5 - SUMMARY

The following lines summerize the various topics which were handled in the present investigation to study the humus substances isolated from organic matter of alluvial soils at Fayoum Governorate.

The method of introducing this summary follows to a great extent the line of approach used in the presentation of the various topics dealt with in this manuscript.

A) The main properties of the studied soil samples :

1- The texture clases of soils under investigation was sandy loam, loam, clay loam and clay.

2- $CaCO_3$ content of soils ranged between 1.9 to 11.5 %, the highest content was found in Sunnoris district.

3- Soil water saturation percent (S.P.) ranged from 37.5 to 100 %.

4- Soil salinity: (the EC values) of soil samples ranged from 0.93 to 15.9 mmhos/ cm/ 25°C.

5- The pH of soil samples was generally neutral or slightly alkaline, ranging between 7.3 and 7.9.

6- Soluble cations: Na^+ cations were characterized by its highest amount in the extract of the investigated soils relative to Ca^{+2} followed by Mg^{+2} and K^+.

7- Soluble anions: HCO_3^- content of the soil samples ranged from 1,5 to 5.0 meq /1., while a very wide range in the soil content of Cl^- anions were observed i.e. from 4 to 140 meq /1. Moreover, SO_4^{-2} ions were fluctuating between 2.9 and 64.8 meq /1.

8- Soil organic matter contents were relatively low throughout the studied samples ranging (from 0.58 to 1.45 %).

9- Total nitrogen content of soil samples ranged between 0.036 to 0.140 %.

10- The variation in the C/N ratio was within a relatively narrow range (from 4.9 to 9.2).

11- The obtained data after extraction with DTPA for the micronutrients,elements, Fe, Mn, Cu, and Zn showed that this values ranged from 6.0 to 9 ppm for Fe, 6.4 to 11 ppm for Mn, 2.8 to 5.4 ppm for Cu and 0.8 to 2.8 ppm for Zn.

12- Extractable Fe, Mn, Cu and Zn with 0.1 M $Na_4P_2O_7$- 0.1 $\underline{N}$ NaOH mixture showed that the values of these micronutrients ranged between (3.5 to 8.5 ppm Fe), (0.5- 2.5 ppm Mn),

(2.0 to 12.5 ppm Cu) and (Zero- 0.5 ppm Zn).

B) Characteristics of humus substances:

1- Data showed that humic acids predominated over fulvic acids in the studied samples and both were found in the upper layer in higher amounts than the lower one.

2- The total carbon content of humic acid ranged from 19.5 to 23.3 % in the surface soil layer, and from 18.5 to 19.3 % in the lower one.

3- The ratio of CHA/ CFA seems to decrease with depth, since their values ranged from 1.09 to 1.44 in the surface soil layer while they ranged from 1.06 to 1.13 in the subsurface ones.

4- Data showed that humin content was inversely proportional to humic acids in general.

5- Iron content of humic and fulvic acids :
Humic acid isolated from soil organic matter contained high values of total Fe content than that of fulvic acid. The values ranged from 2.0 to 6.5 ppm for the former, and 0.5 to 4.5 ppm for the latter.

Moreover, a considerable high values of total Fe content were combined with humic acid extracted from Manshate Tantawy at the district of Sunnoris , its

values ranged from 6.0 to 6.5 ppm. On the other hand, low values were noticed in the district of Tameya (Kasser-Rashwan) ranging from 2.0 to 2.5 ppm. Total Fe in soil was observed in moderate amounts, ranging from 4.0 to 4.5 ppm (Abshway district) at Aboxa and Shakshuk village (at Sunnoris district).

C) Spectro-scopic analysis of humic and fulvic acids :

Ultraviolet spectra of the samples were characterized by a pronounced decrease of absorbance with increasing the wave length, showing nether minimum nor maximum absorption bands.

Moreover, UV spectra of fulvic acid has a lower optical densities than that obtained from the humic acid fraction.

The main bands were observed in the IR spectra of the humic acid. It showed a broad band in the region from 3200 to 3520 cm^{-1} characterizing hydrogen-band of OH groups. while the bands at 1400, 1230 and 1200 cm^{-1}, are characterizing carboxylic, -OH deformation of CO_2H and phenolic OH, stretching respectively. The bands at 1720 and 1625 cm^{-1} were assigned to a weak shoulder for C = O and a strong absorption for -COOH groups respectively.

Major absorption bands in the IR spectra of the isolated fulvic acids resembles with those obtained of humic acid except for the following differences :

a- The band noticed at 2850 cm^{-1} was assigned to carboxylate ion.

b- Strong bands were observed at 1400 cm^{-1} reflecting large quantities of aliphatic structure.