Plant Archives Vol. 19, Supplement 1, 2019 pp. 636-643 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

EFFECT OF TILLAGE MANAGEMENT PRACTICES AND HUMIC ACID APPLICATIONS ON SOME ENGINEERING PROPERTIES OF PEANUT

Sabreen Kh Pibars and H. A. Mansour*

Water Relations and Field Irrigation Dept., Agricultural and Biological Research Division,
National Research Centre, El-Dokki, Cairo, Egypt
*Corresponding author: mansourhani2011@gmail.com

Abstract

Field experiments were conducted during three successive growing seasons 2016, 2017; 2018 to study the effect of Tillage Management Practices and humic acid applications on some engineering properties of peanut (*Arachis hypogaea* L.) Giza 5 variety at the experimental farm of National Research Centre (NRC), El-Nubaria, Beheira Governorate, Egypt. The field experiment was a split-plot design. The main plots were divided to tillage management practices. three tillage management practices were used: Conservation agriculture (T1): Under this method the soil was left without any land preparation, Chisel plows one pass then harrowing once (T2) and Chisel two passes then harrowing twice (T3). On the other hand, three levels of humic acid applications (0, 1 and 2 gram/litre), (H1, H2 and H3) respectively , under surface drip irrigation system .The results show that the geometric characteristics under study for peanut bean yield had a positive and significant response with the application management of tillage and humic acid. The data indicated that the interaction between Chisel two passes then harrowing twice (T3) and applying (2 g/l) of humic acid exceeded the other treatments onall engineering properties of peanut.

Keywords: Tillage system, Sandy soil, Chiesl plows, Humic acid, Engineering properties, Peanut.

Introduction

According to researcher (Netari *et al*., 2008), which proved that peanuts are among the most important crops in the world for oil production. The peanut plants of the *Arachis hypogea* Linnaeus cultivars grow in the soil, and the peanut plants are very rich in protein and oil in terms of nutrition. The peanut kernel is a very rich source of edible oil with 43-55% and the protein content is about 25-28 the atmosphere surrounding the grain is a very good raw material for fertilizers, fuel and feed and also used as a good insulating material. Despite the high potential of economic peanuts, processing can be done in a major way and those processes that take a very long time and the conditions are tired and difficult and not healthy and include a product is poor and inefficient because the cracking and fragmentation of peanuts by shelling is expensive, and to know the characteristics of those physical and mechanical nucleus Such as any other agricultural product that is of great importance to facilitate the process of design and continuous development of machinery and agricultural mechanization equipment for various agricultural operations, for example from harvesting, shelling, cleaning, transportation, separation, delivery, storage, packaging, drying and expulsion of mechanical oil and Treatment products (Davies, 2009); (Mansour et al., 2016a,b,c); (Mansour et al., 2014); (Mansour and Aljughaiman, 2015) and (Mansour and El-Melhem, 2015).

The natural characteristics and quality of soil are very important for their favorable conditions for their crops (Rachman *et al*., 2003). Soil suitability for plant biological activity and growth is a good indication of physical and chemical soil properties (Mulumba and Lal, 2008); (Tayel et al., 2012a,b); (Mansour, 2015a,b) and (Mansour et al., 2015a,b,c,d,e).

Since soil is the primary natural resource, its quality has an integrated management effect for most soil characteristics, which in turn can determine the extent of production and sustainability of the cultivated crops (Anikwe and Ubochi, 2007; Franzluebbers, 2002). Good tillage practices have a significant and positive impact on the properties of physical soils, since it is necessary to select the most appropriate plowing species that improves soil soil physical properties, growth and good production of agricultural crops (Jabro *et al*., 2009). Pasture production is also very important and effective for the establishment of productive crops (Atkinson *et al*., 2007). Seed systems help to create an environment conducive to crop production, development and sustainability without any hindrance (Licht and Al-Kaisi, 2005, Pibars and Mansour (2015, 2016); Pibars et al., (2015); Tayel *et al.*, (2015, a,b,c,d,e);(2016);(2018).

Better management of soil resources has always relationship with maintaining the soil quality in field. The key for successful management system is the adoption of suitable tillage practice (Bajpai and Tripathi, 2000), which influences seed germination and root distribution. Tillage practice brings several changes in soil physical properties and essential for developing economically viable and easily adoptable tillage practices to increase yields of groundnut crop (Ramachandran *et al*., 2015). In spite of the large number of field studies already conducted towards tillage effects on the physical structured soils by many researchers, even though information is lacking in long term tillage effect on crop growth (Green *et al*., 2003).

Sandy soils cover vast areas in Egypt. Therefore, reclamation of these soils is the main target for the horizontal expansion of our cultivable land. Unfortunately, sandy soils have very poor hydrophysical and nutritional values. Thus, the use of soil amendments is of vital importance to improve physical, chemical and nutritional characteristics of these soils. Humic acid is one of the most important liquid and supplemental compounds of soil organic fertilizers. Its molecular structure makes it possible to provide multiple benefits for crop productivity. It also helps in the process of compact and heavy soil fertilization of soil and also assists in the transfer of important nutrients from the soil to the plant. And helps to maintain water in the soil for longer periods and helps to increase the rate of germination of seeds and helps to improve the ventilation of the soil and the formation of good water in the area of growth of roots and also stimulates plant gatherings in the ground (Mackowiak *et al*., 2001).

Humic acid essentially helps the movement of micronutrients from soil to plant. Hermann *et al*. (2000) stated that the positive effect of HA and organic fertilization on the yield capacity of soil consists of many components. First, these components concern nutrient supply to plants. Second, physical soil properties are affected resulting in differences in root penetration, gas exchange and water supply.

The targets of this research study the effect of tillage system and humic acidapplicationson some engineering properties of peanut (*Arachis hypogaea* L.) Giza 5 varietyon sandy soil.

Material and Method

Site Description

The field experiments were conducted between May and October during three seasons 2016 and 2017, 2018 respectively, at the experimental farm of National Research Centre (NRC), El-Nubaria, Beheira Governorate, Egypt (30.8667 N, 30.1667 E, and mean altitude 21-m above sea level). The soil texture is sandy, and its samples were taken every 15 cm from 0 to 60cm. The soil physical analysis are show in Tables (1).

Experimental Design

The field experiment was a split-plot design. The main plots were divided to tillage management. three tillage management were used: Conservation agriculture (T1): Under this method the soil was left without any land preparation, Chisel plows one pass then harrowing once (T2) and Chisel two passes then harrowing twice (T3). On the other hand, three levels of humic acid applications(0,1 and 2 gram/litre), (H1, H2 and H3) respectively, under surface drip irrigation system. The peanut crop(*Arachis hypogaea* L.) Giza 5 variety was grown in north-south rows with 0.2 m spacing between plants and 0.7 m between rows.

Table 1: Some soil physical properties of the experiment of site.

Sample depth, cm	Particle Size Distribution, %				F.C.	W.P.	A. W.	B.D. (g/cm^3)	Texture class
	Coarse Sand	Fine Sand	Silt	Clay	θ_w %				
0-15	8.4	78.6	7.5	5.5	12.0	4.1	7.9	1.56	Sandy
15-30	8.6	78.7	7.3	5.4	12.0	4.1	7.9	1.58	Sandy
30-45	8.5	78.5	7.8	5.2	12.0	4.1	7.9	1.63	Sandy
45-60	8.8	78.7	7.6	5.9	12.0	4.1	7.9	1.62	Sandy

F. C. : Field capacity W. P. : Welting point A.W. : Available water

B.D. : Bulk density

Determination of Engineering Properties

Determination of Moisture Content

The initial moisture content of peanut was determined using ASABE standard (2008) described in (Payman *et al*., 2011) on dry basis. Triplicate samples (pods) of 100 g were dried in air convection oven set at temperature of 100 °C and monitored for a period of 72 hrs. At the end moisture content was calculated on dry basis using the relationship described by Simonyan *et al*. (2009):

$$\mathbf{Mc_{wb}} = \frac{\mathbf{W_i - W_d}}{\mathbf{W_i}} \times \mathbf{100}$$

Where:

Mc_{wb}= Moisture content (% w.b.);

Wi = Initial mass of peanuts (kg), and

Wd = dry mass of the samples (kg).

The resultant moisture contents of groundnut was 29.1 % for the pods .All the physical properties of the groundnut were determined at these moisture levels with four replications at each treatment.

Determination of Density

The density of a groundnut sample was defined as the ratio of the mass of a sample of the groundnut to the solid volume occupied by the sample.

$$\rho = M/V\ (g/cm^3)$$

The bulk density was determined by filling a graduated cylinder of 500 mL with the groundnuts up to its brim from a height of about 150 mm and the excess was removed by striking off the top with stick and weighing the contents of cylinder. The bulk density (ρ) of groundnut pods was then calculated by dividing the mass (M) to the volume (V) of 500 mL (Aydin, 2007).

Sphericity and geometric means of peanut pods

The sphericity and the surface area of groundnut pods were calculated according to Baryeh (2001). One hundred pods were selected randomly for the experiment, in order to determine the size and shape of the peanut. For each peanut pod (Figure 1), the three principal dimensions, namely length (L), width (W) and thickness (T) were measured using a digital micrometer screw gauge with an accuracy of 0.01 mm.

The geometric mean diameter, *D*, arithmetic mean diameter, *Da* and Sphericity, S of the axial dimensions of pods by using the following relationships as stated by (Olajide and Igbeka, 2003)

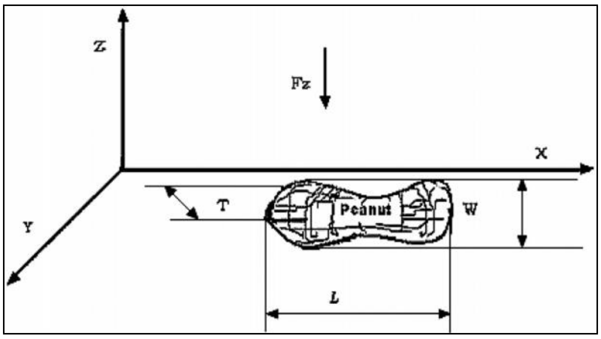

Fig. 1: Axis and three major perpendicular dimensions of peanut

$$D = (LWT)^{1/3}$$

$$Da = (L+W+T)/3$$

$$S = (LWT)^{1/3}/L$$

where:

L = length (mm),

W = width (mm) and

T = thickness (mm) .

The surface area (A) was calculated in accordance with (Odesanya *et al*., 2015) as

$$A = \pi D^2\ (cm^2)$$

Where :

D = Geometric mean diameter (cm).

Determination of Angle of Repose

The angle of repose was determined by using wooden box and two plates; fixed and adjustable. The wooden box was filled with the groundnut sample and the adjustable plate was gradually lifted until the material start to slide over the inclined surface at this point the angle of inclination was recorded as the angle of repose for the groundnut samples (Muhammad *et al*., 2015).

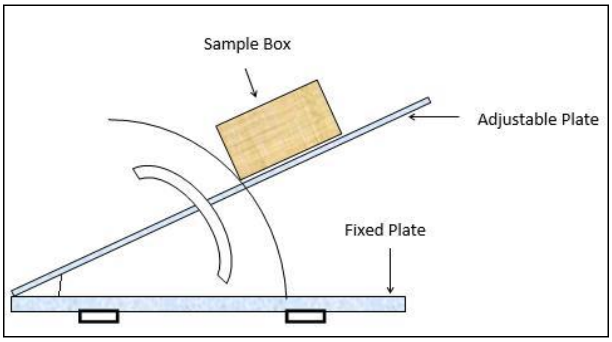

Fig. 2: Determination of static (empting) angle of repose

Results and Discussion

Effect of Tillage Management on Some Engineering Characteristics of peanut:

The data shown in Table (2) for most of the engineering properties of the peanut have a very high response to the management of tillage. It is clear from the statistical analysis in the same table of data for these characteristics that there are significant differences for all transactions at a significant level of 5%.

Table (2) show that the length of peanut pods were 45.5,41.5and 33.7 mm at Chisel two passes then harrowing twice, Chisel plows one pass then harrowing once and Conservation agriculture respectively. The width and thickness for the three tillage management decreased from 21.1 mm, 18.47 mm to 14.4mm and from 12.7,12 to 9.37 in Chisel two passes then harrowing twice, Chisel plows one pass then harrowing once and Conservation agriculture respectively.

The highest geometric mean diameter D (cm) and arithmetic Mean diameter D_{am} value (23, 26.4 cm) were obtained under Chisel two passes then harrowing twice. On the other hand, the lowest values (16.56, 19.17 cm), obtained under the conservation agriculture. The highest surface area (A), and the lowest one was (27.75, 23.70 cm^2), obtained by Chisel two passes then harrowing twice and Conservation agriculture, respectively.

The obtained data indicated that tillage management (chisel two passes then harrowing twice T3) exceeded on both mass and volume of peanut pod. This may be attributed to improving soil characteristics such as aggregate size and good distribution of water and nutrients.

The values of bulk density of the pods are 1.25 g/cm^3, 1.22 and 1.09 under Conservation agriculture, Chisel plows one pass then harrowing once and Chisel two passes then harrowing twice respectively.

The idea of the peanut shelling machine is based on the density of the peanut granules, which helps to know the size and capacity of the casserole, and also to estimate the maximum load possible for the unit area, which can be carried by the machine to carry out the bombing without collapse. Since the true density of the peanut grains is estimated to be less than the density of water (1000 kg/m^3), this is evidence that the peanuts will float on the surface of the water so this can be used to conduct the separation of peanuts from any impurities and other substances heavier than water.

Concerning, sphericity and angle of Repose the tillage management could written in the following ascending order Conservation agriculture < Chisel two passes then harrowing twice < Chisel plows one pass then harrowing once.

Main effect of humic acid on engineering characteristics:

Table (4) recorded some physical properties under different Humic acid application. The highest value of pod length, weight , thickness, surface area of the Geometric mean diameter and the Arithmetic of Mean Diameter were under H3 (46.3 mm, 19.3 g, 12.5 cm^2, 16.01 cm^2, 22.34 m and 26.03 mm), respectively. And the lowest value of this properties were obtained under H_2 (39.9 mm, 17.9 g, 11.6 cm^2, 10.03 cm^2 20.19 mm and 23.1 mm), respectively. Whereas control treatment gave (34.5 mm, 16.7 g, 10 cm^2, 10.28 cm^2, 17.95 m and 20.43 mm) respectively. Regardless of Tillage Management Practices, Humic acid has a promotive effect where the increase on the pod yields of peanut comparing with control treatment.

Table (5) showed the main effects of humic acid applications on some engineering properties of peanut. The obtained data indicated that treatment of H3 exceeded treatment of H1 in all the studied properties except Sphericity (%) and Angle of Repose.

Based upon the obtained values of the studied properties humic acid could put in the flowing ascending order: H1 < H2 < H3.

The highest and lowest value of pod sphericity (%) and angle (52.00 % and 34.23^o), (48.433 % and 30.54^o) were obtained under H1 and H3, respectively.

Table 2 : Main effect of tillage system on physical properties of peanut pods

Tillage system	**Length L (mm)**	**Weight W(mm)**	**Thickness T(cm^2)**	**Surface area, A (cm^2)**	**Geometric mean diameter, D (mm)**	**Arithmetic Mean Diameter, D_{am} (mm)**
T1	33.7 c	14.4 c	9.37 c	16.75 a	16.56 c	19.17 c
T2	41.5 b	18.47 b	12 b	13.91 b	20.91 b	24 b
T3	45.5 a	21.1 a	12.7 a	8.66 c	23 a	26.4 a

(T1): Conservation agriculture, (T2): Chisel plows one pass then harrowing once and (T3): Chisel two passes then harrowing twice.

Table 3 : The effect of tillage system on physical properties of peanut pods

Tillage system	**Mass, M (g)**	**Volume, V(cm^3)**	**Density , ρ(g /cm^3)**	**Sphericity (%)**	**Angle of Repose, (^{0})**
T1	346.7 c	276.7 c	1.25 a	49.4c	28.82c
T2	411 b	351 b	1.22 b	51.67a	34.16a
T3	426.7 a	388 a	1.09 c	50.67b	33.76b

(T1): Conservation agriculture, (T2): Chisel plows one pass then harrowing once and :Chisel two passes then harrowing twice(T3)

Discussion

The importance of the geometric characteristics of peanuts is that the identification of pods forms is indicative of the nature and method of passage of peanuts on the oscillating surfaces during the treatment of this product.

Table 4 : The effect of tillage system on physical characteristics of peanut pods

Tillage system	Length L(mm)	Weight W(g)	Thickness T(cm^2)	Surface area, A (cm^2)	Geometric mean iameter, D (mm)	Arithmetic Mean Diameter, D_{am} (mm)
H_3	46.3 a	19.3 a	12.5 a	16.01a	22.34 a	26.03 a
H_2	39.9 b	17.9 b	11.6 b	10.03 b	20.19 b	23.1 b
H_1	34.5 c	16.7 c	10 c	10.28c	17.95 c	20.43c

(H1): zero humic acid, (H2): one (g/l)and (H3): two (g/l)

Table 5 : Main effect of tillage system on physical properties of peanut pods

Tillage system	Mass, M (g)	Volume, V(cm^3)	Density , ρ(g /cm^3)	Sphericity (%)	Angle of Repose,(^{0})
H_3	433.3a	367.67a	1.23 a	48.433c	30.54c
H_2	390 b	335.67 b	1.18 b	51.400b	31.96 b
H_1	361c	312.33c	1.14 c	52.00a	34.23a

(H1): zero humic acid, (H2): (1g/l)and (H3): (2g/l)

Data presented that most of all engineering parameters of peanut had a significant and positive response with tillage management and humic acid. (Aikins and Afuakwa, 2010) Concluded tillage treatments significantly affected soil penetration resistance, dry bulk density. The disc ploughing followed by disc harrowing treatment presented the lowest soil penetration resistance and dry bulk density, and no tillage treatment produced the highest soil penetration resistance and dry bulk density. The physical properties of the soil are affected by direct and strong tillage operations. The selection of the tillage and the traffic nature of the seeds and horns of the Sudanese beans on the fluctuating surfaces during the processing procedures for the grains and seeds produced is very important of agricultural crops (Jabro *et al*., 2009).This resulted in a decrease in pressure in the soil (Gasso *et al*., 2013). This resulted in the water movement through the random system of agriculture with references (McHugh *et al*., 2009) and water-use efficiency (Wang *et al*., 2009), and higher crop yields (Wang *et al*., 2009), Mansour (2015), Mansour and Aljughaiman (2015), Mansour and El-Melhem (2015), Mansour *et al*. (2015 a; b), Mansour *et al*. (2016 a, b; c), and Mansour *et al*. (2018).The preparation of the seedbed and the appropriate germination medium are important for increasing growth, which will help increase crop productivity (Atkinson et al., 2007). Tillage processes and systems help to achieve the ideal conditions for plant growth and development, which increases crop productivity significantly and without hindrance (Licht and Al-Kaisi, 2005, Tayel *et al*., 2015, 2016 and 2018).

Soil is a key natural resource and soil quality is the integrated effect of management on most soil properties that determine crop productivity and sustainability (Anikwe and Ubochi, 2007).These findings were in harmony with those obtained by (Tayel *et al*., 2015b). They mentioned that most of engineering parameters of the onion bulb had a significant response with the tillage systems. The beneficial effect of humic acid could be attributed to the enhancing of easily nutrients release into soil solution and to encourage their penetration through plant roots, as well as to develop antagonistic impacts toward pests and plant diseases (Ho and Hwan, 2000). These findings were in harmony with those obtained by (Ebtisam I. Eldardiry *et al*., 2012) humic acid application had a highly significant effect on improving soil characteristics such as aggregate size, soil pH and EC as compared with control treatment. Humic acid was superior on increasing these values. HA application had a highly significant effect on improving soil characteristics and increased grain yield of maize compared with control treatment.

In these concern, (Singaravel *et al*., 1998) found that the humic acid contains auxins, which influence cell division and stem that gave the cell walls the ability to expand. So, humic acid can contribute, in increasing seed sesame yield and improving both its protein and oil contents. Mahmoud (2006) found that the individual treatment of humic acid increased seeds and straw yields, oil and protein contents in peanut crop. Similar conclusion was also suggested by Nasef, (2004) and Borhamy, whereas Humic acid soil application improve soil EC with increasing Humic concentration (Ebtisam *et al*., 2012). These findings were in harmony with those obtained by Badawy (2008) he pointed out that the growth of plants is affected by direct and indirect method, which is strongly affected by the fertilizer of humic acid, has proved positive links to the content of humus and soil organic matter, and the direct methods are based on certain factors entrusted with the provision of energy microorganisms in the soil, and have a significant impact on conservation The proportion of water in the soil, which affects the building of soil and helps the release of plant nutrients from mud minerals in the soil, which helps to provide rare minerals in the soil, the result of fertility of the soil significantly and noticeable.

Conclusions

This Study focuses on the effect of tillage management practices and humic acid applications on some engineering properties of peanut in Egypt, the presented data clearly indicated that the most of engineering parameters of peanut had a significant and positive response with tillage management practices and humic acid applications. The data indicated that the inter action between Chisel two passes then harrowing twice (T3) and applying (2 g/l) of humic acid exceeded the other treatments on all engineering properties of peanut

This will help to increase seed germination rate and help to increase the shelf life of the seeds by reducing harmful insects as well as minimizing pest damage. It also addresses any concerns related to crop pollution, helps increase the seed content of oil, Will ultimately help raise the standard of living for peanut farmers and manufacturers in the country, and help increase and grow their domestic investments.

It will also significantly increase exports of high-quality peanuts, bringing foreign currency from overseas, helping to boost overseas investment. In conclusion, through the results of this research, the engineering properties of the grains and grains of peanuts can be chosen for the quality of the product based on the surface area of the seeds of peanut producing and the degree of seed germination. Accordingly, it is possible to obtain recommendations in this research to help the designers of machines and equipment grains and peanuts through the data contained in this research so that these data are sufficient for this purpose.

References

Aikins, S.H.M. and Afuakwa, J.J. (2010). Effect of Four Different Tillage Practices on Cowpea Performance, World Journal of Agricultural Sciences, 6 (6): 644–651.

Anikwe, M.A.N. and Ubochi, J.N. (2007). Short-term changes in soil properties under tillage systems and their effect on sweet potato (*Ipomea batatas* L.) growth and yield in an Ultisol in south-eastern Nigeria, Australian Journal of Soil Research, 45, 351–358.

ASABE Standards 2008. Moisture Measurement-Peanuts. ASAE S410.1 DEC1982 (R2008), St. Joseph, Michigan.

Atkinson, B.S.; Sparkes, D.L. and Mooney, S.J. (2007). Using selected soil physical properties of seedbeds to predict crop establishment, Soil & Tillage Research, 97 (2): 218-228.

Aydin, C. (2007). Some engineering properties of peanut and kernel. Journal of Food Engineering, 79(3): 810–816.

Badawy, A.A. (2008). Effect of water stress and some conditioners on the productivity of peanut crop and water relation in sandy soil. J. Biol. Chem. Environ. Sci., 3(1): 445-454.

Bajpai, R.K. and Tripathi, R.P. (2000). Evaluation of non-puddling under shallow water tables and alternative tillage methods on soil and crop parameters in a rice-wheatsystem in Uttar Pradesh. Soil and Tillage Research 55, 99-106.

Baryeh, E.A. (2002). Physical properties of Millet. Journal of Agricultural Engineering Research, 51(1): 39–46.

Davies, R.M. (2009). Some Physical Properties of Groundnut Grains. Research Journal of Applied Sciences, Engineering and Technology, 1(2): 10–13.

Ebtisam, I.E.; SabreenKh, P. and El-Hady, M.A. (2012). Improving Soil Properties, Maize Yield Components Grown in Sandy Soil Under Irrigation Treatments and Humic Acid Application. Australian Journal of Basic and Applied Sciences, 6(7): 587-593

Eldardiry, E.E.,Hellal, F., Mansour, H.A.A. (2015) Performance of sprinkler irrigated wheat – part II.Closed Circuit Trickle Irrigation Design: Theory and Applications,pp.41

Franzluebbers A.J. (2002). Soil organic matter stratification ratio as an indicator of soil quality, Soil & Tillage Research, 66(2): 95–106.

Gasso, V.; Sorensen, C.A.G.; Oudshoorn, F.W. and Green, O. (2013). Controlled traffic farming: A review of the environmental impacts. Eur. J. Agron. 48:66–73.

Goyal, M.R., Mansour, H.A.A. (2015) Closed circuit trickle irrigation design: Theory and applications.Closed Circuit Trickle Irrigation Design: Theory and Applications ,pp.1

Green, R.T.; Ahuja, L.R. and Benjamin, J.G. (2003). Advances and challenges in predicting agricultural management effects on soil hydraulic properties. Geoderma 116: 3-27.

Ho, H.O. and Hwan, J.K. (2000). The study on the plant growth hormones; in EM Technology and Nature Farming, Sixth Inter. Conf., held in Kyusei, Pretoria, South Africa, 15-21.

Ibrahim, A.,Csúr-Varga, A.,Jolánkai, M., Mansour, H., Hamed, A. (2018) Monitoring some quality attributes of different wheat varieties by infrared technology. Agricultural Engineering International: CIGR Journal 20 (1) ,pp.201

Jabro, J.D.; Stevens, W.B.; Evans, R.G. and Iversen, W.M. (2009). Tillage effects on physical properties in two soils of the Northern Great Plains, Applied Engineering in Agriculture, 25 (3): 377–382.

Licht, M.A. and Al-Kaisi, M. (2005). Strip-tillage effect on seedbed soil temperature and other soil physical properties, Soil & Tillage Research, 80 (1–2): 233-249.

Mackowiak, C.L., P.R. Grossl and B.G. Bugbee, 2001. Beneficial effects of humic acid on micronutrient availability to wheat .SoilSci.Soc.Am. J.65: 1744-1751.

Mahmoud, A.A. (2006). Sustaining the quality and quantity of peanut productivity throughout complementarily treatments between biogas manure, bio and chemical fertilizers. Egypt. J. Appl. Sci., 21(9): 262-280.

Mansour, H.A. (2015a) Performance automatic sprinkler irrigation management for production and quality of different Egyptian wheat varities. International Journal of ChemTech Research 8 (12) ,pp.226

Mansour, H.A., Abd El-Hady, M.,Bralts, V.F.,Engel, B.A.(2016a) Performance automation controller of drip irrigation systems using saline water for wheat yield and water productivity in Egypt. Journal of Irrigation and Drainage Engineering 142 (10)

Mansour, H.A., Abdallah, E.F.,Gaballah, M.S.,Gyuricza, C. (2015a) Impact of bubbler discharge and irrigation water quantity on 1-hydraulic performance evaluation and maize biomass yield. International Journal of GEOMATE 9 (2) ,pp.1538

Mansour, H.A., Abdel-Hady, M.,Eldardiry, E.I.,Bralts, V.F.(2015b) Performance of automatic control different localized irrigation systems and lateral lengths for:1-Emitters clogging and maize (Zea mays L.) growth and yield. International Journal of GEOMATE 9 (2) ,pp.1545

Mansour, H.A., Pibars, S.K.,Abd El-Hady, M.,Eldardiry, E.I. (2014) Effect of water management by drip irrigation automation controller system on faba bean production under water deficit.International Journal of GEOMATE 7 (2) ,pp.1047

Mansour, H.A., Pibars, S.K.,Bralts, V.F. (2015c) The hydraulic evaluation of MTI and DIS as a localized irrigation systems and treated agricultural wastewater for potato growth and water productivity. International Journal of ChemTech Research 8 (12) ,pp.142

Mansour, H.A., Pibars, S.K.,Gaballah, M.S.,Mohammed, K.A.S.(2016b) Effect of different nitrogen fertilizer levels, and wheat cultivars on yield and its components under sprinkler irrigation system management in sandy soil. International Journal of ChemTech Research 9 (9) ,pp.1

Mansour, H.A., Saad, A.,Ibrahim, A.A.A.,El-Hagarey, M.E.(2016c) Management of irrigation system: Quality performance of Egyptian wheat.Micro Irrigation Management: Technological Advances and Their Applications ,pp.279. 2

Mansour, H.A.A. (2015b) Design considerations for closed circuit design of drip irrigation system.Closed Circuit Trickle Irrigation Design: Theory and Applications,pp.61

Mansour, H.A.A., Aljughaiman, A.S.(2015)Water and fertilizer use efficiencies for drip irrigated corn: Kingdom of Saudi Arabia.Closed Circuit Trickle Irrigation Design: Theory and Applications,pp.233

Mansour, H.A.A., El-Hady, M.A., Gyurciza, C.S. (2015d) Water and fertilizer use efficiencies for drip irrigated maize.Closed Circuit Trickle Irrigation Design: Theory and Applications,pp.207

Mansour, H.A.A., El-Melhem, Y. (2015) Performance of drip irrigated yellow corn: Kingdom of saudi arabia.Closed Circuit Trickle Irrigation Design: Theory and Applications,pp.219

Mansour, H.A.A., Tayel, M.Y.,Lightfoot, D.A.,El-Gindy, A.M. (2015e) Energy and water savings in drip irrigation systems. Closed Circuit Trickle Irrigation Design: Theory and Applications,pp.149

McHugh, A.D.; Tullberg, J.N. and Freebairn, D.M. (2009). Controlled traffic farming restores soil structure. Soil Till. Res. 104: 164–172.

Mohamed, Y.T.; Pibars, S.K.; Salama, D.S. (2017). Effect of New Tillage System and Soil Moisture Content on Some Onion engineering properties. Int. J. Agric. Res., 12: 156– 159.

Muhammad, A.I.; Isiaka, M.; Fagge, A.A.; Attanda, M.L.; Lawan, I. and Dangora, N.D. (2015). Some Engineering properties of three varieties of Groundnut pods and kernels. Arid Zone Journal of Engineering, Technology and Environment, 11: 61–75.

Mulumba, L.N. and Lal, R. (2008). Mulching effects on selected soil physical properties, Soil & Tillage Research, 98(1): 106–111.

Nasef, M.A. (2004). Influence of gypsum and NPK rates application on yield and some nutrients uptake of peanut plants grown in newly reclaimed sandy soil. J. Agric. Sci. Mansoura Univ., 29(9): 5365-5384.

Nasef, M.A. (2010). Effect of gypsum, humic acid and ascorbic acid addition on properties and productivityof peanut crop under sandy soil conditions. J. of Soil Sci and Agric Engineering., 1(2): 159-168.

Ntare, B.R.; Diallo, A.T.; Ndjeunga, J. and Waliyar, F. (2008). Groundnut Seed production Manual. Patancheru 502 324, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). 20 pp.

Odesanya, K.O.; Adebiyi, K.A. and Salau, T.A.O. (2015). Estimation of Engineering Parameters for the Development of a Groundnut Decorticator. International Journal of Novel Research in Engineering and Applied Sciences, 2(1): 2–25.

Olajide, J.O. and Igbeka, J.C. (2003). Some physical properties of groundnut kernels. Journal of Food Engineering, 58(2): 201–204.

Payman, S.H.; Ajdadi, F.R.; Bagheri, I. and Alizadeh, M.R. (2011). Effect of moisture content on some engineering properties of peanut varieties. Journal of Food Science and Technology, 48(5): 551–559.

Pibars, S.K., Mansour, H.A. (2015) Evaluate the response of sunflower productivity to modern chemigation systems in new reclaimed lands. International Journal of ChemTech Research 8 (12) ,pp.160

Pibars, S.K., Mansour, H.A.(2016)Evaluation of response sesame water productivity to modern chemigation systems in new reclaimed lands. International Journal of ChemTech Research 9 (9) ,pp.10

Pibars, S.K., Mansour, H.A.A., Abd El-Hady, M.,Eldardiry, E.E.I.(2015)Evaluation of emitter clogging for drip irrigated snap beans.Closed Circuit Trickle Irrigation Design: Theory and Applications,pp.273

Properties, Maize Yield Components Grown in Sandy Soil Under Irrigation Treatments and Humic Acid Application. Australian Journal of Basic and Applied Sciences, 6(7): 587-593, 2012

Rachman, A.; Anderson, S.H.; Gantzer, C.J. and Thompson, A.L. (2003). Influence of Long-term Cropping Systems on Soil Physical Properties Related to Soil Erodibility, Soil Sci. Soc. Am. J., 67: 637–644.

Salwa, A.I.; Mohsen, E.; Abass, M. and Behary, S.S. (2010). Amelioration productivity of sandy soil by using amino acids, sulphur and micronutrients for sesame production. Journal of American Science, 6(11): 250-257.

Simonyan, K.J.; Yiljep, Y.D.; Oyatoyan, O.B. and Bawa, G.S. (2009). Effect of Moisture Content on Some Physical Properties of *Lablab purpureus* (L.). CIGR journal, 11: manuscript No. 1279, XI.

Singaravel, R.; R. Govindasamy and Subramanian, B. (1998). Influence of humic, nitrogen and *Azospirilum*onthe yield and nutrient uptake by sesame. J. Ind. Soc. Soil Sci., 49(1): 142-145.

Tayel, M.Y., Mansour, H.A.A.,Pibars, S.K. (2015a) Performance of sprinkler irrigated wheat – part I. Closed Circuit Trickle Irrigation Design: Theory and Applications,pp.23

Tayel, M.Y., Mansour, H.A.A.,Pibars, S.K.(2015b) Performance of maize under bubbler irrigation system.Closed Circuit Trickle Irrigation Design: Theory and Applications,pp.135

Tayel, M.Y., Mansour, H.A.A.,Pibars, S.K.(2015c) Performance of drip irrigated soybean.Closed Circuit Trickle Irrigation Design: Theory and Applications,pp.250

Tayel, M.Y., Shaaban, S.M., Eldardiry, E.A., Mansour, H.A. (2018) Wheat yield versus seed bed conditions . Bioscience Research. 15(3):1943-1951.

Tayel, M.Y.,Pibars, S.K., Mansour, H.A.A. (2015d) Evaluation of emitter clogging. Closed Circuit Trickle Irrigation Design: Theory and Applications,pp.287

Tayel, M.Y.,Shaaban, S.M., Mansour, H.A. (2015e) Effect of plowing conditions on the tractor wheel slippage and fuel consumption in sandy soil. International Journal of ChemTech Research 8 (12) ,pp.151

Tayel, M.Y.,Shaaban, S.M., Mansour, H.A., Abdallah, E.F.(2016) Response of fodder beet plants grown in a sandy soil to different plowing conditions.International Journal of ChemTech Research 9 (9) ,pp.20

Tayel, M.Y,El-Gindy, A.M, Mansour, H.A (2012a) Effect of drip irrigation circuits design and lateral line length on: IV- uniformity coefficient and coefficient of variation. Journal of Applied Sciences Research 8 (5) ,pp.2741.

Tayel, M.Y.,El-Gindy, A.M., Mansour, H.A.(2012b) Effect of drip irrigation circuits design and lateral line length on: III-dripper and lateral discharge. Journal of Applied Sciences Research 8 (5) ,pp.2725

Wang, Q.; Hao, C.; Hongwen, L.; Wenying, L.; Xiaoyan, W.; McHugh, A.D.; Jin, H. and Huanwen, G. (2009). Controlled traffic farming with no tillage for improved fallow water storage and crop yield on the Chinese Loess Plateau. Soil Till. Res. 104: 192–197.