

## Effect of Adding Wheat Peat and Spraying with Extract and Organic Nutrient Vegeamino in Red Cabbage Leaves Content of Certain Nutrients

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**Abstract:** A field experiment was carried out in Horticulture Department / Collage of Agriculture/University of Baghdad to study effect of adding wheat peat and spraying its extract and organic nutrient vegeamino in red cabbage leaves content nutrient using Raissa hybrid During winter season of 2015-2016 .A factorial experiment using Randomized Complete Black Design ( RCBD) with three replications were conducted . The first factor includes five treatment without fertilizer ( P0) recommended chemical fertilizer ( 100 N, 120 P<sub>2</sub>O<sub>5</sub> and 120 K<sub>2</sub>O kg.h<sup>-1</sup> ) (P1), organic fertilizer 7.5 tan. h<sup>-1</sup> (P2), organic fertilizer 15 tan. h<sup>-1</sup> (P3), organic and fertilizer 30 tan . h<sup>-1</sup> (P4) . The second factor includes four treatment. Spraying only water (E0) ,extract wheat peat (E1) at a concentration 1ml.L<sup>-1</sup>, organic nutrient vegeamino (E2) at 2ml.L<sup>-1</sup> and interaction (E1E2) (E3) . Results showed superiority of organic fertilizer treatment (P4) in percentage of elements N,P,K,Ca and Mg reached 2.945, 0.588 , 3.514 , 1.289 and 0.522 % respectively ,the lowest percentage was in the control treatment (P0) 2.489 ,0.488, 2.457, 0.708and 0.426 % , ( E3) treatment showed significant increase in percentage reached 2.870,0.571,3,308,1.137 and 0.516 % respectively. The lowest percentage was in the control treatment (E0).

**Keywords:** Cabbage production, Foliar application,Organic fertilization, Wheat peat.

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### I. Introduction

Cabbage is the most important member of the genus Brassica and it is found in wild state on the east cost of the mediterrain sea .It belongs to the cruciferae or mustard family and is Known by the technical name *Brassica oleracea* var capitata L. Cabbage thrives best in relatively cool ,moist climate . The plant grown to produce a head which formed from the twisted leaves around the terminal buds. The fresh leaves was used on salaels or in pikles or cooked ( 20 ). The red cabbage is distinguished by deep purplish - red colour due to anthocynine pigment which act on antioxidant and anticancer. It reduce the percentage of cholesterol in the blood. It contain low calorie and protein and its good for silming ( 6).The area under cabbage plantation are 1187.5 ha and the average production was 12.725ton-ha<sup>-1</sup>.Lower then the productivity of surrounding The productivity of cabbage in Iraq are Countries (9) .There is a need to increased the productivity of the cabbage by increased the area under cabbage and the productivity per unit area by using a good cultivars and good fertilizing programe . Cabbage is a heavy freeder especially of nitrogen and potash . it is the vegetable grower to increase vegetable production by increasing the chemical fertilizer and added to the crops (29) . Increasing the chemical fertilizers and pesticide will increase the concentration of nitrate in the vegetable crop and consequentioly will influence the human being heath and it will influence the soil organsium organic matter and the water content (2). There is a need to increase vegetable production and improve the qualities of these vegetable researcher and farmer trying to use the organic fertilizer and application or as foliar sprays and thin will increase the yield and improve soil fertility and environment (10). foliar spray of the chemical and organic fertilizer was a most effective matter for . increasing the quantities and the qualities of the vegetable yield and the vegetative growth (17) . Al-Mashhdani (4) found that fertilizingcauliflower plants with organic fertilizer increased nitrogen , phosphorus and potassium content of the leaves as compared with the control . Ramadan (24) found that fertilizing cabbage plants with organic fertilizer increased percentage of nitrogen, phosphorus and potassium in the outer leaves compared with the control. In our country there is a surplus of wheat chuff so that the aim of this study was to investigate the influence of this chuff and the organic fertilizer (VEGEAMINO) on the mineral content of outer leaves of the red cabbage .

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## II. Methods And Materials

This is experiment experiment was conducted at the experimental field , Department of horticulture and landscape gardening ,collage of Agriculture , university of Baghdad to study the influence of wheat chuff and its extract and the organic fertilizer (VEGEAMINO) on the mineral content of outer leaves of the red cabbage for the growing season 2015-2016. The area for the experiment was divided into three parts ,each part contain 20 experimental units with un eara of 7.2m<sup>2</sup>,each unit contain 3rows, 3meters long and the distant between rows was0.08m .Each wor contain7 plants spaced at 0.04m and the number of plants per experimental unit was 21plant. Dirp irrigation system was used to irrigate thin experiment . Ten soil sample was taken at a depth of 0.03m from the experimental area to find the chemical and physical characters of the soil ( Table 1). The seeds of the red cabbage hybride Raissa were planted in the nursery on 25-7-2015. After 50 days and when the seedling reached 15cm length and 5-6 ture leaves were transported in the field on 15-9-2015 . the experimental design was ( RCBD ) with 3 replicates . The first factor was five treatments ,(control P0) without fertilizer, The recommended fertilizer ( 3) N 100 , P<sub>2</sub>O<sub>5</sub> 100 , K<sub>2</sub>O120 Kg.ha<sup>-1</sup>(P1) .Adding wheat chuff (its chemical physical characters shown in the Table 2) at a rate of 7.5ton .ha<sup>-1</sup>(P2) , Adding wheat chuff at a rate of 15ton .ha<sup>-1</sup>(P3), Adding wheat chuff at a rate of 30ton .ha<sup>-1</sup>(P4), The wheat chuff was adding befor the transplanting of the seedling by mixing the wheat chuff and the soil in top 20cm of the row . The other work was done by foliar spray with water alon ( E0) . foliar spray with wheat chuff which prepared as shown by page et al ( 23) . The chemical and physical character of the extract was shown in Table 3 ), The concentration was 2ml.L<sup>-1</sup> ( E1) , Foliar spray with vegeamino ( its chemical physical characters shown in the ( Table 4) . The rate was 1ml.L<sup>-1</sup> ( E2).The third treatment was using 1.0 ml<sup>-1</sup> of wheat chuff and vegeamino at 1.0 ml.L<sup>-1</sup>(E3) . The first sprays was done after 2 weeks from transplanting and the second sprays was done after 2 weeks from the first sprays and the third sprays was done at rolling of the leaves to from the heads. The foliar spray was done during evening due to high temperature during day time. Trend as surfactants produced by Du pont was used at a rate of 1.6 m.L<sup>-1</sup>. Red cabbage head s was harvested from 15-12-2015 to 1-2-2016 the experimental results was stastically anaylisid using Genstat. The statistical means was compared using L.S.D at 0.05 significant . The studied characters:-

1. The percentage of nitrogen in the outer leaves was determined by Micro Kjeldahl as shown by Jackson [16]
2. The percentage of phosphorus the outer leaves was determined using spectrophotometer as shown by Olsen and Sommers [22] .
3. The percentage of potassium in outer leaves was determined using Flame photometer as shown by page et al [22].
4. The percentage of Calcium in outer leaves was determined using Flame photometer as shown by page et al [22].
5. The percentage of Magnesium in outer leaves was determined using Flame photometer as shown by Al-Sahaf [7].

**Table 1.** Chemical Physical Characters Of Field Soil

parameter	Soil pH	Electrical conductivity	Available Nmg.kg <sup>-1</sup>	Available P mg.kg <sup>-1</sup>	Available k mg.kg <sup>-1</sup>	Sand %	Salt %	Clay %	Soil
Values	7.2	2.94	68.21	39,2	79.8	17.4	49.6	33	

**Table 2.** Chemical Physical Characters Of Wheat Chuff

parameter	Soil pH	Electrical conductivity	Total N g.kg <sup>-1</sup>	Total P g.kg <sup>-1</sup>	Total k g.kg <sup>-1</sup>	C/N g.kg <sup>-1</sup>	Total Ca	Total Mg
Values	7.08	2.6	20.6	6.4	16.8	586.16	49.6	6.50

**Table 3.** Some Chemical Physical Characters Of Wheat Chuff Extract

parameter	Soil pH	Total N mg.kg <sup>-1</sup>	Total P mg.kg <sup>-1</sup>	Total k mg.kg <sup>-1</sup>	Fe mg.kg <sup>-1</sup>	Zn mg.kg <sup>-1</sup>	Mn mg.kg <sup>-1</sup>	Cu mg.kg <sup>-1</sup>
Values	8.02	28	22.5	49.5	32	7	10.5	12.2

**Table 4.** Some chemical characters of vegeamino

parameter	Amino acid %	Organic Nitrogen %	Nitrogen as Amnia %
Values	24.8	4.77	0.04

## III. Results And Discussion

### The Percentage Of N,P,K ,Ca And Mg .

From Table 5. and 6 we can find that the high content of organic matter in the soil influence positively the percentage of N,P,K ,Ca and Mg in other leaves of red cabbage and the treatment P4 gave the highest percentage of these mineral elements ( 2.945 ,0.588 , 3.514 ,1.289 ,0.522 %) respectively , while the lowest values of these elements was 2.489, 0.488 , 2.457, 0.708 , 0.426 % respectively .The influence of foliar spray with wheat chuff and vegeamino was significant and E3 was superior than the other treatments and it gave the

highest values of 2.870 , 0.571, 3.308, 1.137, 0.516 % respectively , while the lowest values was 2,679, 0.519 , 3.106 , 0.921, 0.439 in control of treatment E0 respectively . The influence of the interaction between the treatment with wheat chuff and the foliar spray with its extracts and the sprays with vegeamino was significantly increased the percentage of these elements. Treatment P4E3 gave the highest while the lowest values of these elements 3.123 , 0.632, 3.590, 1.387, 0.568 % respectively , while the lowest values of these percentages 2.400, 0.465, 2.263, 0.570, 0.383 % was found in treatment POE0 respectively .The increases of the content of N,P,K ,Ca and Mg can be attributed to the increase in the organic fertilizers added to the soil and the increases of the organic matter content in the soil and this will increase of the numbers of soil organisms and their activities and that will increase the mineralization and availability of these element in the soil and to be absorbed by the plants . Increase the organic matter in the soil will improve the structure of the soil and increased soil aeration and allowing the roots to grow and absorb the mineral elements [ 26 ]. The increases of the content of outer leaves of red cabbage from these elements and also due to gradually unavailability of these elements as a result of the degradation of the organic matter in the availability of these elements in the soil and also increased the acidity of the soil and make these element ready to be absorbed by the plant roots and then increases its content in the vegetative parts [ 5] .Its also can be attributed to the availability of N.P.K during plant growth as a result of degradation of the organic matter in the soil [8] . From a results in table [5] there is a high percentage of N on the outer leaves of red cabbage and this can be as a result of the improving of the structure of the soil by the organic fertilizers and allowing the plants roots to grow in the soil and absorb more nitrogen from the soil and also the rate of K in increasing the absorption of N from the soil by the roots [12] . The increases of N in outer leaves may be due to the rate of humic acid which is formed by the analysis of the organic fertilizers in the soil and humic acid will reduce the activity of Urease enzyme and then reduce the volatilization of the nitrogen [31]. The results in table [5] showed that the percentage of phosphorus in outer leaves was increased when organic fertilizer was used this can be attributed to the facts that the organic fertilizers contain phosphorus and also during the analysis and degradation of in these fertilizers will release many organic acid such as Butyric , Fulvic , Humic acids and these acids will dissolve many element is some in the soil and some insoluble phosphatic compounds and then increased the phosphorus to be increased absorbed by this plants [1] . Humic acid in the soil will increase the activity of phosphate enzyme which help in dissolving the phosphate rocks and produce the phosphorus [19] .The availability of phosphorus may be due to the high biological mass in the soil and increased CO<sub>2</sub> production in the soil and then the formation Carbonic acid ( H<sub>2</sub>CO<sub>3</sub>) which will reduce the pH of the soil and increased the solubility of phosphatic compound and produced the phosphorus in the soil to be absorbed by the plants [ 15] and the organic matter in the soil will prevent the fixation of phosphorus in the soil [21]. The results in table [5] indicated that an increase in potassium in outer leaves of red cabbage and that is as a result of the analysis of the organic fertilizer in the soil to produce potassium in the soil to be available to the roots and then to be leaves .The disintegration of organic matter in the soil lead to formation of humic acid and Fulvic acid and may be these acids help in liberation of potassium in soil solution to

**Table 5.** Effect of adding wheat chuff and foliar spray of vegeamino and their the interaction on the percentage of N. P. K in the outer leaves of red cabbage

Treatment	N %	P %	K %
P0	2.489	0.488	2.457
P1	2.888	0.576	3.478
P2	2.775	0.532	3.147
P3	3.447	0.546	2.802
P4	3.514	0.588	2.945
L.S.D 0.05	0.059	0.013	0.037
E0	2.679	0.519	3.106
E1	2.760	0.553	3.195
E2	2.811	0.542	3.225
E3	2.870	0.571	3.308
L.S.D 0.05	0.053	0.012	0.033
POE0	2.400	0.465	2.263
POE1	2.473	0.493	2.486
POE2	2.530	0.483	2.523
POE3	2.553	0.510	2.556
PIE0	2.808	0.548	3.429
PIE1	2.857	0.588	3.455
PIE2	2.919	0.578	3.472
PIE3	2.967	0.591	3.556
P2E0	2.676	0.506	2.993
P2E1	2.770	0.538	3.076
P2E2	2.810	0.529	3.196
P2E3	2.846	0.557	3.323
P3E0	2.720	0.529	3.590

P3E1	2.790	0.551	3.420
P3E2	2.836	0.541	3.463
P3E3	2.860	0.565	3.516
P4E0	2.790	0.549	3.456
P4E1	2.910	0.593	3.536
P4E2	2.960	0.580	3.473
P4E3	3.123	0.632	3.590
L.S.D 0.05	0.119	0.027	0.075

**Table 6** .Effect of adding wheat chuff and foliar spray with vegeamino and their interaction on the percentage of Ca , Mg in the outré leaves of red cabbage

Treatment	Ca %	Mg %
P0	0.708	0.426
P1	1.270	0.507
P2	0.812	0.445
P3	1.057	0.482
P4	0.522	1.289
L.S.D 0.05	0.064	0.439
E0	0.921	0.439
E1	1.047	0.418
E2	0.470	1.005
E3	1.137	0.516
L.S.D 0.05	0.057	0.014
P0E0	0.570	0.383
P0E1	0.745	0.433
P0E2	0.693	0.417
P0E3	0.823	0.473
P1E0	1.230	0.475
P1E1	1.283	0.511
P1E2	1.253	0.508
P1E3	1.313	0.533
P2E0	0.637	0.410
P2E1	0.827	0.443
P2E2	0.765	0.430
P2E3	1.020	0.497
P3E0	0.960	0.443
P3E1	1.077	0.491
P3E2	1.050	0.486
P3E3	1.140	0.509
P4E0	1.210	0.486
P4E1	1.295	0.526
P4E2	1.263	0.510
P4E3	1.387	0.568
L.S.D 0.05	0.128	0.033

be available to plants [ 25] .Humic acid also increased the permability of potassium through the cell membrane and the a bsorption of potassium by the plants [27] . The increases in the percentage of calcium and magnesium in outer leaves (Table. 6) was related to the rote of organic percentage fertilizer in improving the physical and chemical and biological characters of the soil and percentage the element from leaching and fixation and making the elements available to be absorbed by the plants.The organic matter improved the water holding capacity of soil and also contain Exchange capacity and increased fixation or relasing positive ions such as Ca<sup>+</sup>, Mg<sup>+</sup> [11] . The increases of nitrogen , phosphorus , potassium , calcium and Megnisium in outer leaves as a result of foliar spray vegeamino was due to the fact that vegeamino contain amino acid and organic nitrogen ( Table. 4) , and the nitrogen in the amino acid was available to be a bsorped directly by the plants and the organic nitrogen also [ 7] and this will increase the nitrogen in the sprayed leaves . The nitrogen in the leaves will assist in the formation of chlorophyll pigment and than photothynsis and building the protein which increased the capacity of the plant to absorbed and accumulate the other elements such as phosphorus , potassium , calcium and Magnesium [ 30] , The increases of the concentration of these elements in the leaves as a results of foliar spray with organic matter may be attributed to the macro and micro element in extract of the organic matter [ 3] ,which a bsorped directly when sprayed to plant leaves and increased its percentage in the leaves [28]. These elements in the leaves may directly or indirectly help a bsorping elements by the plant through improving root growth and increasing roots area , or the organic matter extract may be contain some compound such as humic acid while worked as auxins or cytokinins [14 , 32] which worked as sink for this nutrient element while increased the concentration of these element in the leaves [18] .

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