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STUDY OF CHEMICAL CHARACTERISTICS OF SOIL AND RELATIONSHIP BY SOME ELEMENTS BEHAVIOR IN EL KAWAMEL, SOHAG, EGYPT

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ABSTRACT

This research was aimed to know the chemical characteristics of the soil and its relationship with the behaviour of some elements in El Kawamel - Sohag - Egypt. Therefore, seventeen soil samples were collected representing six profiles representing the study area.

The results showed that: - The texture of the soil in El Kawamel soil is sandy in all soil samples. The cation exchange capacity ranged from 4.2 to 5.9 **$Cmol_cKg^-$**soil .The soil pH ranged from 7.61 to 8.79 (alkaline to slightly alkaline), therefore the electrical conductivity ranged from 0.15 to 6.97 dS/m at 25^0C. The total calcium carbonate content ranged from 10.46 to 46.85 gKg^{-1}.In addition the order of the soluble cations content was as follows: Sodium > Calcium > Magnesium > Potassium. The soluble anions content was arranged as follows: - Sulphate > Chloride > Bicarbonate, while the carbonate anion was absent. The results also showed that the total content of some of the microelements were as follows: Iron > manganese > zinc > lead > nickel > copper. while the chemically extracted microelements content were as follows : - Iron > manganese > zinc > copper > nickel > lead.

Key Words: chemical, elements and El Kawamel.

INTRODUCTION

Redwan *et al.*(2021), obtained flood hazard assessment of the area showed that most of the basins exhibit moderate hazard except wadis W. N. Kawamel Bahari, W. Tag El-Waber, W. El-Raqaqna, and W. El-Dukhan, exhibit low hazard possibility and W. ElKawamil Bahri and W. El-Shaykh El-Aqra showed high hazard possibility. To avoid the area from the overland flow hazards, it is recommended: 1-Small dams or barrage could be constructed. appropriate locations to restore the excess water derived from any runoff and could be used for cultivation (W. ElKawamel Bahari, W. El-Shaykh El-Aqra, W. El-Kawamil Qibbli, W. El-Yataiyim, 2-A lined large channel could be excavated as a source of water at specific locations upstream

Melegy *et al.*, (2014), geochemical mobilization of heavy metals in water has been cited as an important factor in many diseases of Sohag Governorate, Egypt. Forty-two groundwater samples were collected from the Quaternary aquifer and eight samples from surface water of Sohag Governorate. The results recorded high contamination with cadmium and lead. Besides, about 50%of samples are contaminated with iron and manganese at an alert level. All the metals under study exhibited an asymmetric statistical distribution in the investigated area. The study identified positive relationship between contaminated water (surface and groundwater) of Sohag with Cdas well as Pb.

Sohag Governorate is considered one of the Governorates of Upper Egypt with a narrow floodplain, and therefore a small area of fertile productive agricultural soils, and with an increasing population, most of whom depend entirely on the agricultural sector mainly (about 70% of the Governorate's population).

Sohag Governorate is considered one of the most populous Governorates in the republic, which constitutes a heavy burden on the infrastructure in the Governorates of Greater Cairo (migration from rural to urban areas)

Therefore, the eyes of Sohag farmers and investors turned to the hinterland to fill the food gap from the needs of the Governorate's residents.

It was necessary for us to exploit these soils optimally in agriculture, and to achieve this, it is necessary to know the chemical properties of the soils and its relationship to the behavior of some important minor elements for the growth of strategic crops.

MATERIALS AND METHODS

Six soil profiles representing the dominant soil land uses in soils El-Kawamel –Sohag –Egypt. were identified and selected for this study **(Figure.1).** The main characteristics of the studied soils were determined as follows: Particle size distribution by dry sieving methods (**James, 2007**); $CaCO_3$ content volumetrically using the Collin's calcimeter according to ***Şenlikçi et al*. (2015**); pH in soil suspension 1: 2.5 using pH-meter, **3320 Jenway**, (Soil Testing Laboratory, **2012);** electrical conductivity (ECe) in the soil saturation extract using electrical conductivity meter (**YSI model 35**); soluble cations and anions according to the standard methods outlined (**Haluschak, 2006**) and CEC by De **Dawid and Dorota (2014).**

Total content of trace metals of soils was determined after being digested o.5 g of soil by a mixture of concentrated HNO_3 (4.0 mL) + concentrated H_2SO_4 (7.0 mL) + 60 % $HClO_4$ (1.0 mL) as recommended by **Thakur *et al*. (2014).** Extractable content of trace metals of soils were extracted according to Tran **(2010)** using Diethelene Triamine Penta acetic acid (DTPA) and then were measured by Inductively Coupled Plasma (ICP).

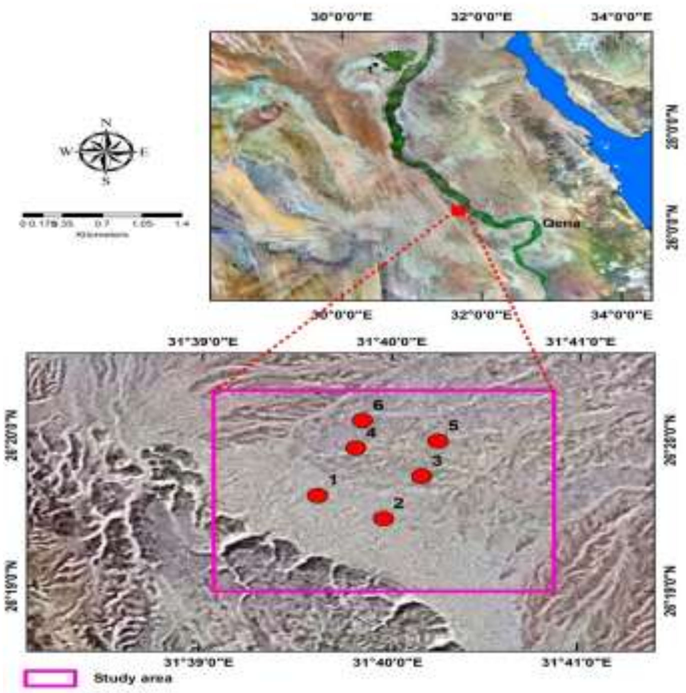


Figure (1): The location of the studied soil profiles in El Kawamel

RESULTS AND DISSECTION

Characterization of the studied soils

-Soil texture

Data in Table 1 show that soil texture of all profiles was sand. Regarding the fine earth, it is quite evident that the coarse fractions (coarse and fine sand) constitutes the major textural components where their content constitutes more than 97 % in all layers of profiles soils.

- Cation exchange capacity (CEC)

Data in Table 1 showed that CEC of the soils under study ranged from 4.2 to 5.9 $\mathbf{cmol_cKg^{-1}}$ soil. The lowest value was recorded in the subsurface layer of profile 3 while the highest the highest value was the subsurface layer of profile 2. Undoubtedly, the variations encountered in CEC values of the studied soil profiles was degree of weatherability of susceptible minerals as well as the content of amorphous inorganic materials in each soil layer of the studied profiles.

- Soil reaction (pH)

Data in Table 2 revealed that the soil pH values range from 7.71to 8.79, indicating alkaline soil reaction. However, most soil layers have mildly alkaline to alkaline soil reaction.

-Soil salinity

Data in Table 2 show that soil salinity of the different layers of the studied profiles varies from non-saline to saline. The lowest EC_e value characterizes the subsurface layer of profile 4 whereas the highest value was deepest layer of profile 6. Depthwise distribution of soil salinity follows two different patterns where soil salinity tends irregular distribution of soil salinity within layers profiles 1, 3,4 and 5) and decrease downwards (profiles 2 and 6). Neither soil salinity nor its vertical distribution within the soil profiles have a unique or specific pattern pertaining to soil types representing the study area.

Calcium carbonate content.

Data in Table 2 dictate that $CaCO_3$ content in the studied soils varies within range between 10.46 and 46.85 $mgKg^{-1}$. The least content was found surface layer of profile 1 while the highest content characterizes the deepest layer of profile 3. Depthwise distribution of soil $CaCO_3$ follows three different patterns where soil $CaCO_3$ tends increase distribution of soil $CaCO_3$ within layers profiles 1, 2,3, and 5) ; continual irregular downwards (profiles 4) and stable distribution of soil $CaCO_3$ content within the soil profile 6.

-Cationic and anionic composition of the soil saturation extract

Data presented in Table 2 show that the cationic composition of the soil extract follow; $Na^+ > Ca^{+2} > Mg^+ > K^+$ while the anionic composition of the soil saturation extract follow $SO4^{-2} > Cl^- > HCO_3^-$ while $CO3^{-2}$ anions was absent.

Table 3 shows that total Fe content in the studied soils varies widely from 1590.0 to 10920.0 $mgKg^{-1}$ with a mean of 3549.50 $mgKg^{-1}$. The lowest total Fe content was found in the subsurface layer of profile 5 while the highest total Fe content was associated with the surface layer of profile 2.

Table 3 shows that total Mn content in the studied soils varies widely from 21.63 to 120.22 $mgKg^{-1}$ with a mean of 80.71 $mgKg^{-1}$. The lowest total Mn content was found in the surface layer of profile 5 while the highest total Mn content was associated with the surface layer of profile 6.

Table 3 shows that total Cu content in the studied soils varies widely from 1.32 to 28.31 $mgKg^{-1}$ with a mean of 9.44 $mgKg^{-1}$. The lowest total Cu content was found in the deepest layer of profile 4 while the highest total Cu content was associated with the subsurface layer of profile 1.

Table 3 shows that total Zn content in the studied soils varies widely from 15.48 to 53.65 $mgKg^{-1}$ with a mean of 36.64 $mgKg^{-1}$. The lowest total Zn content was found in the subsurface layer of profile 5 while the highest total Zn content was associated with the surface layer of profile 6.

Table 3 shows that total Ni content in the studied soils varies widely from 1.21to 41.07 $mgKg^{-1}$ with a mean of 12.90 $mgKg^{-1}$. The lowest total Ni content was found in the subsurface layer of profile 5 while the highest total Ni content was associated with the surface layer of profile 6.

Table 3 shows that total Pb content in the studied soils varies widely from 3.80 to 8.84 $mgKg^{-1}$ with a mean of 32.44 $mgKg^{-1}$. The lowest total Pb content was found in the deepest layer of profile 4 while the highest total Pb content was associated with the subsurface layer of profile 2.

- Chemically extractable of trace metals

Table 4 reveals that DTPA-extractable Fe varies widely 2.16 to 30.46 $mgKg^{-1}$ with a mean of 12.66 $mgKg^{-1}$. The lowest extractable Fe content was found in the surface layer of profile 4 while the highest extractable Fe content was associated with the surface layer of profile 6.

Table 4 shows that Mn varies from 0.25 to 9.33 $mgKg^{-1}$ with a mean of 4.09 $mgKg^{-1}$. The lowest DTPA-extractable Mn content was found in the surface layer of profile 4 while the highest DTPA-extractable Mn content was associated with the surface layer of profile 3.

Table 4 shows that DTPA-extractable Cu content in the studied soils varies widely from 0.31 to 1.02 $mgKg^{-1}$ with a mean of 0.69 $mgKg^{-1}$. The lowest DTPA-extractable Cu content was found in the surface layer of profile 4 while the highest DTPA-extractable Cu content was associated with the surface layer of profile 6.

Table 4 shows that DTPA-extractable Zn content in the studied soils varies widely from 0.38 to 1.66 $mgKg^{-1}$ with a mean of 1.26 $mgKg^{-1}$. The lowest DTPA-extractable Zn content was found in the surface layer of profile 4 while the highest DTPA-extractable Zn content was associated with the surface layer of profile 2.

Table 4 shows that DTPA-extractable Ni content in the studied soils varies widely from 0.15 to 1.21 $mgKg^{-1}$ with a mean of 0.67 $mgKg^{-1}$. The lowest DTPA-extractable Ni content was found in the subsurface layer of profile 4 while the highest DTPA-extractable Ni content was associated with the subsurface layer of profile 6.

Table 4 shows that DTPA-extractable Pb content in the studied soils varies widely from 0.11 to 0.58 $mgKg^{-1}$ with a mean of 0.52 $mgKg^{-1}$.

The lowest DTPA-extractable Pb content was found in the surface layer of profile 4 while the highest DTPA-extractable Pb content was associated with the subsurface layer of profile 1.

Statistically the relationship were made among the studied some elements behavior and some corresponding variable of EL-Kawamel studied soils is explained in Table 5 and Figures 2,3.

Table (1) Particle size distribution and textural classes of the, El-Kawamel studied soils

Profile No.	Depth, (Cm.)	CS	FS	S + C	Textural Classes	CEC $cmol_cKg^{-1}$ soil
1	0 - 40	16.30	82.96	0.74	S	5.3
	40 - 80	19.01	77.81	3.18	S	5.0
	80 - 120	11.12	88.26	0.62	S	5.6
2	0 - 30	3.40	95.28	1.32	S	5.6
	30 - 60	7.18	90.82	2.00	S	5.9
	60 - 90	13.18	84.34	2.48	S	5.2
3	0 - 30	15.93	79.57	4.50	S	5.1
	30 - 60	30.63	64.96	4.11	S	4.2
	60 - 90	21.04	75.18	3.78	S	5.2
4	0 - 30	33.56	64.10	2.34	S	4.3
	30 - 60	13.37	85.65	0.98	S	5.2
	60 - 100	15.13	83.06	1.81	S	4.9
5	0 - 40	29.97	67.77	2.26	S	5.1
	40 - 80	16.23	60.79	1.98	S	4.6
	80 - 120	35.11	62.19	2.71	S	5.1
6	0 - 30	15.76	83.60	0.64	S	5.3
	30 - 75	15.37	83.42	1..21	S	5.6

Not. , CS: Coarse, FS: Fine sand S+C: silt+ clay and S: Sand

Table (2) Chemical properties of the, El-Kawamel studied soils

Profile No.	Depth, (cm.)	pH	EC_e dS/m at 25 ^0C	$CaCO_3$ gkg^{-1}	Cations ($mmol_cL^{-1}$)				Anions ($mmol_cL^{-1}$)			
					Na^+	K^+	Ca^{++}	Mg^{++}	CO_3^{-2}	HCO_3^-	Cl^-	SO_4^{-2}
1	0 - 40	8.37	0.31	10.46	0.65	0.15	1.71	0.56	0.0	1.80	0.36	0.91
	40 -80	8.05	1.2	10.88	3.60	0.80	6.30	1.20	0.0	3.60	1.50	6.80
	80-120	8.22	0.59	12.55	2.07	0.50	2.38	1.02	0.0	1.19	1.02	3.76
2	0 - 30	8.29	0.23	11.71	0.50	0.17	1.00	0.60	0.0	0.70	0.40	1.17
	30 - 60	8.79	0.21	13.39	0.33	0.09	1.50	0.18	0.0	0.60	0.18	1.32
	60 - 90	8.39	0.21	13.80	0.65	0.14	1.05	0.28	0.0	0.56	0.49	1.08
3	0 - 30	7.85	0.94	22.59	3.14	1.27	3.12	1.95	0.0	1.37	1.56	6.55
	30 - 60	8.73	0.67	45.21	3.59	0.91	1.40	0.70	0.0	1.12	0.98	4.50
	60 - 90	7.95	1.0	46.85	4.58	1.25	2.48	1.55	0.0	1.24	1.55	7.07
4	0 -30	7.72	0.51	12.55	0.79	0.20	2.47	1.60	0.0	3.02	1.02	3.02
	30 - 60	8.52	0.15	11.71	0.26	0.07	1.04	0.16	0.0	0.72	0.48	0.33
	60 -100	8.56	0.22	12.55	0.56	0.18	1.02	0.48	0.0	0.48	0.24	1.53
5	0 - 40	7.82	0.52	11.13	3.26	0.90	6.00	3.50	0.0	3.00	2.50	8.11
	40- 80	8.55	0.21	12.80	5.33	1.02	7.00	3.00	0.0	3.50	3.00	9.85
	80 -120	8.25	0.51	12.80	3.06	0.61	1.90	0.57	0.0	1.33	1.71	3.09
6	0 - 30	7.83	6.64	10.88	38.75	4.43	18.40	4.60	0.0	1.61	17.25	47.32
	30 - 75	7.71	6.97	10.88	41.23	4.27	18.80	4.70	0.0	1.18	19.98	47.85

Table (3) Total content of trace metals of the, El-Kawamel studied soils.

Profile No.	Depth, (cm.)	Fe	Mn	Cu	Zn	Ni	Pb
		mgKg^{-1}					
1	0 - 40	2066.0	33.80	11.9	31.90	18.16	18.16
	40 - 80	2851.0	57.67	28.31	35.11	18.16	18.16
	80 - 120	2981	62.04	23.71	41.55	17.95	17.95
	W*	2632.67	51.17	21.31	36.19	18.09	10.69
2	0 - 30	10920.0	75.07	4.15	41.55	13.82	40.18
	30 - 60	4528.0	65.81	16.15	45.35	10.99	80.84
	60 - 90	2108.0	34.01	3.54	48.51	17.29	13.37
	W*	5852.0	58.30	7.95	33.85	14.03	33.60
3	0 - 30	2108.0	38.44	2.91	26.67	9.91	49.56
	30 - 60	2542.0	44.49	6.51	34.73	8.17	53.86
	60 - 90	3229.0	75.33	23.16	29.6	5.56	58.94
	W*	2626.33	52.75	10.86	30.33	7.88	54.12
4	0 - 30	2108.0	38.44	9.16	40.40	14.03	18.29
	30 - 60	2542.0	44.49	2.47	43.38	7.95	8.90
	60 - 100	3229.0	75.33	1.32	36.46	4.26	3.80
	W*	6160.50	55.01	4.02	39.72	8.30	9.68
5	0 - 40	1466.0	21.63	13.72	41.50	5.99	21.36
	40 - 80	1590.0	59.55	8.40	15.48	1.21	17.84
	80 - 120	4858.0	43.96	3.38	28.30	3.60	4.43
	W*	2638.0	41.71	8.50	28.43	3.60	14.54
6	0- 30	3239.0	120.22	6.82	53.65	41.07	14.03
	30 - 75	9809.0	92.38	2.16	49.86	15.16	11.64
	W*	7181.0	103.52	4.02	51.30	25.50	12.60
	W**	3549.50	80.71	9.44	36.64	12.90	32.44

W* weighted mean of profile and W weighted mean of all profiles**

Table (4) Extractable content of trace metals of the, El-Kawamel studied soils

Profile No	Depth, (Cm.)	Fe	Mn	Cu	Zn	Ni	Pb
		mgKg^{-1}					
1	0 - 40	11.22	3.01	0.86	0.98	0.82	0.41
	40 - 80	9.03	1.98	0.59	1.55	0.63	0.58
	80 - 120	7.11	0.79	0.46	1.36	1.22	0.17
	W*	9.38	1.93	0.64	1.30	0.64	0.39
2	0 - 30	17.14	8.55	0.76	1.66	0.78	0.27
	30 - 60	14.13	6.13	0.57	1.12	0.53	0.22
	60 - 90	11.59	7.11	0.85	1.02	0.49	0.35
	W*	14.29	7.26	0.73	1.27	0.60	0.28
3	0 - 30	15.07	9.33	0.67	0.89	0.86	0.28
	30 - 60	12.24	5.17	0.56	1.44	0.45	0.47
	60 - 90	8.32	7.69	0.49	1.34	0.57	0.52
	W*	8.20	7.40	0.57	1.22	0.63	0.42
4	0 - 30	2.16	0.25	0.31	0.38	0.26	0.11
	30 - 60	13.34	1.26	0.64	1.23	0.15	0.28
	60 - 100	10.41	1.92	0.51	1.36	0.27	0.31
	W*	8.81	1.22	0.49	1.03	0.23	0.24
5	0 - 40	13.57	3.95	0.66	1.33	0.48	0.22
	40 - 80	14.62	1.87	0.71	1.27	0.29	0.13
	80 - 120	10.98	2.94	0.69	1.01	0.23	0.13
	W*	13.06	2.04	0.69	1.20	1.05	0.16
6	0- 30	30.46	4.76	1.02	1.40	0.35	0.08
	30 - 75	18.38	4.64	0.99	1.58	1.21	0.22
	W*	22.23	4.69	1.01	1.51	0.87	1.64
	W**	12.66	4.09	0.69	1.26	0.67	0.52

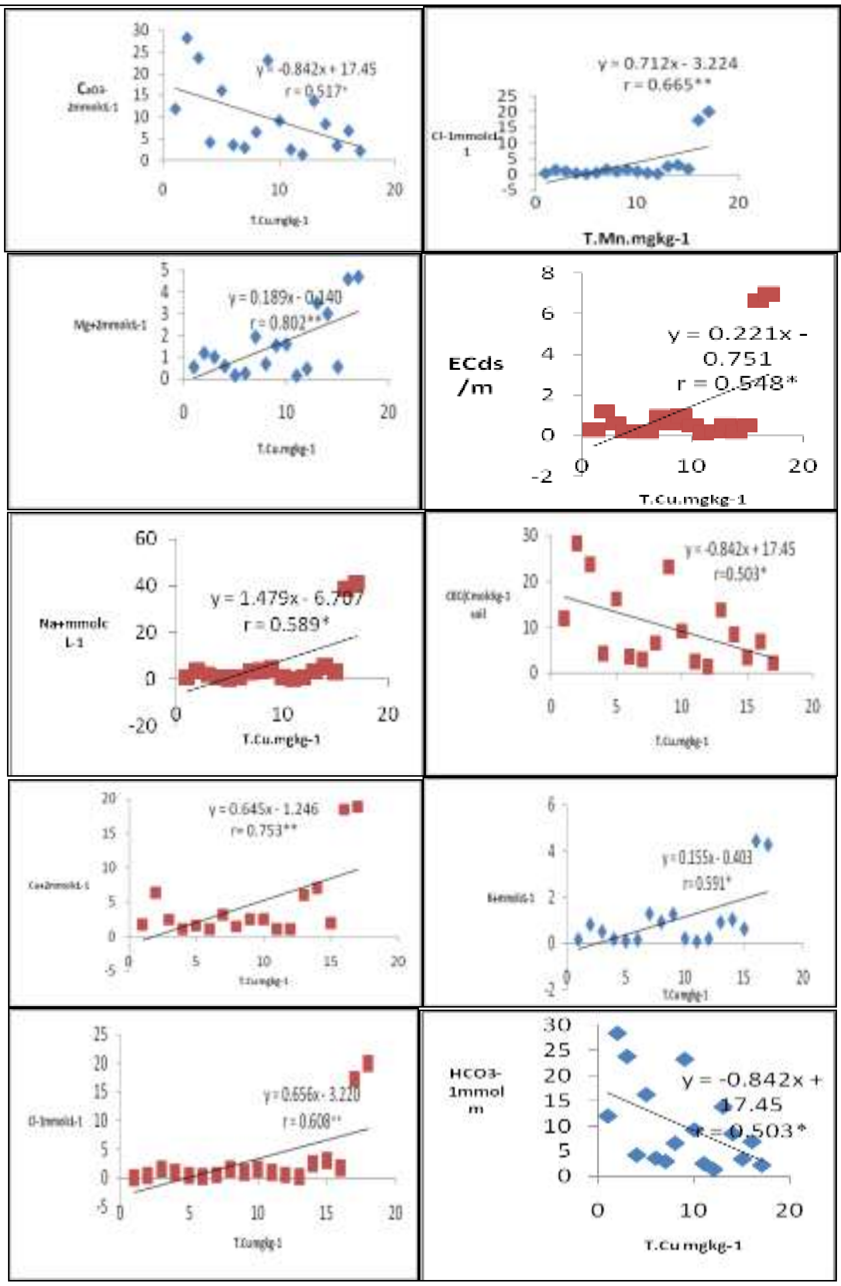
W* weighted mean of profile
W weighted mean of all profiles**

Table (5) Correlation coefficients (r) among the studied some elements behavior and some corresponding variable of EL-Kawamel studied soils

Variables	Some elements $mgKg^{-1}$											
	Total Fe	**Total Mn**	**T otal Cu**	**T0tal Zn**	**Total Ni**	**Total pb**	**Fe-DTPA**	**Mn-DTPA**	**Cu-DTPA**	**Zn-DTPA**	**Ni-DTPA**	**Pb-DTPA**
Silt + Clay (%)	-	-	-	-	-	-	-	-	-	-	-	**0.544***
pH	-	-	-	-	-	-	-	-	-	-	-	**0.544***
EC (dS/m)	**0.527***	**0.527***	**0.548***	**0.834****	**0.528***	**0.527***	**0.682****	**0.686****	**0.633****	**0.527***	**0.527***	-
CaCO3 (gKg-1)	-	-	**0.517***	-		-	-	-	-	-	-	**0.544***
Soluble Na+ (mmolcL-1)	**0.589***	-	**0.589***	-	**0.690****	-	**0.711****	**0.776****	-	**0.589***	**0.596***	**0.590***
Soluble K+ (mmolc L-1)	**0.592***	**0.592***	**0.591***	**0.592***	-	**0.592***	**0.714****	**0.592***	**0.620****	**0. 592***	**0.592***	-
Soluble Ca+2 (mmolcL-1)	**0.580***	**0.655****	**0.753****	**0.583***	-	**0.580***	**0.496***	**0.496***	-	**0.580***	**0.580***	**0.580***
Soluble Mg+2 (mmolcL-1)	-	**0.640****	**0.802****	**0.542***	-	**640****	**0.640****	**0.501***	**0.640****	-	**0.640****	-
Soluble HCO3- (mmolcL-1)	**0.612****	-	**0.503***	-	**0.690****	-	**0.474***	-	-	**0.474***	-	-
Soluble Cl- (mmolcL-1)	**0.612****	**0.655****	**0.608****	**0.612****	**0.612****	**0.69 3****	**0.563***	**0.845****	**0.665****	**0.612****	-	**0.611****
Soluble SO4-2 (mmolcL-1)	**0.597***	**0.715****	-	**0.597***	**0.598***	**0.714****	-	**0.786****	**0.644****	**0.597***	**0.598***	**0.597***
CEC (Cmolc Kg-1 soil)	-	-	**0.503***	-	-	-	-	**0.501***	**0.551***	-	-	-

1- Significant correlation only are shown in the table

2- Levels of significance 5% (*) and 1% (**)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r = 0.517*
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y = 0.189x - 0.140
r = 0.802**
Mg+2mmolcL-1
T.Cu.mgkg-1
ECds/m
y = 0.221x - 0.751
r = 0.548*
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Na+mmolc L-1
y = 1.479x - 6.707
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r=0.503*
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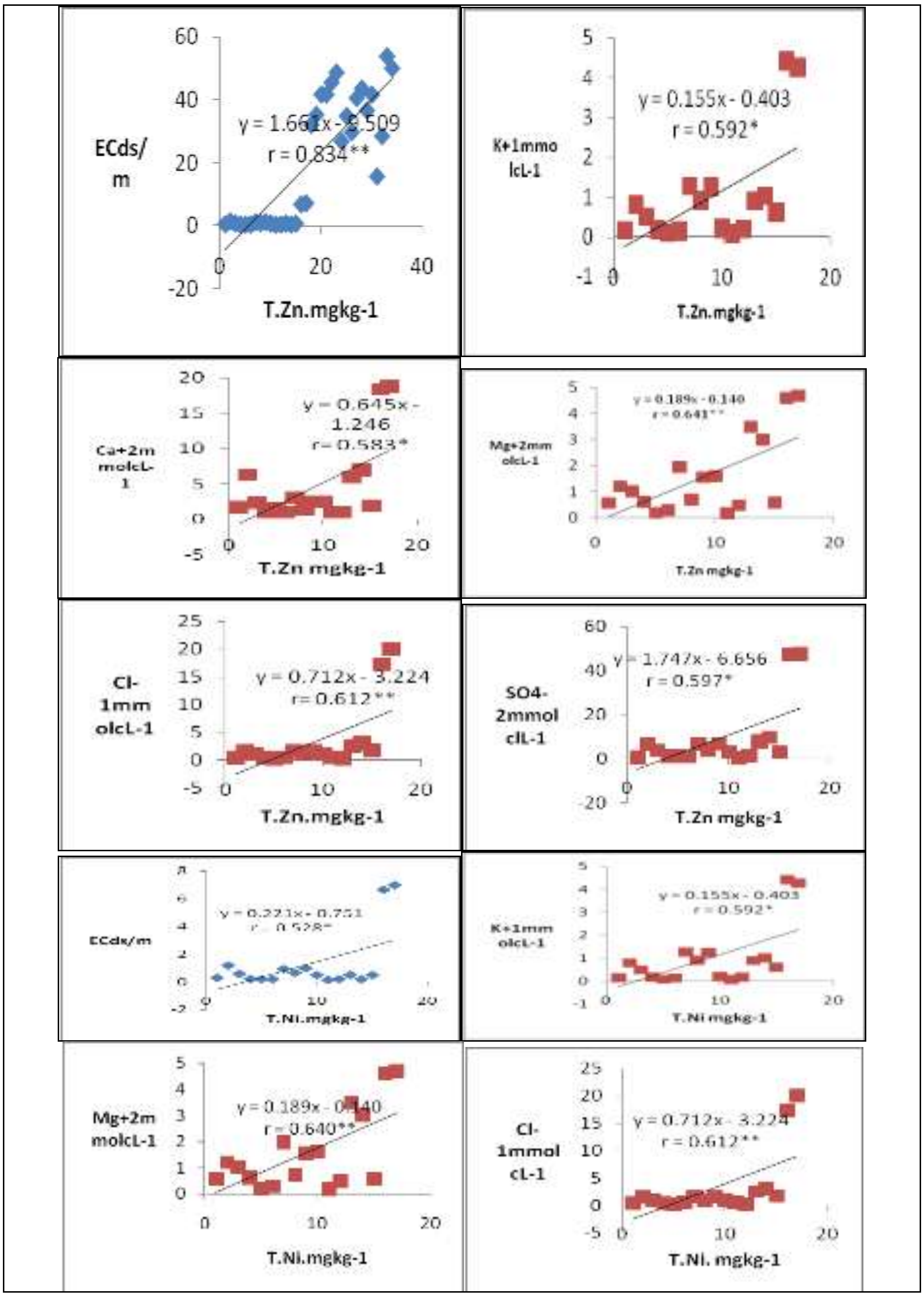
y = 0.645x - 1.246
r= 0.753**
y = 0.155x - 0.403
r=0.591*
y = 0.656x - 3.220
r = 0.608**
HCO3-1mmol m
y = -0.842x + 17.45
r = 0.503*
T.Cu mgkg-1

Fig.(2)Con.



ECds/m
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r = 0.834**
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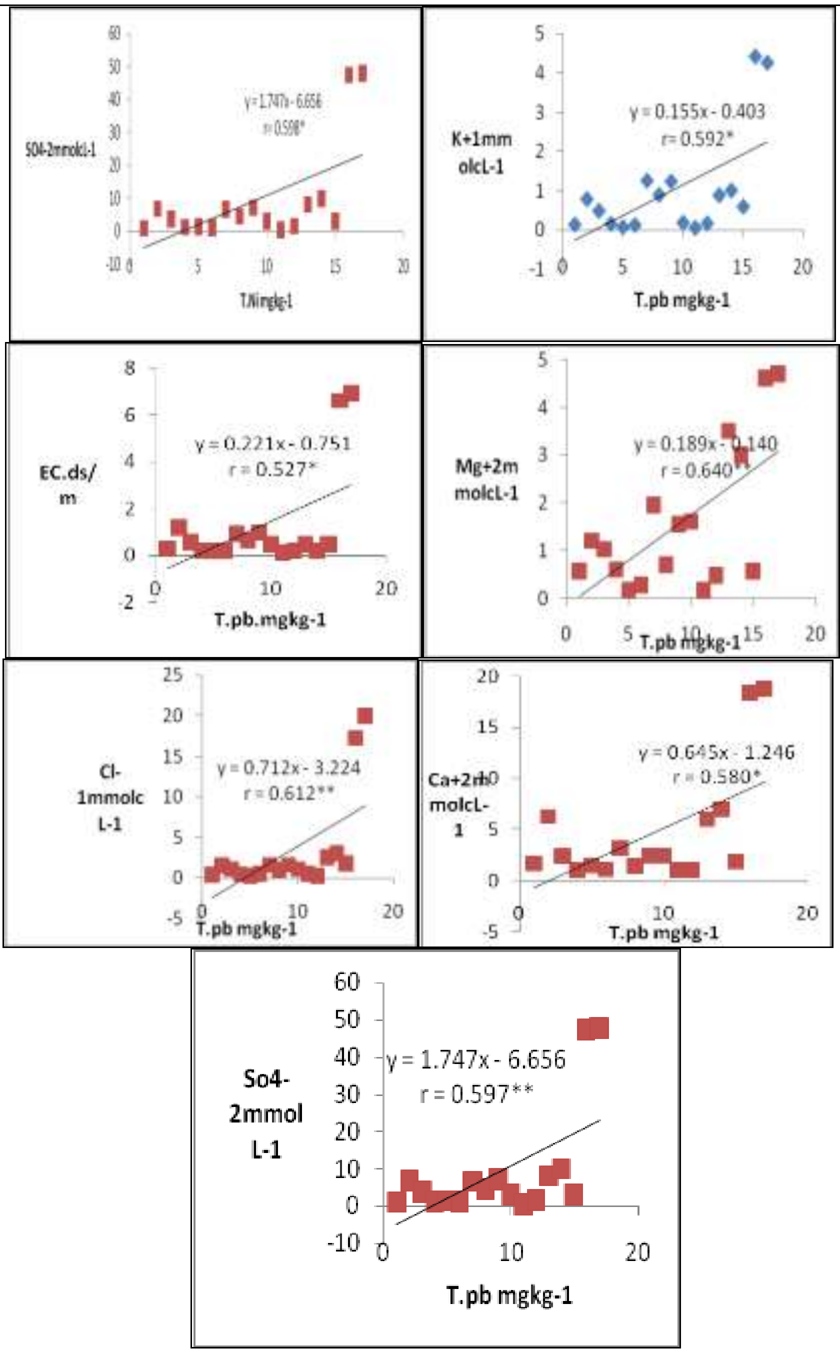
K+1mmolcL-1
y = 0.155x - 0.403
r = 0.592*
T.Zn.mgkg-1
Ca+2mmolcL-1
y = 0.645x - 1.246
r = 0.583*
T.Zn mgkg-1
Mg+2mmolcL-1
y = 0.189x - 0.140
r = 0.641**
T.Zn mgkg-1
Cl-1mmolcL-1
y = 0.712x - 3.224
r = 0.612**
T.Zn.mgkg-1
SO4-2mmolcL-1
y = 1.747x - 6.656
r = 0.597*
T.Zn mgkg-1
ECds/m
y = 0.221x - 0.751
r = 0.528*
T.Ni.mgkg-1
K+1mmolcL-1
y = 0.155x - 0.403
r = 0.592*
T.Ni mgkg-1
Mg+2mmolcL-1
y = 0.189x - 0.140
r = 0.640**
T.Ni.mgkg-1
Cl-1mmolcL-1
y = 0.712x - 3.224
r = 0.612**
T.Ni. mgkg-1

Fig. (2) Cont.



S04-2mmolcl-1
y=1.747x-6.656
r=0.598*
T.Nmgkg-1
K+1mm olcL-1
y = 0.155x - 0.403
r= 0.592*
T.pb mgkg-1
EC.ds/m
y = 0.221x - 0.751
r = 0.527*
T.pb.mgkg-1
Mg+2m molcL-1
y = 0.189x - 0.140
r = 0.640**
T.pb mgkg-1
Cl- 1mmolc L-1
y = 0.712x - 3.224
r = 0.612**
T.pb mgkg-1
Ca+2m molcL-1
y = 0.645x - 1.246
r = 0.580*
T.pb mgkg-1
So4-2mmol L-1
y = 1.747x - 6.656
r = 0.597**
T.pb mgkg-1

Fig(2) Cont.

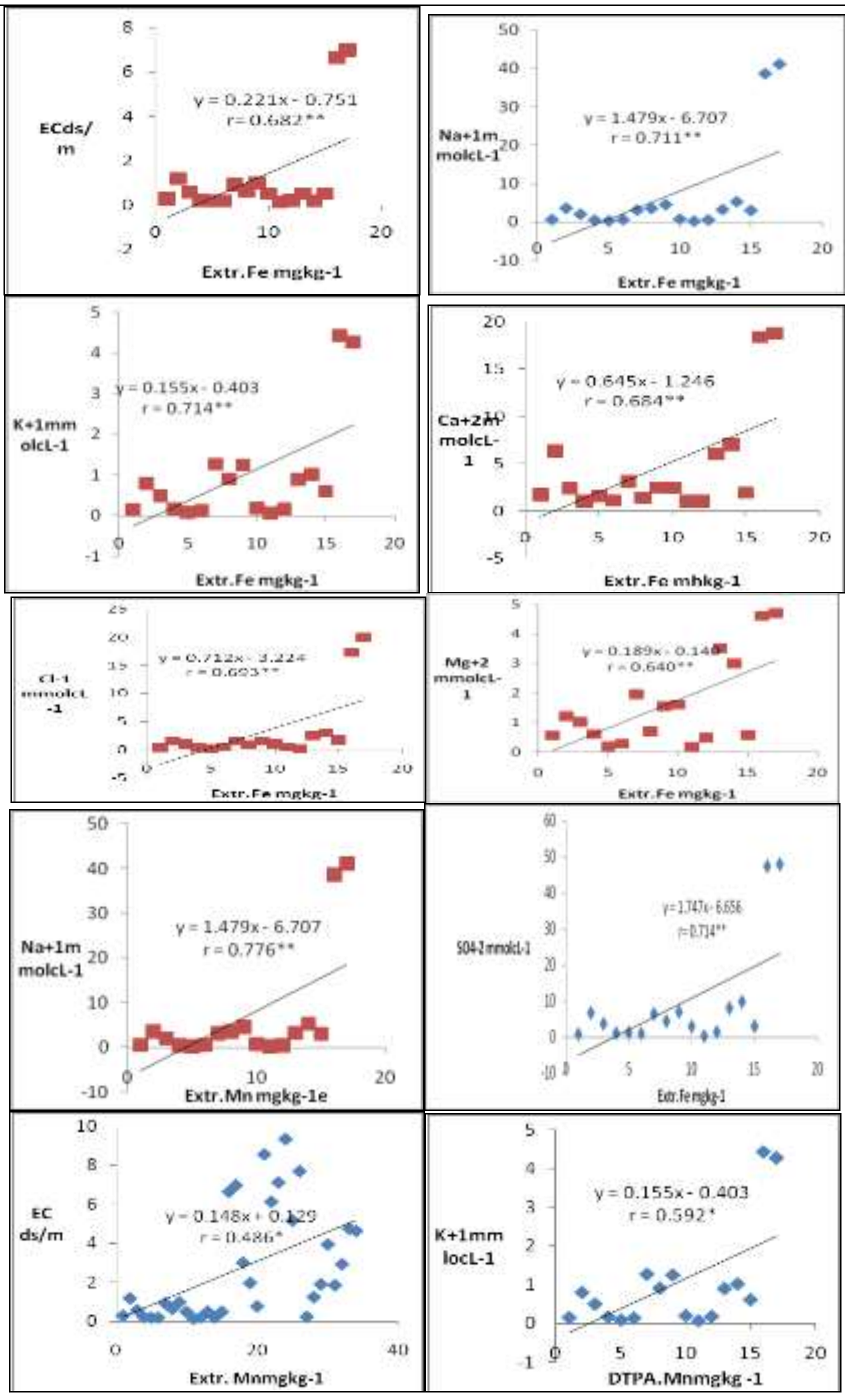


Fig.(3) Relationship among DTPA trace elements and soil variables

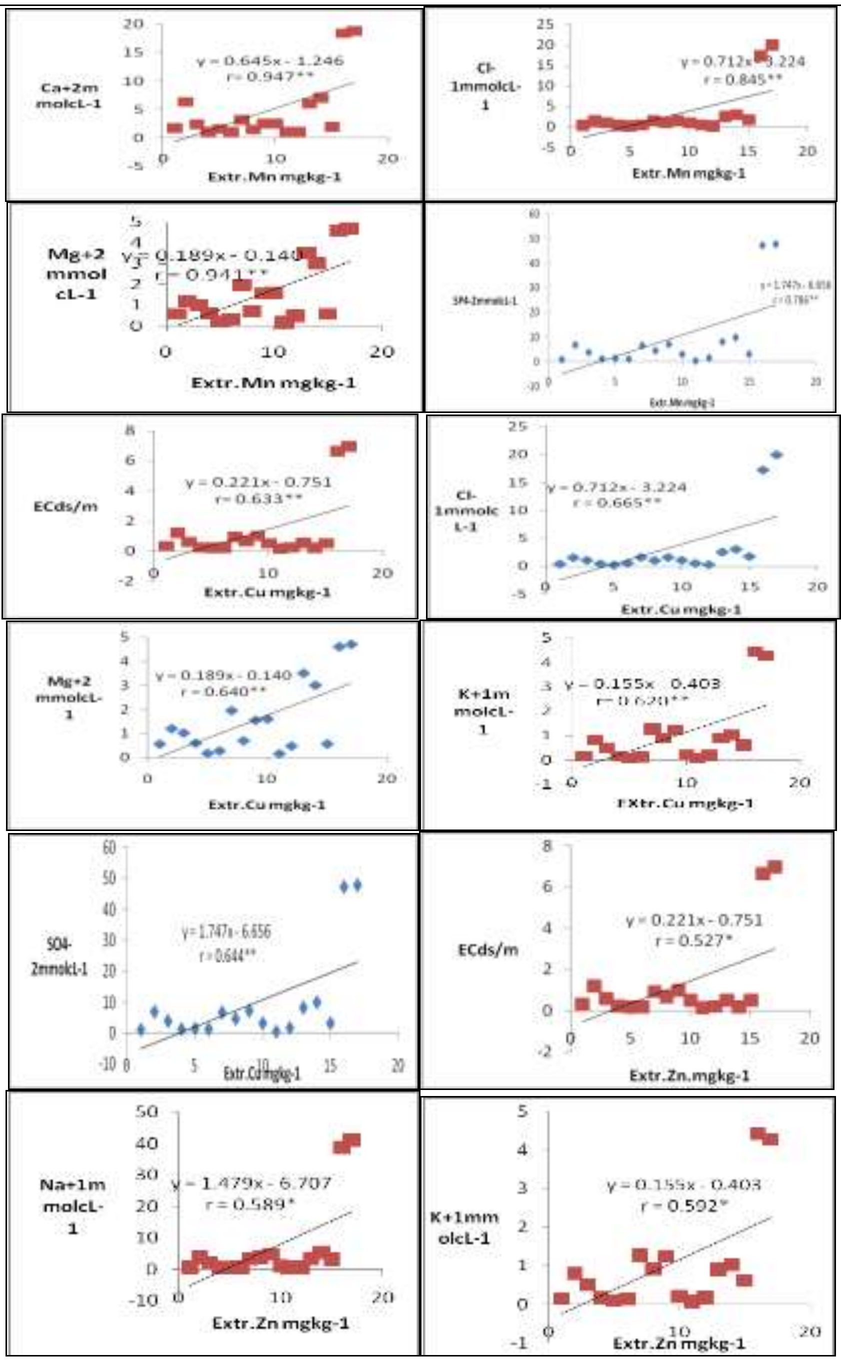

Ca+2m molcL-1
y = 0.645x - 1.246
r = 0.947**
Extr.Mn mgkg-1
Cl- 1mmolcL-1
y = 0.712x - 3.224
r = 0.845**
Extr.Mn mgkg-1
Mg+2 mmol cL-1
y = 0.189x - 0.140
r = 0.941**
Extr.Mn mgkg-1
ECds/m
y = 0.221x - 0.751
r = 0.633**
Extr.Cu mgkg-1
Cl- 1mmolc L-1
y = 0.712x - 3.224
r = 0.665**
Extr.Cu mgkg-1
Mg+2 mmolcL-1
y = 0.189x - 0.140
r = 0.640**
Extr.Cu mgkg-1
K+1m molcL-1
y = 0.155x - 0.403
r = 0.620**
EXtr.Cu mgkg-1
SO4-2mmolcL-1
y = 1.747x - 6.656
r = 0.644**
Extr.Cumgkg-1
ECds/m
y = 0.221x - 0.751
r = 0.527*
Extr.Zn.mgkg-1
Na+1m molcL-1
y = 1.479x - 6.707
r = 0.589*
Extr.Zn mgkg-1
K+1mm olcL-1
y = 0.155x - 0.403
r = 0.592*
Extr.Zn mgkg-1

Fig.(3) Cont.

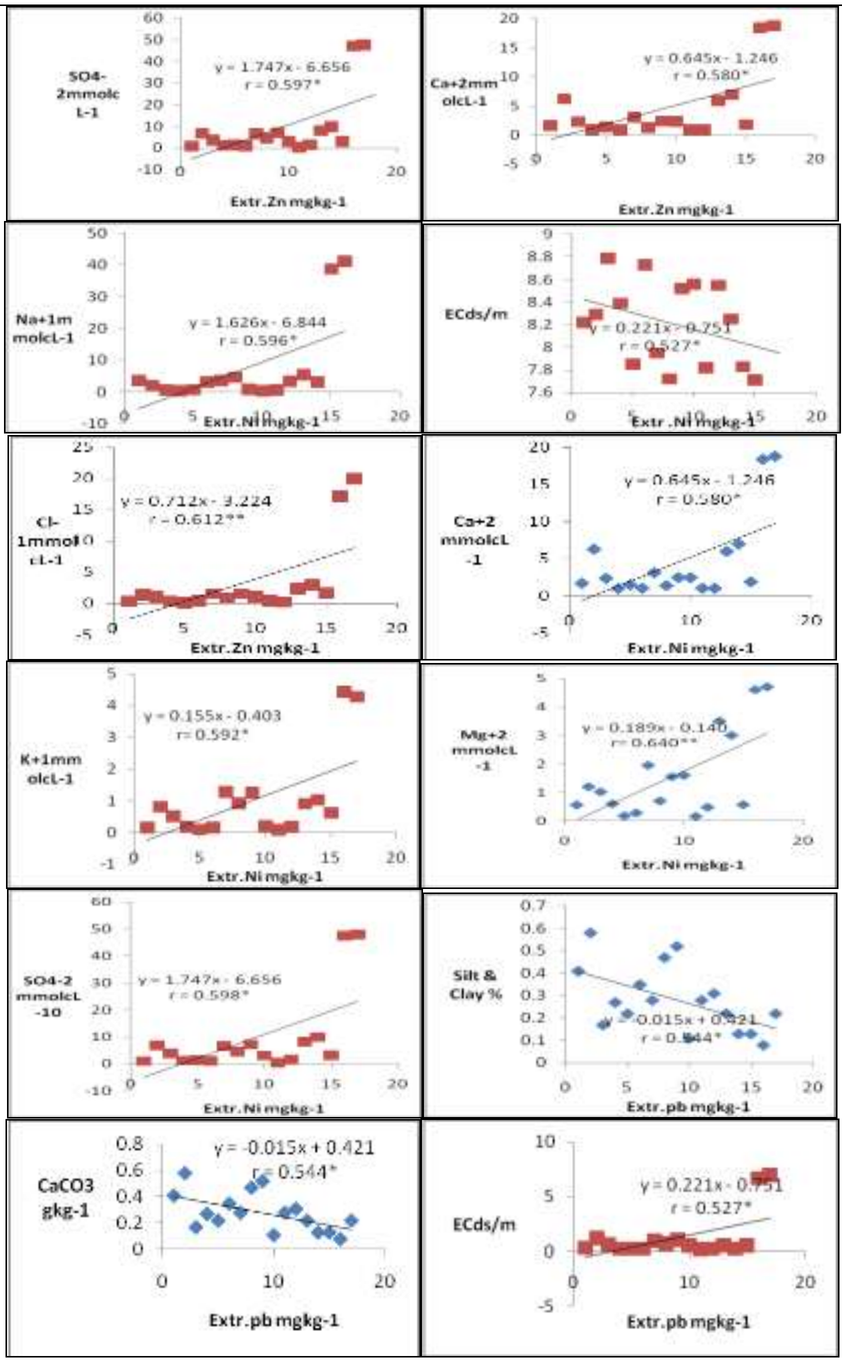


Fig.(3) Cont.

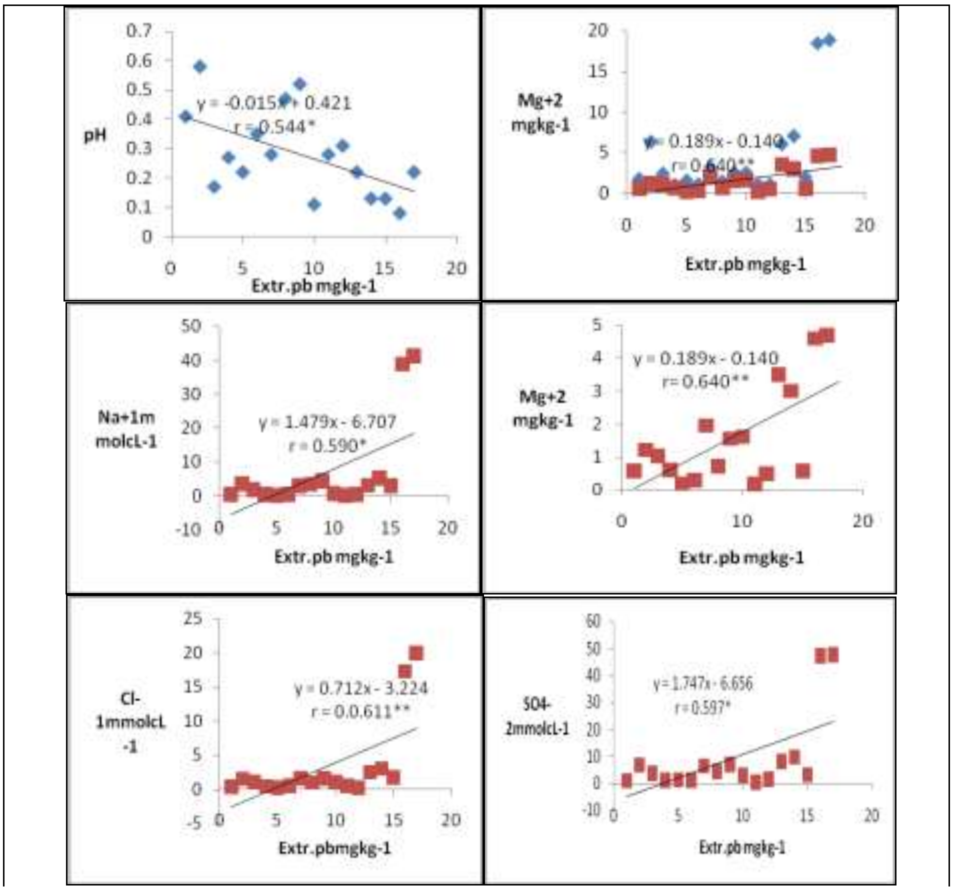


Fig.(3) Cont.

CONCLUSION

Statistical relationships were made between some elements behavior and some corresponding variable of EL-Kawamel studied soils. The results classified indicated that there were high significant between electrical conductivity (EC), total Zn, DTPA- Zn, DTPA - Mn and DTPA-Cu. As for the soluble Na^+ there was high positive significant relationships with the total Ni, Fe-DTPA and Mn-DTPA). Soluble K^+ showed high positive significant among DTPA -Fe and Cu-DTPA. Data showed that soluble Ca^{++}, had high positive significant with each of total Mn and Cu.

The results showed that the soluble Mg^{++} had high positive significant with each of soluble Mg^{++} of the soil and total (Mn, Cu and Pb), DTPA – (Fe, Cu and Ni).The results also showed that the soluble

HCO_3^- had high positive significant among each of the total (Fe and Ni). Soluble Cl^- showed high positive significant among each of the total (Fe, Mn, Cu, Zn, Ni, and Pb) and DTPA- (Mn, Cu, Zn and Pb). As for the soluble $SO4^{-2}$, there were high positive significant with each of total (Mn and Pb), DTPA-(Mn and Cu). At least data showed that the CEC were only positive significant with each of total Cu, Mn-DTPA and Cu-DTPA.

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دراسة الخصائص الكيميائيه للتربه وعلاقتها بسلوك بعض العناصر فى الكوامل– سوهاج – مصر

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مركز بحوث الصحراء– القاهرة– مصر

يهدف هذا البحث إلى معرفة الخصائص الكيميائيه للتربه وعلاقتها بسلوك بعض العناصر فى الكوامل –سوهاج – مصر. ولذالك تم جمع عدد سبعة عشرة عينه تربه تمثل عدد ستة قطاعات ارضيه ممثله لمنطة الدراسه.

وقد أوضحت النتائج أن:– قوام التربه بأراضى الكوامل رملى فى كل عينات التربه الممثله لأراضى المنطقه. وكانت السعه التبادليه الكاتيونيه تتراوح ما بين 4,2 إلى 5,9 سنتمول شحنه لكل كيلو جرام تربه. وكان تفاعل التربه يتراوح ما بين7,61 إلى8,79 (قلوى إلى قلوى خفيف) كما أن التوصيل الكهربائى يتراوح ما بين 0,15 إلى 6,97 ديسمينز لكل سم فى 25 درجه مئويه وكان محتوى كربونات الكالسيوم الكليه يتراوح ما بين 10,46 إلى 46,85 ملجم لكل كليو جرام.

وكان ترتيب محتوى الكاتيونات الذائبه كالتالى :–الصوديوم > الكالسيوم> الماغنسيوم> البوتاسيوم أما محتوى الأنيونات الذائبه فكان ترتيبها كالاتى:– الكبريتات >الكلوريد> البيكربونات أما أنيون الكربونات فكان غائباَ.

كما أوضحت النتائج أن المحتوى الكلى من بعض العناصر الصغرى كالاتى :– الحديد> المنجنيز> الزنك> الرصاص> النيكل> االنحاس.

وقد تبين من النتائج أن محتوى العناصر الصغرى والمستخلصه كيميائياَ أن:– :– الحديد> المنجنيز> الزنك> النحاس > االنيكل> الرصاص.

وقد نوقشت النتائج إحصائياَ بين خواص التربه الكيميائيه مع بعض العناصربمنطقة الدراسه .