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RESEARCH ARTICLE

Effect of Method and Type Additive Fertilization with Date Palm Wastes on Growth of Cucumber Plants under Open Field Conditions

M. M. Muslat*, E. B. Abd-Alrahman

Horticulture Department and Garden Engineering, College of Agriculture Anbar University/Iraq.

***Corresponding Author Email:** *emanburkan@gmail.com*

Abstract

This experiment was carried out in spring of 2017 in a field of the Horticulture department and Garden Engineering / College of Agriculture / Baghdad University (Abu-Ghraib) , alternative site for Anbar University, to study the effect of method and type of organic fertilization with Date palm waste (decomposed Date palm leaves and decomposed grinder Date palm seeds) Add To the soil by weight : weight ratio and spraying the extract of decomposed grindery Date palm seeds on cucumber growth under field conditions, according to RCBD. Treatments included T0 was the control using recommended chemical fertilizer (260 kg urea / h + 340 kg super phosphate / h and 100 kg K / h using potassium sulphate) , T1 , T2 and T3 was organic fertilizer consisting of 2.5%, 5% and 7.5% decomposed Date palm leaves wastes respectively, T4, T5 and T6 fertilizing with 4%, 6% and 8% decomposed grindery Date palm seeds respectively, and T7, T8 and T9 addition of 2.5%, 5% and 7.5% decomposed Date palm leaves wastes respectively with foliar spray by extract of decomposed grindery Date palm seeds , T10 add organic fertilizer consisting of decomposed Date palm leaves 5% and 4% decomposed Date palm seeds . Half of the fertilizer recommendation was added to all organic fertilization treatments. The data were analyzed by Gen Stat program and the results were tested according to LSD test at a 0.05 probability level. The results showed that organic fertilization with decomposed Date palm leaves increased the vegetative growth. T9 exceeded most of the studied traits, It given 100% germination ratio, rate of leaf area was 4305 cm^2, phosphorus ratio in leaves was 0.3833, potassium in leaves was 1.2000%. T5, T4 and T6 were exceeded significantly about the other treatments in speed of germination were 7.24, 6.75 and 6.60 plant per day respectively. T8 given highest rate of plant height was 175.1 cm. T7 given highest chlorophyll content in plant leaves was 62.10 Spad. T3 given highest dry mater of vegetative part was 11.17%.

Keywords: *Organic fertilization, Foliar application, Date palm wastes, Plant extract Cucumber.*

Introduction

Cucumis sativus L, which belongs to cucurbitaceae family, is an important vegetable crop in the world. It is believed to be native to Southeast Asia, especially in northern India and Himalayas [1, 2], but is cultivated in many places around the world. Although cucumber is relatively low calorie food, the juice contains about 15 calories per cup and the water makes up 95.23 % of the fruit weight, but it contains fiber, carbohydrates, protein and vitamins such as A, E, K, B1, B2, B3 and B6 And mineral nutrients such as iron, zinc, calcium, magnesium, manganese, phosphorus, sodium and potassium salts, and various rate of fatty and amino acids [3,4]. Recent research suggests that cucumber is anticancer and activates the cardiovascular system and has sedative properties of the digestive system as it moisturizes cells and keeps them active at a high level and slows down aging [5]. Cucumber cultivated in Iraq in the open field in spring and autumn, and in the protected environment, the area cultivated with cucumber in Iraq in 2014 (1248 dunums), while the yield (2188.6 kg $dunam^{-1}$), and in 2015 was cultivated area (822 dunums) the yield (1902.6 kg $dunam^{-1}$) [6].

Cucumber is a crop that has high nutrient requirements and its field performance is weak in the case of nutrient deficiencies in the soil, resulting in reduced yield, deformation and poor taste [7].

In order to get the best productivity, the nutritional status of the soil requires the addition of organic fertilizers or chemical fertilizers. However, the addition of long-term chemical fertilizers has reduced the levels of organic soil and organic carbon [8, 9], as well as continuous cultivation, erosion and loss by leaching, as soil fertility decreased and thus reduced production [10].

The arable land has been reduced, necessitating the use of methods to reclaim impaired land and prevent further impairment by increasing organic soil by the repeated addition of organic matter to soils [11]. Adding organic fertilizer increases organic soil and organic carbon, increases porosity, stabilizes soil concentrations, reduces electrical conductivity, and reduces nutrient washing [12].

Bultck [13] and Te Pas and Rees [14] found that the addition of plant and animal residues to the soil led to an increase in organic soils, improved physical, chemical and fertility properties of soil and improved soil quality and disease resistance, For many pathogenic organisms as a result of these changes there has been an increase in productivity. Among the plant wastes are date palm wastes, which are disposed of by burning, causing pollution of the environment, while it can be used to increase organic soil and sustainable environment.

Abid [15] mentioned that fertilizer from date palm fiber can be used for soil that is deficient in organic matter due to its availability, low cost and positive effect on soil fertility, increasing its organic content and its potential use as a substitute for conventional fertilizers for a sustainable environment, suitable for seed germination and for root and vegetable growth. Ghehsareh et al [16].

Ghehsareh, Kalbasi [17] and Ghehsareh [18] found that when using palm residues on cucumber, decrease in soil density and increase porosity and retention of moisture, allowing the plant root to penetrate the medium easily and gave good support to nutrients and increase exchange capacity Cation, which positively reflected on plant growth and yield. AL-Kahtani at el [19] found the addition of date palm residues with the residues of olives and maize by 1: 1: 1 with 20% and 40% sheep fertilizer to sandy soil, which increased growth and increased chlorophyll and mineral elements in tomato leaves, Quality of fruits. Eifediyi et al [20]. Found an increase in plant length, fruit diameter, fruit length, plant yield and total yield when using organic fertilization compared to chemical fertilizers on cucumber plant.

So the purpose of this research is to study the fertilization method (adding to the soil or spraing on the leaves) and type of wastes that used (decomposed date palm leaves or decomposed Date palm seeds) as organic fertilizers and their effect on cucumber growth under open field conditions and compared with the effect of chemical fertilizer.

Materials and Methods

The experiment was carried out in one of the fields of vegetable crops of the Department of Horticulture and Garden Engineering/ College of Agriculture - Abu Ghraib /Baghdad University, alternative site for Anbar University during spring 2017. Seeds of hybrid cucumber RANI were planted in the field directly. Randomized Complete Block Design (RCBD) was divided into a simple experiment [21] with eleven experimental units and three replicates per experimental unit between each repeater distance of 1 m.

A sample of soil was taken for analysis in the laboratories of the Ministry of Science and Technology / Soil and Water Department Table (1). Decomposed date palm leaves and dates palm seeds that were decomposed as [22] were mixed with field soil at a depth of 20 cm according to the experimental units, each with contained 20 plants with a distance of 40 cm between plants. The experimental unit length is 8 m and width 0.3 m and the distance of 1.5 m between experimental units.

Table (2) shows some of the physical and chemical components of decomposed date palm leaves and date palm seeds before and after decomposition. Treatments included T0 fertilization of the recommended chemical fertilizers (NPK) by using (260 kg urea/ha, 340 kg super phosphate/ha, 100 kg K / ha using potassium sulphate) [23], and the addition of organic waste were T1 decomposed date palm leaves wastes 5%, T2 5% decomposed date palm leaves wastes, T3 decomposed date palm leaves wastes 7.5%, T4 decomposed grindery date palm seeds 4%

,T5 decomposed grindery date palm seeds 6 % , T7 decomposed date palm leaves wastes 2.5 % sprayed with decomposed grindery date palm seeds extract, T8 decomposed date palm leaves wastes 5% sprayed with decomposed grindery date palm seeds extract, T9 decomposed date palm leaves wastes 7.5% sprayed with decomposed grindery pate palm seeds extract, T10 5% date palm leaves with 4% decomposed grindery date palm seeds . A half of recommendation fertilizer was added for soil treatment from T1 to T10. After that, soil and organic fertilizers was mixed, a drip irrigation system was installed to ensure that the irrigation water was distributed equally on the experimental plants. Table 3 and 4 show some physical and chemical properties of the soil of the study treatment at cultivation and after the season. Agricultural service operations were carried out in a symmetrical manner for all treatments, as the case with cucumber production in open field condition. Exposed water extract 1 : 7 of 1 kilo of decomposed grindery Date palm seeds and 7 liters of water in a container was covered and left for a week with stirring once to twice a day. The extracts were sprayed on the leaves of the treated plants (7, 8 and 9) at a rate of once every week. Table 5 shows some chemical properties and the content of the elements of the spray extract.

Table 1: Some of chemical and physical soil properties before planting

Property		value	Unit
Soil texture		Clay Loam	g/Kg
Soil separators	sand	220	
	silt	410	
	clay	370	
pH		7.36	———
Electrical conductivity (Ec)		1.58	ds/m
Total dissolved solids		1010	mg/L
Total cation and anion dissolved	Ca^{++}	145	mg/L
	Mg^{++}	85	
	Na^{+}	215	
	K^{+}	10	
	$SO_4^{=}$	153	
	Cl^{-}	212	
	HCO_3^{-}	89	
	NO_3^{-}	2.5	
	$PO_4^{=}$	0.31	
Organic matter		11.4	g/Kg
Available N		48	Ppm
Available P		11.6	
Available K		168	
Total Fe		2125	
Available Fe		10.8	
Total Mg		911	
Available Mg		131	

Table 2: Some of physical and chemical properties of decomposed date palm leaves and grindery Date palm seeds before and after decomposition

Property	Decomposed date palm leaves waste	grindery Date palm seeds	
		Before decomposion	after decomposition
Organic matter %	71.03	97.4	74.99
Total N %	1.72	1.86	2.10
Total P %	0.62	0.53	0.58
Total K %	1.20	0.60	0.62
Organic C %	41.2	56.5	43.5
C/N %	23.95	30.4	20.71
Total Fe ppm	0.0516	121	0.0163
Total Mg ppm	0.0470	110	0.0096
Ec ds/m	5.20	3.77	2.57
Ph	7.80	8.15	7.86
Cellulose%	26.4	41	33.0

Table 3: some of physical and chemical soil properties of the study treatments soil at cultivation

Treat.	pH	Ec ds/m For saturated dough	Available nutrients mg/kg					Organic matter %	Total N %	Total C %	C/N %
			N	P	K	Fe	Mg				
T0	7.43	2.69	43	10.4	142	6.2	110	0.96	0.0230	0.5570	24.22
T1	7.36	5.18	47	13.0	153	16.8	145	1.49	0.0256	0.8643	33.76
T2	7.31	6.53	50	14.1	169	20.0	163	1.71	0.0270	0.9919	36.74
T3	7.25	8.05	55	14.7	182	24.3	172	1.90	0.0276	1.1021	39.93
T4	7.42	3.21	51	14.3	158	11.4	121	1.46	0.0264	0.8469	32.08
T5	7.37	3.55	56	15.0	171	16.5	132	1.85	0.0278	1.0731	38.61
T6	7.34	3.96	60	16.4	186	19.8	129	2.00	0.0289	1.1601	40.14
T7	7.61	6.00	50	14.0	158	19.5	170	1.23	0.0259	0.7135	27.55
T8	7.69	7.91	56	14.8	176	22.0	173	1.34	0.0275	0.7773	28.27
T9	7.67	8.65	61	16.7	189	27.1	188	1.32	0.0287	0.7657	26.68
T10	7.38	5.89	59	16.9	190	23.0	179	2.10	0.0275	1.2181	44.29

Table 4: Some of physical and chemical soil properties of the study treatments soil at the end of the season

Treat.	pH	Ec ds/m For saturated dough	Available nutrients mg/kg					Organic matter %	Total N %	Total C %	C/N %
			N	P	K	Fe	Mg				
T0	7.51	2.53	52	15.8	178	9.5	123	1.15	0.0339	0.6680	19.7
T1	7.29	4.41	46	12.9	149	15.3	136	1.46	0.0330	0.8488	25.72
T2	7.23	5.76	51	13.5	165	18.6	150	1.82	0.0337	1.0581	31.39
T3	7.19	7.62	54	15.0	179	22.5	158	2.25	0.0346	1.3081	37.81
T4	7.38	3.09	48	13.2	151	7.9	112	1.38	0.0345	0.8023	23.95
T5	7.33	2.98	53	14.6	168	10.0	110	1.93	0.0342	1.1221	32.81
T6	7.28	2.92	59	16.2	181	11.2	115	2.36	0.0391	1.3721	35.09
T7	7.59	3.91	49	13.7	155	17.5	156	1.18	0.0338	0.6861	20.30
T8	7.66	9.63	53	15.2	171	20.0	165	1.22	0.0345	0.7093	20.56
T9	7.63	7.96	57	16.9	186	24.8	185	1.19	0.0389	0.6879	17.68
T10	7.26	5.56	55	16.5	185	19.1	153	2.48	0.0347	1.4419	41.55

Table 5: Some of chemical properties and content of some nutrients of extract 7: 1

grindery Date palm seeds extract	pH	Ec ds/m	Available nutrients %			Available nutrients ppm	
			N	P	K	Fe	Mg
7/1	5.35	2.43	0.91	0.20	0.32	61	58

Germination Experiment

A simple experiment was carried out to test the maturity and readiness of organic manure for used according to [24] using two treatments T1, a comparison treatment in which distilled water was used as a growth media , and the second treatment T2 using a water extract 1: 2 ratio and repeated each treatment three times. Prepare the water extract from 40 g of with decomposed grindery date palm seeds mixed with 80 ml distilled water, the solution leave for an hour then it was filtered by filter paper. Table (6) shows some chemical properties and content of elements of the extract.

Three petri dishes were used for each treatment; seeds of cucumber were seeded with 10 seeds between two filter sheets within each dish. Add 20 ml of water extract decomposed grindery Date palm seeds to soak the seeds and leave in the dark at ambient temperature. At the same time, the seeds of the comparison treatment were soaked with distilled water only. The seeds were monitored until the seeds of the comparison treatment were completed germination over 7 days, after which the experiment was completed by adding 1 mL 50% (v / v) of ethanol to each petri dish to stop germination.

The germination value was calculated as 0.0 cm for non-sprouting seeds. The germination index was calculated as: germination index = germination percentage × percentage of radiant length × 100, germination percentage = average seed germination in water extract / average seed germination in distilled water,

percentage of root length = average length of radiant in water extract / average length of radiant in the distilled water. If the germination index is greater than 100, the extract is a promoter of seed germination.

If it is less than 100, it is toxic to the seeds and inhibits germination. Table (6) shows some chemical properties and content of the elements of extract (1/2) of decomposed grindery date palm seeds used in the germination experiment. Coumarin was estimated as mentioned in Celeghini et al. [25] and a phenol was estimated as mentioned [26]. Measured traits included:

The germination rate was calculated from the equation: germination% = number of seeds grown/total number of seeds x 100, germination speed calculated from equation: germination speed = number of seeds grown x first day + number of seeds grown x second day …. / Number of germination days. leaves area cm^2 $Plant^{-1}$ Calculated by weight method [27] Concentration of chlorophyll (SPAD-unit), plant length cm^2 at the end of season using metric bar.

The percentage of nitrogen as mentioned in Jackson, 1958, phosphorus [28] and potassium [29] in leaves%, dry matter percentage = total vegetative weight after drying / weight before drying x 100.

Table 6: Some chemical properties and content of ingredients for extract 2:1

grindery Date palm seeds extract	pH	Ec ds/m	Available nutrients %			Available nutrients ppm		Phenols %	Coumarin ppm
			N	P	K	Fe	Mg		
2:1	6.84	4.63	1.25	0.31	0.50	89	75	12.7	40.7

Result and Discussion

Germination Percentage%

The results of Table 7 show that the treatments used in this study differed in their effect on the germination rate. The treatments of T8 and T9 showed the highest germination rate 100%, while the treatments T0 and T 1 gave germination rate 98.3% followed by T3 and T7 and T10, with germination rate 95 %. There were no significant differences between them. However, they differed significantly from treatments T4 and T6 in germination ratio 85% and T5 recorded the lowest germination rate compared to the rest of the treatments which recorded 73.3 %.

The seeds of cucumber require relatively high temperatures for germination, and the biological processes within the seed that provide energy for the developing embryo require a waterway. The seed germination are controlled by a number of factors, including the water content of the seed, the abundance of oxygen and nutrients, as well as the factors of the seed [7]. Organic matter increases the ability of the soil to absorb heat from the periphery because of its dark color [30].

It also plays an important role in improving the physical properties of soil, including regulating the soil structure, reducing its density and thus increasing its porosity. The ratio of available water and the rate of water conductivity, and also equates soil pH [31, 36].As well as increasing the available of large and micro-components through their metal and preventing their stabilization in the soil [37]. Organic fertilizers contain humic acids and growth-stimulating hormones, giving a higher germination rate [38].

Organic compounds activate germination by stimulating enzymatic activity, high metabolites, disintegrating compound and converting them into molecules that can be introduced into new compounds used in the biological construction of the embryonic axis and the transition of the embryo from the self-feeding phase to the seedling phase [39] This explains the percentage of germination in the treatment of the addition of decomposed date palm leaves.

While treatment of adding grindery Date palm seeds, which have been decomposed have given the lowest values, perhaps due to the incomplete process of decomposition and thus continued decomposition in the soil, which will raise the temperature to the extent that accelerated the process of germination and this was demonstrated by

the results of calculating the speed of germination.

While its addition affected the germination rate ,therefore It is important to carry out the germination test experiment, which showed that the grindery date palm seeds , which is decomposed for a month and a half, is insufficient to adding it as an organic fertilizer in the case of planting seeds directly in the soil or within the seed germination medium. The negative impact of reduced germination may be due to the fact that these residues still contain phenolic compounds with toxicity concentrations [24].

This is confirmed by the chemical analysis of the decomposed grindery date palm seeds extract (Table 6), which shows that phenols and Coumarin content reached 12.7% and 40.7 mg/L^{-1} respectively. While concentration of 200 µ of Coumarin is inhibitory for germination. On the other hand Ec extract parameter was very high (4.63 ds/m) may be effect on cucumber seed germination.

Speed of Germination (plant day $^{-1}$)

Table 7 indicates that the superiority of treatment T5 significantly on the rest of the treatments at the speed of germination amounted to 7.24 plants day $^{-1}$ followed by treatments T4 and T6, which gave the speed of germination of 6.75 and 6.60 plant day $^{-1}$, respectively, with significant differences about comparison treatment, which achieved rate of 4.42 plants day $^{-1}$, while the rest of the treatments showed no significant differences between them or with comparison treatment.

These results show that the addition of partially decomposed grindery date palm seeds to the soil before planting seeds, continued analysis after the addition that means raising the temperature of the soil, which speeds up seed germination, but negatively affects the proportion of germination. The effect of temperature may interfere with the incomplete decomposition of inhibitory substances such as coumarins and phenolic compounds [24].

Leaves Area (cm²)

Increase of Leaves area means intercepting the largest amount of sunlight and thus increases carbon representation, when the low Leaves area low levels of carbon representation and output and therefore less plant production of dry matter [40]. The results of Table 7 show that there was a significant increase in the Leaves area at treatment T9, which reached 4305 cm² and a 63.31% increase compared to comparison treatment which gave Leaves area of 2636 cm². the second place is treatment T1, which was 3837 cm², while did not differ significantly with treatments T8, T2 and T3 with Leaves area of 3739, 3615 and 3547 cm² respectively, followed by T7 and T10 with Leaves area of 2980 and 2198 cm² respectively, while T6 and T4 and T5, with Leaves area of 1678, 1150 and 1122 cm² respectively.

The improvement in vegetative growth indicators (Table 7 and 8) may be due to the role of compost added to soil in soil organic matter and available macro and micro nutrients (Table 2). Microorganisms in the soil use the carbon of organic acids in organic matter as an energy source and release carbon dioxide that dissolves in water and produces carbonic acid, reducing hydrogen function and increasing nutrient availability [41]. In addition to the nutrients in the spray extract (Table 5), this increased the plant growth and leaves area compared with T0. Nitrogen increases the content of nucleic acids and makes proteins essential to formation of leaves principles [42].

Phosphorus plays an important role in many enzymatic and structural reactions. It enters into formation of membranes, enzymes and co-enzymes that necessary for energy reactions in respiration and photosynthesis. Potassium also plays a major role in the transfer of water and available nutrients between roots and vegetative growth [7] and thus reflected on increase of leaves area and increased vegetative growth. This result corresponds to [18, 43].

Plant Length (cm)

Table 7 indicates that treatment T8 recorded the highest plant length of 175.1 cm with an increase of 18.39% compared with comparison treatment T0, which gave the length of a plant of 147.9 cm. The treatments T1, T3, T7 and T9 ranked second with a plant length of 172.6 and 171.5 170.3 and 168.5 cm respectively. No significant differences were recorded between them. The lowest treatment rate was T5. Organic fertilizers improve soil porosity, fertility and water retention.

Ultimately, the effect of all these characteristics on plant growth is better [44].

The addition of Organic fertilizers has enhanced its organic content; Plants absorb nutrients needed to improve plant growth, especially N and P [45]. Organic matter clearly and directly affects plant growth through its effect on biochemical, physiological and morphological processes from seed germination to cell development, nutrient uptake and plant growth generally [46].

Increase in plant length in most of the treatments in this study may be due to nitrogen fertilizer content (Table 1 and Table 5), which is absorbed by the plant and increases its content (Table 8). Nitrogen stimulates the production of oxygen and the synthesis of proteins in the plant, and then increases the length of the plant [47].

Table 7 Effect of organic fertilization with date palm wastes on percentage of germination%, germination speed day and plant length cm and leaves area cm²

Treat.	Germination%	Germination speed day	Plant length cm	Leaves area cm²
T0	98.3	4.42	2636	147.9
T1	98.3	5.01	3837	172.6
T2	93.3	5.30	3615	155.3
T3	95.0	4.92	3547	171.5
T4	85.0	6.75	1150	150.8
T5	73.3	7.24	1122	140.0
T6	85.0	6.60	1678	142.3
T7	95.0	5.07	2980	170.3
T8	100.0	5.08	3739	175.1
T9	100.0	5.50	4305	168.5
T10	95.0	4.66	2198	151.7
L.S.D.	15.24	1.114	1049.0	18.37

Chlorophyll % Content

Increasing the chlorophyll content of the leaves means higher carbonate, as chlorophyll is the center of photovoltaic harvesting and conversion to bio energy [47]. The results of the statistical analysis in Table 8 indicate that the treatment of T7 gave the highest chlorophyll content in the leaves at 62.10 spad units and did not register a significant difference from the rest of the treatments except the treatment T3 that gave the lowest value of the chlorophyll content of 55.85 spad units.

This may be due to the effect of spraying the water extract of decomposed grindery Date palm seeds in increasing the content of the leaves of nitrogen which is involved in the manufacture of chlorophyll as well as the formation of the amino acids involved in the formation of green plastids [48].

Leaves content of nutrients N, P, K %

Nitrogen Insert into composition of many Plant cell components, including amino acids and organic acids. Nitrogen deficiency in the plant inhibits its growth. Phosphorus also essential to composition of important compounds of the plant cell, including Phospholipids, which involved in the synthesis of cellular membranes and a component of DNA and RNA. Potassium is a key factor in regulating the Osmotic potential of plant cells and also activates a large number of enzymes involved in breathing and carbonization [49].

Table 8 indicates that T10 was significantly exceeded all treatments by giving the highest rate of nitrogen content of 1.8067 with an increase of 11.52% about T0 comparison which recorded the lowest rate of nitrogen content in the leaves of 1.6200 . in the second place were the treatments 6T and 9T with nitrogen content 1.7633 and 1.7533 respectively.

The results showed that the highest phosphorus content in the leaves was at T9 of 0.3833, with an increase of 16.15% about T0 comparison, which content of 0.3300 phosphorus rate, thus significantly exceeded on the rest of treatments except T10 That Contained 0.3733 phosphorus rate in the leaves, followed by the T6 with phosphorus content of 0.3633 and T4 recorded the lowest phosphorus content of 0.3233., T9 and T10 showed the highest rate of potassium content in the leaves at 1.2000 with an increase of 4.34 % about Comparative treatment

exceeded on the rest of treatments were followed by T6 and T8 content of potassium reached 1.1800 and 1.1733 respectively, T3 and T5 were in the third place of potassium content was 1.1700 for both that recorded significant differences with the rest of treatments.

The reason of increase macro nutrients in plant leaves of organic fertilization treatments may be attributed to content of these residues from available nutrients (Table 2) and continued preparation of the elements through mineralization process of organically elements present in organic fertilizers [37]. As well as organic matter reduces hydrogen function subsequently increases nutrient availability [34].

Or may be due to the susceptibility of organic matter to increasing adsorption properties of these elements on the surface of the soil particles [50] and improve soil aggregates, thus reducing the loss of elements by washing [51]. Or perhaps due to the role of organic acids (humic acid and fulvic acid) in these fertilizers and their role in increasing the permeability of cellular membranes and facilitate the process of nutrient transfer, thus increase the efficiency of the plant and accumulation of nutrients, which leads to an increase in the percentage of leaves [52]. This result is consistent with [43].

Table 8 Effect of organic fertilization with date palm wastes on leaves chlorophyll content Spad and nitrogen, phosphorus and potassium%

Treat.	chlorophyll Spad	Nitrogen %	Phosphorus %	Potassium %
T0	58.58	1.6200	0.3300	1.1500
T1	59.29	1.6300	0.3300	1.1300
T2	58.93	1.6433	0.3233	1.1533
T3	55.85	1.7133	0.3600	1.1700
T4	61.29	1.6667	0.3233	1.1400
T5	57.91	1.7100	0.3433	1.1700
T6	58.72	1.7633	0.3633	1.1800
T7	62.10	1.6367	0.3467	1.1500
T8	60.11	1.7000	0.3433	1.1733
T9	60.26	1.7533	0.3833	1.2000
T10	61.74	1.8067	0.3733	1.2000
L.S.D.	5.246	0.02680	0.02004	0.01764

Conclusions and Recommendations

The organic fertilization with date palm leaves wastes and half of the chemical fertilizer recommendation of the crop gave positive results in accelerating the germination of cucumber seeds, as well as increasing the vegetative growth and yield compared with chemical fertilization.

The spraying of the water extract of decomposed grindery Date palm seeds on plant leaves in the open field, which is organically fertilized with decomposed date palm leaves waste, has a clear effect on plant vegetative growth. The use of organic fertilization with the partially decomposed grindery Date palm seeds fails to form a strong vegetative growth. We propose using date palm residues in organic fertilization, particularly in areas where palm orchards are abundant for their high productivity, which is parallel if not more than chemical fertilization and other experiments using organic fertilization levels that exceeded the fertilizer recommendation but without the addition of chemical fertilizer, taking into consideration completion of the decomposition process of grindery date palm seeds.

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