION AT DIFFERENT EGYPTIAN SOILS.

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ABSTRACT

Organic manure is one of the sources of nitrogen in the soil. Nitrogen mineralization depends on application method, source of organic manure, microbial activity, aeration and moisture. The objective of this study was to investigate the rate of nitrogen mineralization as affected by different sources of organic manures (compost, chicken manures, and town refuse) which mixed with clay and sandy soils at the rate of 10 and 20 t fed^{-1} at different incubation periods.

The experiment was carried out in laboratory of Soils Department, Faculty of Agriculture, Mansoura University. Soil samples were taken from El-Mansoura (clay soil) and El-Sharkia (sandy soil). Nitrogen mineralization was studied in both soils mixed with different organic manure types at different incubation periods. The analysis of ammonium and nitrate were conducted at (0, 7, 14, 30, 60 and 90 days after incubation at 38˚C).

The results showed that NH_4^+-N content at the different organic manures application to both soils used increased compared with the control (without organic manure addition) at different incubation periods. The maximum concentration of NH_4^+-N obtained at 60 day of incubation with compost then chicken manure in sandy soil and contrast with clay soil. While the maximum concentration of NO_3^--N reaches at 90 days after incubation in both soils It was clearly with compost then chicken manure in clay soil and contrast with sandy soil.

It can be concluded that, nitrogen mineralization is the process by which organic N is converted to inorganic forms which mostly ammonium (NH_4^+) and nitrate (NO_3^-). When manures are regularly added to soils, the mineralization gradually increases over time until it eventually reached a plateau know as the steady-state condition.

Keywords: Compost, Chicken manure, Town refuse, Incubation, N-Mineralization.

INTRODUCTION

The addition of organic manures such as compost, chicken manure and town refuse to soils is a current environmental and agricultural practice for human healthy and have a direct effect on soil organic matter content, improve soil fertility, soil physical characteristics beside that, augment microbial activities, ameliorate metal toxicity (Wong and Swift, 2003; Aggelides and Londra, 2000; Chaturvedi *et al.,* 2008 and Escobar and Hue, 2008).

Nitrogen is one of the most difficult plant nutrients to control, whereas losses may occur in both the oxidized and leaching (Mikkelse *et al.,* 1995). Most of nitrogen (N) in the environment is in forms that are unavailable for plant uptake. In a process known as N mineralization, the organic N contained in soil organic matter is converted into inorganic forms (ammonium, NH_4^+, and nitrate, NO_3^-) as a result of the activities of soil microorganisms.

The mineralization of organic manures in soils is affected by such soil properties as types of soils, depth of soil, temperature, soil moisture, pH, C/N ratio and lignin content (Khalil *et al.,* 2005). Application rate of these manures must be determined on the basis of crop need to avoid hazards associated with excess nitrate in the soil (Navarro *et al.,* 1996). An improved understanding of N mineralization process is important in order to predict the net mineralization of manure N (Azeez and Averbeke, 2010).

Addition of nitrogen in proper dose at proper time is very essential for increasing the crop productivity thus; the process of mineralization and nitrogen availability in different organic manures at different incubation periods is very important (Spalding and Exuer, 1993).

Tu *et al.,* (2006) stated that the organic fertilizer had been used affected microbiological activity, causing more intensive mineralization of organic matter in the analyzed soil.

Khalid *et al.,* (2010) found that addition of compost to the soil has increased soil organic matter and has optimized nitrogen releasing which means that compost organic matter was more efficient than slow releasing fertilizer which didn't give the required advantage of optimum nitrogen supply, but has caused yield decrease due to vegetative promoting effect.

Calderon *et al.,* (2005) reported that mineralized N during manure decomposition may be remaining in the soil and become part of net mineralized N pool or immobilized by microbes or be denitrified and lost as di-nitrogen oxide. Thus, application of manure with high N content to soil should give high values in any or combination of these processes. Rahman *et al.,* (2013) showed that higher amount of N increase with incubation time in manure amended soils compared with control soil.

Linca *et al.,* (2012) reported that the soil showed their lowest mineralization rates at the beginning of the incubation followed by maximum concentration on day so was as follows; straw compost > goat manure > control > chicken manure > straw. They found that the maximum concentration NH_4^+-N in dry soil have different days content. The maximum concentration for chicken manure and straw compost are obtained after 8 day, straw and control are 5 day, and after 2 days goat manure In dry soils under aerobic conditions the ammonification occurs faster than the oxidation of ammonium to nitrate resulting in ammonium nitrate accumulation. The maximum concentration ranged from 59 to 72 mg NH_4^+-N. At the end of incubation amounts of ammonium decreased for all different organic fertilizers.

The main objective of the current study is to investigate the rate of nitrogen mineralization as affected by different sources of organic manures (compost, chicken manures, and town refuse) which mixed with clay and sandy soils at different incubation periods.

MATERIALS AND METHODS

In order to study the effect of different sources of organic manures (compost, chicken manures and town refuse) mixed with clay and sandy soil at different incubation periods on the rate of nitrogen mineralization. The clay soil samples was collected from faculty of agricultural farm, Mansoura University and sandy soil was collected from El-Sharkia, air dried and screened by passing through a 2 mm sieve. Soil analysis results show in (Table 1).

Table (1): Some physical and chemical properties of the experimental soils.

Properties	Clay	Sandy
A: Chemical properties		
*pH (1:2.5 soil suspension)	8.14	7.94
**EC dSm^{-1} (1:5 extract)	2.15	1.95
O.M. (organic matter) $g\ kg^{-1}$	19.00	4.30
B: Cations and Anions ($mmol_c/L$)		
Ca^{2+}	6.00	7.00
Mg^{2+}	1.00	1.00
Na^{+}	3.55	1.65
K^{+}	0.20	0.10
***CO_3^{2-}	N.D.	N.D.
HCO_3^{-}	2.00	0.40
SO_4^{2-}	2.75	1.35
Cl^{-}	6.00	8.00
C: Mechanical analysis %		
Sand	3.64	93.46
Silt	58.73	3.77
Clay	37.63	2.77
Textural class	Silty clay loam	Sandy
D: Available nutrient ($mg\ kg^{-1}$)		
N	44.9	22
P	14.6	9.3
K	236	50

***pH determined in (1:2.5) soil water suspension,**EC determined in (1:5) soil water extract.**
****** N.D.: Not Detected**

The manures were dried in air and sieved through a 2 mm sieve. pH, electrical conductivity, C/N ratio, available NH_4^+-N and NO_3^--N were determined. Manures analysis results show in (Table 2). Manures were mixed with soil on oven dry weight basis. An amount of 100 g air dry clay soil and 150 g air dry sandy soil were weighed and taken in plastic containers (5.5 × 7 cm). The organic manures were thoroughly mixed with soil at a rate of 10 t fed^{-1} and 20 t fed^{-1} at clay and sandy soils, respectively.

Table (2): Chemical characteristics of the manures used for the incubation experiment.

Organic manures	pH	EC $dS\ m^{-1}$	Total nitrogen%	C:N ratio	Available nitrogen	
					NO_3^--N (ppm)	NH_4^+ -N (ppm)
Compost	7.7	3.32	0.49	18.63	28	21
Chicken manure	7.5	5.16	0.95	14.55	56	38.5
Town refuse	7.6	4.82	0.63	24.44	52.5	10.5

Thus, the arrangement of the total treatments with three replicates was:

- Control (C): No manure added.
- Compost (CO): 20 t/fed at clay and sandy soil, respectively.
- Chicken manure (CM): 20 t/fed at clay and sandy soil, respectively.
- Town refuse (TR): 20 t/fed at clay and sandy soil, respectively.

A total of (144) plastic container was used during the whole incubation period. The soil samples were incubated at temperature (~28˚C). The moisture of the soil was kept at field capacity condition. Soil samples were collected periodically at 0, 7, 14, 30, 60 and 90 days of incubation during the period of January to April, 2015 in the laboratory of Soil Science, Faculty of Agricultural, Mansoura University. Plastic containers were arranged in a split plot design. Whereas, main plot (organic manure), while, sub main plots (incubation periods). The results will be expressed on oven dry weight basis.

Soil analysis:

The EC of the soil extract was measured by EC meter was measured in (1: 5 soil water extract) and soil reaction (pH) was measured in (1: 2.5 soil water suspension) according to the methods of Jackson, (1967). Mechanical analysis was determined following the international pipette as described by Dewis and Fertais, (1970). Organic matter content and $CaCO_3$ content were determined according to Page *et al.,* (1982). Available N was extracted by KCl 2N extractant and determined by steam- distillation procedure using MgO- Devarda ally according to the methods described by Black *et al.,* (1965). Available P was extracted using 0.5 M $NaHCO_3$ solutions at pH 8.5 and determined calorimetrically according to Page, at el., (1982). Available K was extracted using 1N ammonium acetate at pH 7.0 and determined photo metrically according to Jackson, (1958). At each sampling date, fresh soil samples were collected and analyzed for available NH_4^+-N and NO_3^--N, immediately. Nitrate and ammonium – nitrogen extracted and determined by Kjeldahl distillation according to the method described by Page *et al.,* (1982).

Statistical analysis:

All statistical analyses were performed using analysis of variance technique by means of COSTAT computer software.

RESULTS AND DISCUSSION

Nitrification of organic nitrogen as affected by manure types mixed with clay soil in different incubation periods

In Table (3), data show that the conversion of the N in the clay soil and that due to the manure addition to nitrate (NO_3^- mg kg^{-1}) at different incubation days. At 90 days of incubation period the value content of (NO_3^- mg kg^{-1}) was higher than different incubation periods and the lowest value of (NO_3^- mg kg^{-1}) at zero time of incubation period. At this period (90 days) compost manure had the highest net nitrification (286.67 mg kg^{-1}) followed by chicken manure (250.33 mg kg^{-1}) followed by town refuse (230.67 mg kg^{-1}) and the least in control (without manure treatment) (193.33 mg kg^{-1}).

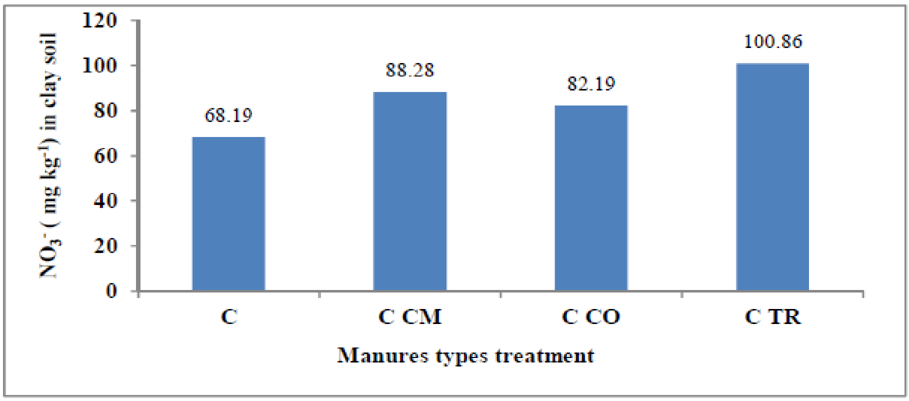
It can be expected that a large portion of manure undergoes slow mineralization, complementing or slightly increasing the proportion of readily hydrolysable nitrogenous organic matters that can mineralized in a later period. It is expected that after the application of high quality manure, the biomass of microorganisms markedly increases as a result of the incorporation of substrate and specific micro flora. After extinction this biomass is a very rich source of nutrients, particularly nitrogen. It is so called reactive part of the soil organic component that is mineralized within several weeks or months under favorable conditions. This consideration is correct because NO_3^- content in the soil does not mostly increase after manure application. The results matched with Vanek *et al,* (2003) and Ross, (2012).

Table (3): Interaction effect between incubation days and manures types on net nitrification of organic nitrogen.

Incubation days	NO_3^- (mg kg^{-1}) in clay soil				
	without	**CM**	**CO**	**TR**	**Mean of period**
0	14.33	30.17	17.67	32.67	23.71
7	20.00	34.83	52.17	41.00	37.00
14	47.33	64.17	44.17	69.50	56.29
30	65.17	73.50	46.17	92.67	69.38
60	69.00	76.67	46.33	138.67	82.67
90	193.33	250.33	286.67	230.67	240.25
Mean of manures	68.19	88.28	82.20	100.86	
Statistical analysis					
Sign. of periods	**	Sign. of manures	**	Sign. of periods x manures	**
LSD $_{at\ 5\%}$	5.11	LSD $_{at\ 5\%}$	2.65	LSD $_{at\ 5\%}$	7.06

**** CM: chicken manure, CO: compost, TR: Town refuse.**

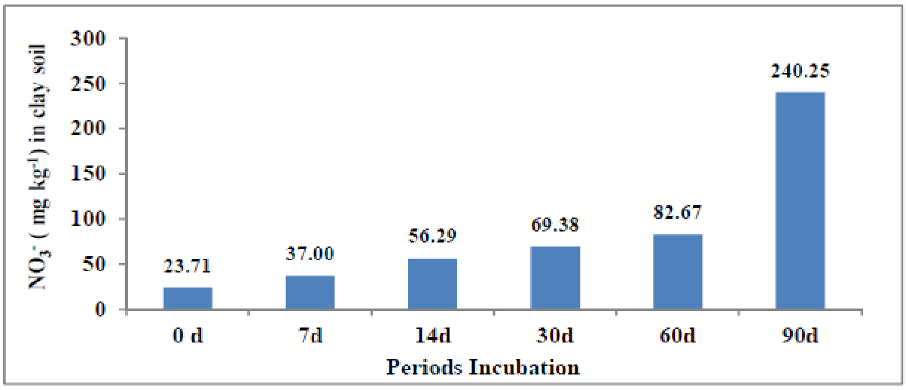
The conversion of the N in clay soil and that due to the manure addition to nitrate is shown in Fig. (1). It was shown that the lowest amount of N detained with compost (82.19 mg kg^{-1}) and the highest amount of N with town refuse (100.86 mg kg^{-1}) treatment. Similar results were also gained by Ross, (2012).



C: control, C CM: clay chicken manure, C CO: clay compost, C CR: clay town refuses.

Fig. (1): Effect of manure types on the mineralization of nitrogen forms (NO_3^- mg kg^{-1}) in clay soil.

In Fig. (2), data show that values of (NO_3^-) content in clay soil incubation generally increased significantly with length of incubation periods. The investigated incubation periods can be arranged according to their effects on (NO_3^-) content in following order: zero < 7 < 14 < 30 < 60 < 90 days of incubation. The highest value of (NO_3^-) content in clay soil (240.25 mg kg^{-1}) at 90 days of incubation period. The lowest value of (NO_3^-) content at zero time (23.7 mg kg^{-1}). These results are in agreement with those obtained by Vanek *et al.,* (2003).



0 d: 0 day, 7d: 7 day, 14d: 14 day, 30d: 30 day, 60 d: 60 day, 90d: 90 day.

Fig. (2): Effect of incubation periods on the mineralization of nitrogen forms (NO_3^- mg kg^{-1}) in clay soil.

Nitrification of organic nitrogen as affected by manure types mixed with sandy soil in different incubation periods

Data in Table (4), show that the conversion of the N in the sandy soil and that due to the manure addition to nitrate (NO_3^- mg kg^{-1}) at different incubation days. At 90 days of incubation period the value content of (NO_3^- mg kg^{-1}) was higher than other incubation time and the lowest value of (NO_3^- mg kg^{-1}) at zero day of incubation period.

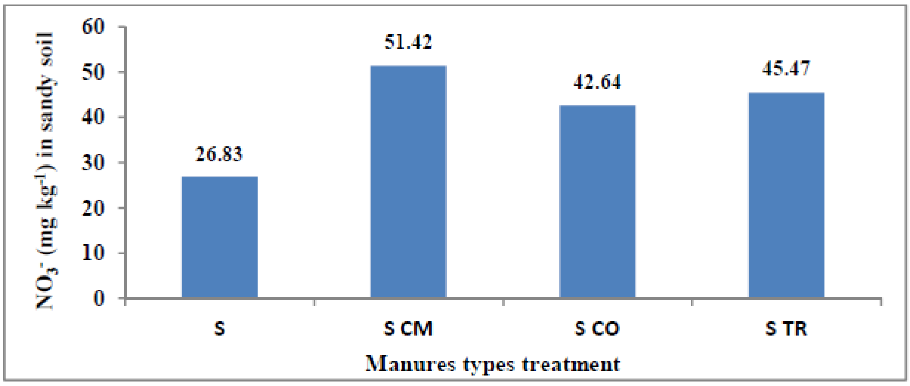
Table (4): Interaction effect between incubation days and manures types on net nitrification of organic nitrogen.

Incubation days	**NO_3^- (mg kg^{-1}) in sandy soil**				
	with out	**CM**	**CO**	**TR**	**Mean of periods**
0	14.8	20.0	20.3	18.8	18.5
7	17.5	24.5	21.0	23.0	21.5
14	18.8	26.5	19.7	24.0	22.3
30	21.8	28.8	23.2	30.8	26.2
60	21.3	43.0	27.0	38.2	32.4
90	66.7	165.7	144.7	138.0	128.8
Mean of manures	26.8	51.4	42.6	45.5	
Statistical analysis					
Sign. of periods	**	Sign. of periods	**	Sign. of periods x manures	**
LSD at 5%	2.08	LSD at 5%	1.30	LSD at 5%	3.16

**** CM: chicken manure, CO: compost, TR: Town refuse.**

At the incubation time up to 90 days chicken manure had the highest net nitrification (165.67 mg kg^{-1}) followed by compost (144.67 mg kg^{-1}) followed by town refuse (138.00 mg kg^{-1}) and the least in control (66.67 mg kg^{-1}).

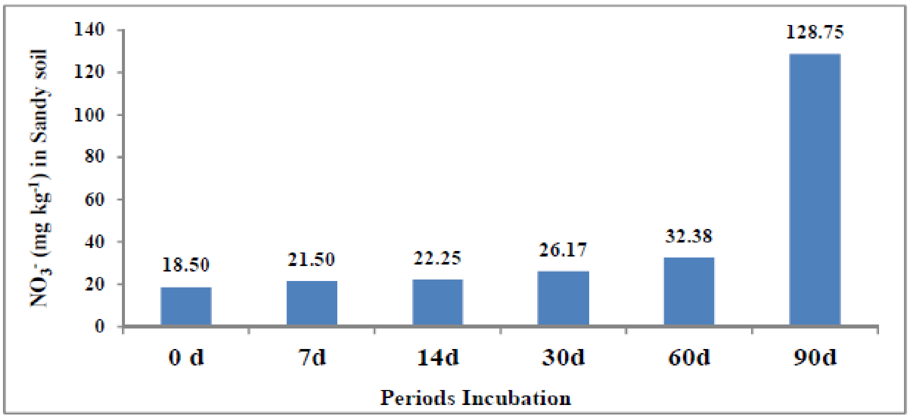
Data in Fig. (3) show that values of (NO_3^-) contents in sandy soil incubated with application of organic manure types. The investigated manures treatment can be arranged accenting to their effect on (NO_3^-) content in following order: control < compost < town refuse < chicken manure. The highest value of (NO_3^-) content (51.42 mg kg^{-1}) was obtained due to the treatment chicken manure while the lowest values of (NO_3^-) content (26.83 mg kg^{-1}) with control then (42.64 mg kg^{-1}) with compost treatment. These results are in accordance with Khalil *et al.,* (2005).



C: control, S CM: sand chicken manure, S CO: sand compost, S CR: sand town refuse.

Fig. (3): Effect of manure types on the mineralization of nitrogen forms (NO_3^- mg kg^{-1}) in sandy soil.

Data presented in Fig. (4) show that the value of (NO_3^-) content ($mgkg^{-1}$) in sandy soil as affected by the incubation periods. The lowest amount of N mineralization to (NO_3^-) (18.50 $mgkg^{-1}$) at zero days of incubation time and the highest value of (NO_3^-) content (128.75 $mgkg^{-1}$) at 90 days of incubation time in sandy soil. The effect of incubation occurred in (NO_3^-) content followed the order; zero < 7 <14 < 30 < 60 < 90 days of incubation period.



0 d: 0 day, 7d: 7 day, 14d: 14 day, 30d: 30 day, 60 d: 60 day, 90d: 90 day.

Fig. (4): Effect of incubation periods on the mineralization of nitrogen forms (NO_3^- mg kg^{-1}) in sandy soil.

Ammonification of organic nitrogen as affected by manure types mixed with clay soil in different incubation periods

Ammonification is the conversion of organic N to ammonium by microbes in the soil. The cumulative net ammonification (NH_4^+ mg kg^{-1}) in clay soil as affected by interaction between manure types and incubation time as shown in Table (5).

Table (5): Interaction effect between incubation days and manure types mixed with clay soil on net ammonification of organic nitrogen.

Incubation days	NH_4^+(mg kg^{-1}) in clay soil				
	with out	CM	CO	TR	Mean of period
0	37.00	47.00	57.17	40.50	45.42
7	40.50	49.33	52.33	43.33	46.37
14	44.17	50.83	61.00	49.33	51.33
30	79.33	121.33	92.33	104.33	99.33
60	101.00	254.67	192.50	184.33	183.13
90	83.67	179.67	91.00	167.00	130.34
Mean of manures	64.28	117.14	91.06	98.14	
Statistical analysis					
Sign. of periods	**	Sign. of manures	**	Sign. of periods x manures	**
LSD $_{at 5\%}$	5.65	LSD $_{at 5\%}$	6.39	LSD $_{at 5\%}$	10.53

**** CM: chicken manure, CO: compost, TR: Town refuse.**

Data revealed that the highest values content of (NH_4^+) detained at 60 days of incubation time with all manures treated clay soil. The lowest values content of (NH_4^+) given at zero time with all manures treated clay soil. At 60 days of the incubation period, the effect of manures treatment on (NH_4^+) content can be arranged in following order: control (101.00 mg kg^{-1})< town refuse (183.33 mg kg^{-1}) < compost (192.50 mg kg^{-1}) < chicken manure (245.67 mg kg^{-1}), these results are in accordance with those reported by Anggria *et al.,* (2012).

Data in Fig. (5) observed that the lowest amount of N mineralization was in control (64.28 mg kg^{-1}) while compost, town refuse and chicken manure, treatments had higher values (91.06, 98.14and 117.14, mg kg^{-1}), respectively in clay soil. The lowest amount of organic nitrogen converted to ammonium by microbes in clay soil with compost treatment and the highest amount of N mineralization to ammonium (NH_4^+) with chicken manure. It could however also relate thin effect to the C/N ratio of the manures. Compost had higher C/N ratio composing with chicken manure and town refuse, these data agree with Ross, (2012).

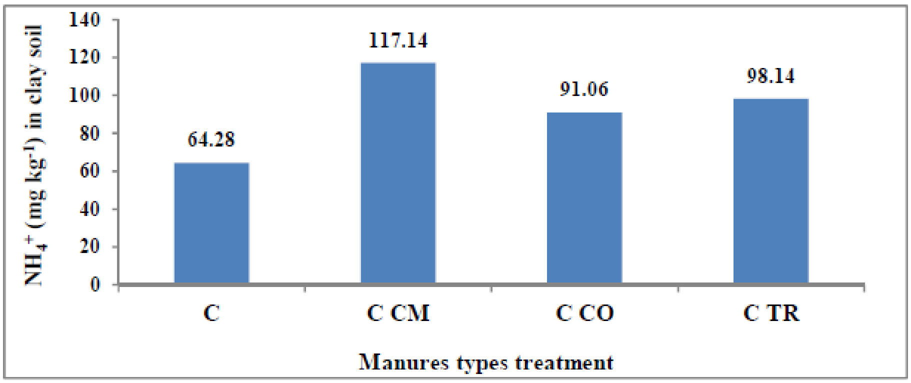


Fig. (5): Effect of manure types on the mineralization of nitrogen forms (NH_4^+ mg kg^{-1}) in clay soil.

Data in Fig. (6) shows the effect of incubation periods on the mineralization of N in clay soil across manures types It was observed that a gradual build-up of ammonium in the clay soil up to 60 days of incubation, then subsequently reduced significantly after 60 days of incubation. The highest content value (183.1 mg kg^{-1}) at 60 days of incubation in clay soil and the lowest content value (45.42 mg kg^{-1}) at zero time of incubation.

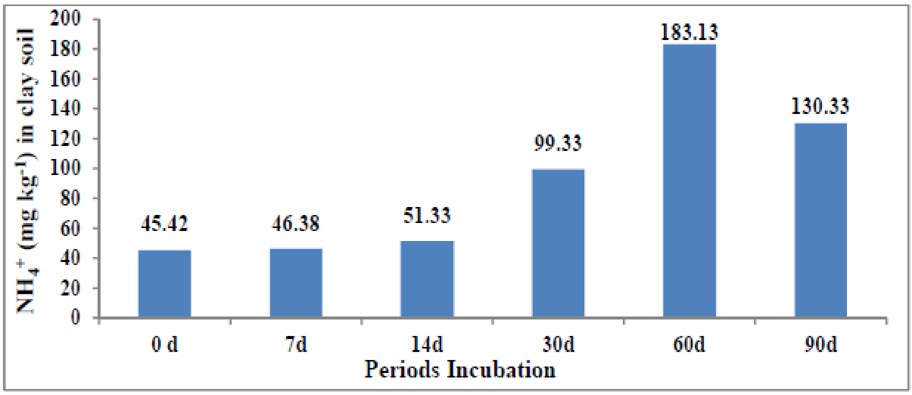


Fig. (6): Effect of incubation periods on the mineralization of nitrogen forms (NH_4^+ mg kg^{-1}) in clay soil.

The increases occurred in (NH_4^+) content as affected by incubation followed the order: zero < 7 < 14 < 30 < 90 < 60 days of incubation in clay soil. These results coincide with the results of Anggria *et al.,* (2012).

Ammonification of organic nitrogen as affected by manure types mixed with sandy soil in different incubation periods

Data in Table (6) show that conversion of the N in the soil and that due to the manure addition to ammonium (NH_4^+ mg kg^{-1}) at different incubation days. At 60 days of incubation period with all manures treated the sandy soil.

The lowest values content of (NH_4^+) at zero time with all manures treated sandy soil. At 60 days of the incubation period, the effect at the investigation manures treatment on (NH_4^+) content can be arranged in following order: control (49.0 mg kg^{-1}) < town refuse (57.67 mg kg^{-1}) < chicken manure (83.33 mg kg^{-1}) < compost (120.50 mg kg^{-1}).

Table (6): Interaction effect between incubation days and manures types on net ammonification of organic nitrogen.

Incubation days	NH_4^+(mg kg^{-1}) in sandy soil				
	with out	**CM**	**CO**	**TR**	**Mean of period**
0	15.67	22.50	40.00	17.50	23.92
7	17.67	24.33	42.00	39.33	30.83
14	20.33	31.67	45.83	42.00	34.96
30	29.67	60.33	71.83	35.33	49.29
60	49.00	83.33	120.50	57.67	77.63
90	47.67	52.00	63.00	54.67	54.33
Mean of manures	30.00	45.69	63.86	41.08	
Statistical analysis					
Sign. of periods	**	Sign. of periods	**	Sign. of periods x manures	**
LSD $_{at\ 5\%}$	2.99	LSD $_{at\ 5\%}$	1.16	LSD $_{at\ 5\%}$	3.25

**** CM: chicken manure, CO: compost, TR: Town refuse.**

In a process known as N mineralization, the organic N contained in soil organic matter is converted into inorganic forms (NH_4^+ and NO_3^-) as result of the activities of soil microorganisms. The mineralization of organic manure in soils is affected by types of soil. As for ammonium (NH_4^+) content, it can be seen from results illustrated in Fig. (7) that, the ammonium content significantly increased due to applying organic manures mixed with sandy soil. The highest content value (63.86 mg kg^{-1}) of compost treatment and the lowest content value (30 mg kg^{-1}) of untreated soil. The increases occurred in ammonium (NH_4^+) content followed the order: control < town refuse < chicken manure < compost.

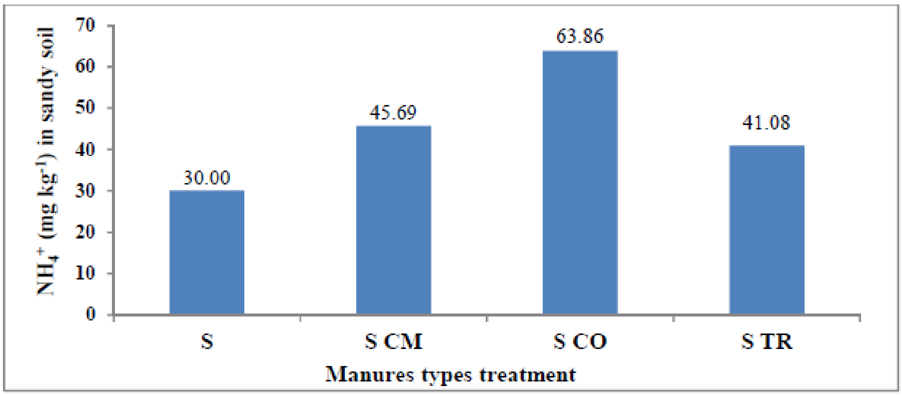


Fig. (7): Effect of manure types on the mineralization of nitrogen forms (NH_4^+ mg kg^{-1}) in sandy soil.

Data in Fig. (8) shows the effect of incubation periods on the mineralization of N in sandy soil across manures types. It was observed that a gradual build-up of ammonium in the sandy soil up to 60 days of incubation, that subsequently reduced significantly after 60 days of incubation. The highest content values (77.63 mg kg^{-1}) in sandy soil of timed at 60 days of incubation and the lowest one (23.92 mg kg^{-1}) found in sandy soils at zero time of incubation.

The increases occurred in (NH_4^+) content followed the order: zero < 7 < 14 < 30 < 90 < 60 days of incubation in sandy soil. These results coincide with the results of Anggria *et al.,* (2012).

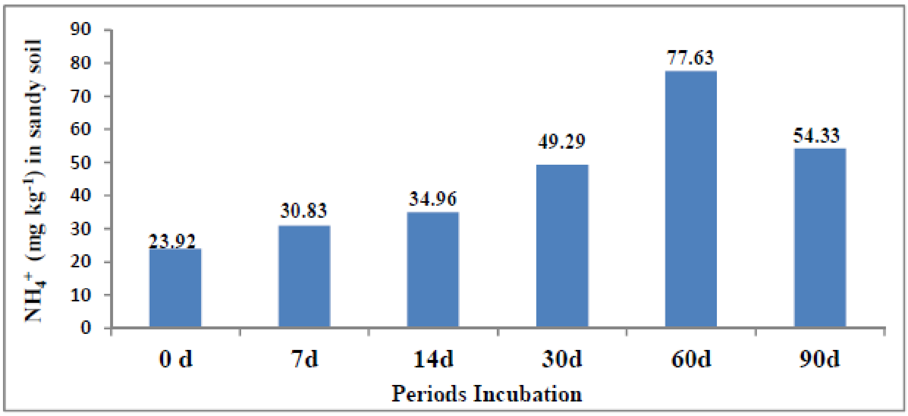


Fig. (8): Effect of incubation periods on the mineralization of nitrogen forms (NH_4^+ mg kg^{-1}) in sandy soil.

CONCLUSION

1- The concentration of both NH^+_4 -N and No_3^--N in clay soil were higher than in sandy soil.
2- The maximum concentration of (NH^+_4 -N) of timed in clay and sandy soils at 60 days incubation often chicken manure and compost application, respectively.
3- The maximum concentration of (No_3^--N) of timed at the 90 days incubation for two types of soils (clay and sandy soils).
4- The types of organic fertilizer can be effect the time of nitrogen availability and evaluate the best time for planting.
5-The higher carbon content of the some organic manures could have encouraged the growth of the microbes and the subsequent use of all N manures causing mineralization of nitrogen in soils.

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تأثير إضافة الأسمدة العضوية على معدنة النيتروجين في أراضي مصرية مختلفة.

أيمن محمد الغمري ، دينا عبد الرحيم غازي و محمود عياش على إمعرف
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السماد العضوي هو واحد من مصادر النيتروجين في التربة. تعتمد عملية معدنة النيتروجين على طريقة الإضافة، ونوع المخصب العضوي المضاف والنشاط الميكروبي كذلك التهوية والرطوبة. وتهدف الدراسة إلى بحث معدل معدنة النتروجين المتأثر بمصادر مختلفة من الاسمدة العضوية (الكمبوست، مخلفات الدجاج، وسماد مخلفات القمامة) بعد خلطها مع نوعين من التربة (الطينية والرملية) بمعدل 20 طن/ الفدان، على التوالي، في فترات مختلفة من التحضين.

أجريت التجربة في معمل قسم التربة، كلية الزراعة، جامعة المنصورة. وقد جمعت عينة التربة من المنصورة (التربة الطينية) ومن الشرقية (التربة الرملية). وقد تمت دراسة معدنة النيتروجين في كل من التربة الطينية والرملية في فترات تحضين مختلفة. وتم تقدير الأمونيوم والنترات في فترات (0، 7، 14، بعد 30 و 60 و 90 يوما من التحضين على درجة حرارة 28 درجة مئوية).

وأظهرت النتائج أن محتوى الآمونيا في المعاملات المختلفة من المخصبات العضوية على فترات التحضين المختلفة في كل من التربة الطينية والرملية المستخدمة زادت مقارنة مع الكنترول (بدون إضافة المخصب العضوي). التركيز الأقصى من الأمونيا لوحظ عند 60 يوما من التحضين مع الكمبوست ثم سماد الدواجن في التربة الرملية والعكس مع التربة الطينية. في حين أن الحد الأقصى لتركيز النترات لوحظ عند 90 يوما من التحضين في كل من التربة الطينية والرملية وكان أعلى مع الكمبوست ثم سماد الدواجن في التربة الطينية والعكس مع التربة الرملية.

ويمكن أن نخلص إلى أن عملية معدنة النتروجين هي عملية يتم فيها تحويل النيتروجين العضوية الي الصورة غير العضوية التي في الغالب تكون الآمونيوم والنترات وذلك عند إضافة المخصبات العضوية بانتظام إلى التربة، و أن عملية المعدنة تزيد تدريجيا مع مرور الوقت.