DOI : 10.35124/bca.2019.19.S1.2747

Biochem. Cell. Arch. Vol. 19, Supplement 1, pp. 2747-2752, 2019 | www.connectjournals.com/bca | *ISSN 0972-5075*

EFFECT OF ORGANIC RESIDUES OF COWS AND ORGANIC ACIDS ON THE READINESS OF SOME MICRONUTRIENTS IN THE SOIL

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(Received 21 March 2019, Revised 12 June 2019, Accepted 17 June 2019)

ABSTRACT : The study was conducted in the Iraq, Anbar, Fallujah (Saqlawiyah) in silty loam. In the 2009 and 2010 for three months to study the effect of organic manure (Cows residue) (CR) and adding of organic acids extract (OA) of the same compost on the readiness of some micro elements Fe, Zn and Cu (iron, zinc, copper) in the soil. The Cows residue were added in three levels: CR1, CR2 and CR3 by 10, 20 and 30 tons. E^{-1} respectively, in addition to the comparison treatment (without addition). While the organic acid extract was added by four rates; OA1, OA2 and OA3 were 0, 5, 10 and 20 kg.E^{-1}, respectively. The results showed an increase in the concentration of each of Fe, Zn, Cu ready in the soil as a result of adding CR and OA compared to the treatment of comparison. The treatment of CR2 (Cattle Waste) was the best, with the mean soil content of ready-made iron reached 5.44 and 4.60 mg.Kg^{-1} compared to 3.41 and 3.12 mg. Kg^{-1} for the treatment of comparison in the first year and second respectively. The soil content of zinc was increased to 1.53 and 1.26 mg. Kg^{-1} in the same order. Copper was 0.69 and 0.55 mg. Kg^{-1} compared with comparison treatment (0.46 and 0.40 mg. Kg^{-1}) for the first and second years, respectively.

Key words : Micronutrients, soil, organic.

INTRODUCTION

The world is moving towards to use of clean farming technologies in order to minimizing the pollution, so the use of natural substances such as organic or biological fertilizer, or both, is an appropriate alternative to chemical fertilizers. One of the important stages in the soil cycle is the formation of organic matter, which returns many of the basic elements to the free state (Cotrufo *et al*, 2015). In spite of the important role of organic matter in supplying the soil with the nutrients that enter the activities of the plant bio, at the same the organic matter has play a very important role in the transformations taking place in the soil by increasing the readiness of many elements in the soil, such as Fe Fe, Zn and Cu copper by reducing the degree of soil reaction (PH) or prevent the entry of those elements In weak compounds by forming organic mineral complexes (Shaheen *et al*, 2017).

Several studies have indicated the role of organic fertilizers and their derivatives in the preparation of micro nutrients, soil fertilization and crop productivity (van Bruggen *et al*, 2016) noted the widespread use of organic matter and humate, particularly in intensive and irrigated agriculture. As Islam (2016) increasing the calcareous soil content of ready-made iron as a result of the addition of farm waste and compost. Koch *et al* (2015) pointed out that the productivity of the crops was increased by adding a mixture of organic matter with mineral fertilizers which affected the movement of elements and their susceptibility to plant utilization. Tan (2014) states that the role of organic matter in the processing of micro nutrients in soil is through the formation of claws that can increase or decrease their availability in the soil. Carrasco-Gil *et al* (2018) indicates the need for micronutrients such as Fe, Zn and Cu in calcareous soils, as well as in high organic matter soils. The increased strength of these elements and their association with all the calcareous soil and organic matter affects the ability to process the plant. Pointed out (Singh *et al*, 2015) the role of organic fertilizers in improving physical and chemical properties of soil, through its interaction with clay minerals then improve the aquatic and aerobic properties of soil, as well as improve the adsorption capacity of the fertility nutrients and make them ready for the plant. However, they pointed to the positive role of organic matter in the preparation of micro-elements when the percentage of organic matter in the soil does not exceed 2%. Confirmed (Zechmeister-Boltenstern *et al*, 2015) the positive role was played by organic matter in the processing of micro elements in general. The iron particular is through the formation of chlorinated compounds with its cheated substances.

Lehmann and Kleber (2015) pointed out that soil reaction (PH) and its content of organic matter affects the readiness of iron, copper, zinc and other small elements. That the water extracts of the various organic waste decomposed contain most of the elements needed by the plant depending on the type of element and the nature of the organic matter, so it is possible to supply the plant with a portion of the nutrients needed. Ercoli *et al* (2017) pointed out that the addition of zinc profiles to the soil had a significant effect on the increase of total dry matter and grain yield of coarse wheat.

Indicated Agneessens *et al* (2015) to increase the nitrogen and phosphorus ready in the soil with increasing the addition of organic matter (Sheep residues) and zinc sulphate added to the soil.

Therefore, the present study aims to:

1. Study the effect of organic manure (cows residues) in the readiness of some minor elements in the soil.
2. Effect of adding organic acid extract in the preparation of some minor elements in the soil.

MATERIALS AND METHODS

The experiment was carried out in one of the fields of Saqlawiyah of Falluja district in 2009 and 2010 during November, December and January in the soil of a green mixture. Soil samples were taken from the surface layer (0-10 cm) and some physical and chemical properties were estimated according to the methods mentioned in Zhang and Sun (2014) as shown in Tables 1 and 2, the field was divided into 21 experimental pieces with a distance of 1 x 1 m, the soil was treated with three levels of cattle residue (Table 3) after being fermented by air, 10, 20 and 30 tons e^{-1} mixing with soil to a depth of 10 cm. Organic acids were also extracted from cows' residues by taking 100 g of organic fertilizer and adding 1000 cm^3 of hydroxide Sodium NaOH (N0.1) Mechanism, then shake for three hours on the rattle, then filtrate the mixture and take the leachate and add the extract (leachate) three rates are 5, 10 and 20 kg e^{-1}. The soil was analyzed at the end of the experiment to determine its iron content Fe, Zn and Cu. Use the experiment to design the complete random segments with three replicates.Used the complete random design with three replicates.

RESULTS AND DISCUSSION

Table 4 shows the effect of cattle residues and organic acid extract in iron readiness. The table shows significant differences in the ratio of iron content of ready-made soil between CR2 and comparison in both years, where it was 5.44 compared to 3.41 mg. Kg^{-1} as an average in the comparison treatment during the first year, rose from an average of 3.12 in a comparative treatment to 4.60 mg.Kg^{-1} in CR2 treatment during the second year in addition, there were no significant differences between the organic acid and bovine acid extracts in the three concentrations the second transaction was the best CR2 transaction.

Results showed ainsignificant differences between

Table 1 : Some physical and chemical properties of soil.

The adjective		Unit	The value
Dismissed during soil	Sandbox	GM. Kg^{-1}	195
	Greenway		578
	Clay		227
The degree of textures		Blend Grenier	
Bulk density		Mikagharam.M^{-3}	1.26
Real density		2.50	
Porosity		%	49.60
EC		Under Simmons.M^{-1}	2.40
pH		-	7.54
Organic matter		Mg. Kg^{-1} soil	11.30
Organic carbon		-	3.10
Carbon: nitrogen C:N		-	13:10
Carbonates College		%	43.21
Active lime			17.22

Table 2 : Soil content of certain nutrients.

The adjective	Unit	The value
Instant nitrogen	Mg. Kg^{-1} soil	73.23
Instant phosphorus		24.15
Potassium is ready		225
Fe		1.43
Zn		0.48
Cu		0.25

Table 3 : Some chemical characteristics of fecundity of the remnants of cows.

The adjective	Unit	The value
pH (1:10)	-	8, 5
EC (1:10)	Under Simmons. M^{-1}	3, 4
C	%	31.02
N		2.11
P		0.60
K		0.81
Fe	Mg. Kg^{-1}	39.06
Zn		18.3
Cu		12.51

Table 4 : Effect of cows residues and organic acids extract in the amount of ready iron in the soil ($mg.Kg^{-1}$).

Treatment	First year	Second year
Comparison	b3.41	b3.12
CR1	ab4.62	ab4.60
CR2	a5.44	a4.60
CR3	ab5.12	ab4.19
OA1	ab4.43	ab3.33
OA2	ab4.32	ab3.45
OA3	ab4.12	ab3.45
$L.S.D_{0.05}$	1.72	1.40

Similar characters in the same column are not significant differences.

Table 5 : Effect of cows residues and Organic Acid Extraction in the Amount of Zinc Ready in Soil (mg/kg^{-1}).

Treatment	First year	Second year
Comparison	a1.20	ab0.84
CR1	a1.49	a1.13
CR2	a1.53	a1.26
CR3	a1.37	ab0.94
HA1	a1.14	ab0.85
HA2	a1.27	a1.16
HA3	a1.21	ab0.88
$L.S.D_{0.05}$	0.65	0.44

Similar characters in the same column are not significant differences.

Table 6 : Effect of cows residues and organic acid extract in quantity of prepared copper in the soil (mg/kg^{-1}).

Treatment	First year	Second year
Comparison	ab0.46	ab0.40
CR1	a0.66	a0.51
CR2	a0.69	a0.55
CR3	a0.58	ab0.47
OA1	a0.59	ab0.44
OA2	ab0.49	ab0.41
OA3	ab0.51	ab0.44
$L.S.D_{0.05}$	0.32	0.21

Similar characters in the same column are not significant differences.

OA1, OA2 and OA3 during the two years, while it was recordeda significant difference between OA1, OA2 and OA3 and the comparison treatment reached 4.43, 4.32 and 4.12 $mg.Kg^{-1}$ for the three treatments respectively compared to 3.41 $mg.Kg^{-1}$ in comparison treatment in the first year, in the second year the soil content of ready-made iron increased from 3.12 $mg.Kg^{-1}$ in the comparison treatment to 3.33, 3.45 and 3.45 $mg.Kg^{-1}$ for OA1, OA2 and OA3, respectively. It was recorded a insignificant differences between the experiment factors during the two years.

This is what (Libohova *et al*, 2018) has pointed out, to the positive role of organic matter in increasing the capacity of micronutrients when their proportion in the soil is appropriate.

Table 5 shows the effect of bovine waste and organic acid extract in the amount of zinc ready in the soil. it is noted from the table that the concentration of zinc in the soil increased slightly (insignificant difference) in CR1, CR2 and CR3 compared to the comparison treatment with concentrations of 1.49, 1.53 and 1.37 compared to 1.20 $mg.Kg^{-1}$ for comparison treatment in the first year of the three transactions respectively. While its concentration increased from 0.84 $mg.Kg^{-1}$ in the comparison treatment to 1.13, 1.26 and 0.94 $mg.Kg^{-1}$ for coefficients CR1, CR2 and CR3 during the second year. The differences between OA1, OA2 and OA3 were not significant in the first year.While slightly increased in the second year of 0.84 compared withthe comparison treatment reached 1.16 $mg.Kg^{-1}$ for OA2 treatment, While the other transactions were not recorded a significant differentcompared with the comparison treatment.This is consistent with (Fan *et al*, 2016), which indicated increased concentration of ready zinc in the soil with increasing the organic matter.

Table 6 shows the effect of cows residues and organic acid extract in the amount of copper ready in the soil, the table shows no significant differences in the soil content of ready copper between all the treatments, Perhaps this is due to the organic compost is rich in micronutrients. In general, the table shows a marked superiority of the treatment of the cows residues and the organic acid extract compared to the comparison treatment. Perhaps this is due to the organic compost is rich in micronutrients, or the participation of its functional groups in the processing of copper to some extent, but these differences were not significant.

Table 6 shows that CR2 was superior in both years, with copper in soil 0.69 and 0.55 $mg.Kg^{-1}$ in both years compared to 0.46 and 0.40 $mg.Kg^{-1}$ compared with the comparison treatment over the same two years.It is noted from the table that the soil content of copper a significantly when treated with soil organic extract reached 0.46 $mg.Kg^{-1}$ compared with the comparison treatment in the first year reached 0.59 and 0.51 $mg.Kg^{-1}$ for OA1 and OA3 coefficients. The second year it has risen from 0.40 mg. Kg-1 compared with the comparison treatment was reached 0.44, 0.41 and 0.44 $mg.Kg^{-1}$ for OA1, OA2 and OA3 respectively, but the differences between the coefficients were not all a significant.This corresponds to what (Shahid *et al*, 2016) indicates from increased the micronutrient concentrations especially copper in the soil when treated with organic matter with the high proportion of nitrogen, phosphorus and potassium ready in the soil.

CONCLUSION

Positive role of organic matter in increasing the capacity of micronutrients when their ýproportion in the soil is appropriate was approved.

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