RESULTS AND DISCUSSION

The first part

I- Effect of Tryptophan and Aspartiac acids on vegetative growth and flowering of *Iberis amara* in frist and seasons (1995 / 96 - 1996 / 97)

I.A. Iberis amara

I.A.1. plant height in cms :-

Mean values of height plants in the first season of study are given in Table (1). The differences in plants height due to the different concentrations of tryptophan and aspartic acids were statistically significantly in the first season. The plant height increased with increasing the concentrations of tryptophan or aspartic acids.The higher concentration of tryptophan (75.p.pm) gave the tallest plants as 57.10 cm. While the control treatment gave the shortest plants in first season as 50.70 cm. On the other hand, tryptophan at 50 p.p.m produced the next value as 55.90. cm .

Similar results were obtained in the second season showing a trend similar to the first season. Also, the differences among these results were significant in Table (2).

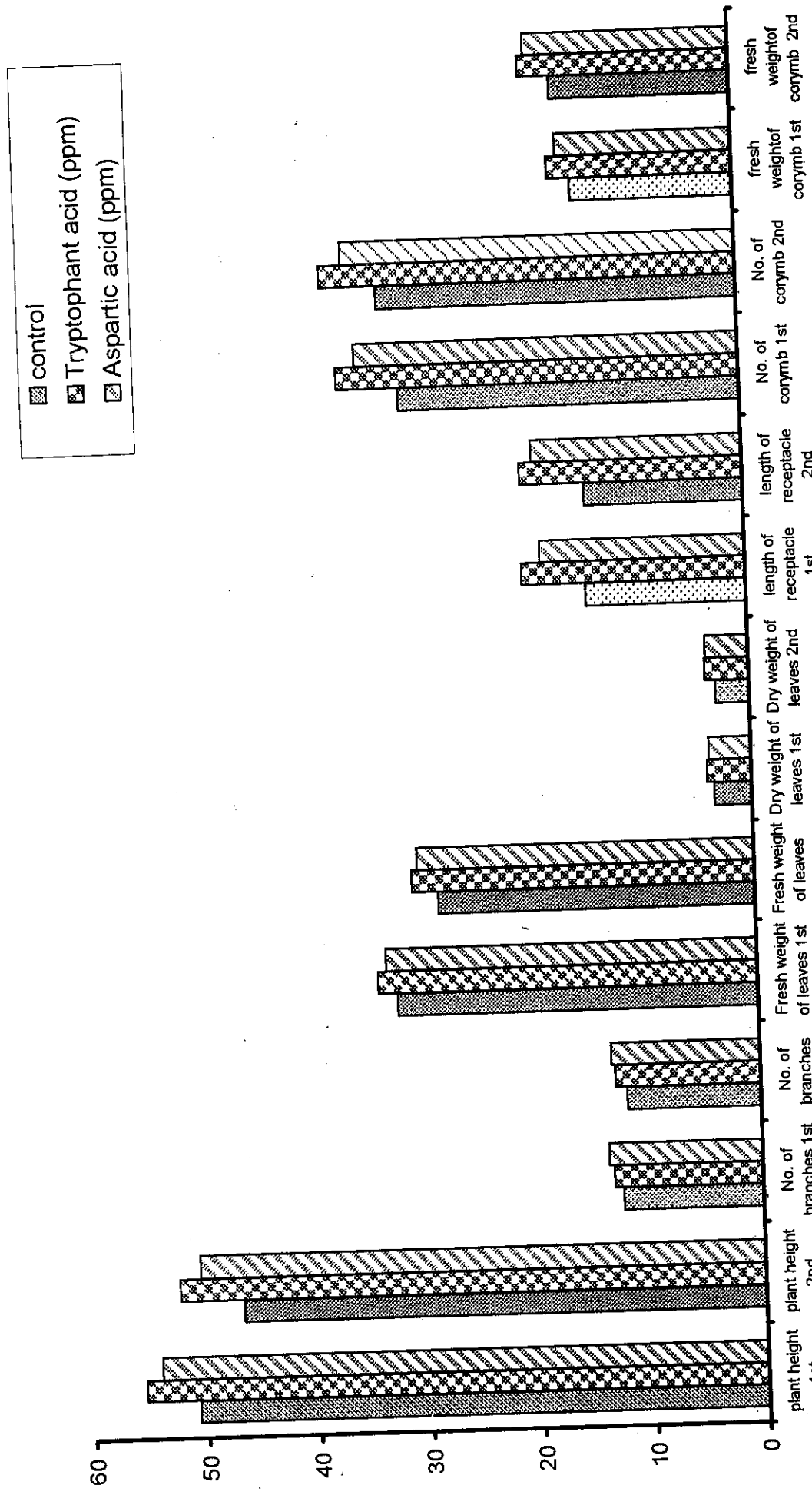
Generally, all treatments of tryptophan gave the best results in this concern comparing with all concentrations of aspartic acid, Fig. (1) Such increase in height of plants treated by tryptophan might be due to IAA formation, ***(Thimann, 1935)*** which induces cell division, ***(Patau et al . 1957)*** cambial division,
(Thimann , 1972), increased cell wall deposition, ***(Jenkins , 1974)*** and maintains the cell wall in a chemical and / or phsical state to allow continued cell elongation , while also affecting gene expression for the production of specific macromolecules required for permanent cell elongation, ***(Vanderhoef , 1980).***

Table (1) Effect of Tryptophan and Aspartic acid on vegetative growth and flowering of *Iberis amara* in the frist season (1995 / 1996)

Treatment		plant height cm	No. of branches	fresh weight of leaves\g	Dry weight of leaves\g	length of receptacle cm	No. of corymb	fresh weightof corymb\plant (g)
control ppm	0.0	50.70	12.40	32.10	3.30	14.23	30.31	14.40
Tryptophant acid (ppm)	25	53.06	13.90	33.62	3.80	19.37	32.97	14.90
	50	55.90	13.00	33.50	3.82	20.06	36.84	16.97
	75	57.10	12.63	34.50	4.10	20.24	37.72	17.36
Aspartic acid (ppm)	25	52.10	13.10	32.99	3.63	17.80	33.72	15.61
	50	54.70	14.90	33.08	3.75	18.73	31.99	15.01
	75	54.90	12.81	33.12	3.79	18.11	36.71	16.27
L.S.D 5%		2.35	0.60	0.39	0.18	1.71	1.28	0.50

Table (2) Effect of Tryptophan and Aspartic acid on vegetative growth and flowering of *Iberis amara* in the second season (1996 / 1997)

Treatment		plant height cm	No. of branches	fresh weight of leaves\g	Dry weight of leaves\g	length of receptacle cm	No. of corymb	fresh weightof corymb\plant (g)
control ppm	0.0	46.50	11.88	28.20	2.99	14.10	32.10	15.99
Tryptophan acid (ppm)	25	49.11	13.37	29.81	3.20	18.99	34.65	17.43
	50	52.81	12.89	29.99	3.99	20.01	37.71	19.01
	75	54.63	12.51	31.70	4.65	20.36	38.95	19.78
Aspartic acid (ppm)	25	48.79	12.97	29.01	4.63	18.01	34.97	17.96
	50	50.11	14.68	30.12	3.29	19.03	33.37	17.02
	75	52.09	12.09	30.99	3.48	19.25	38.39	19.64
L.S.D 5%		2.28	0.30	0.46	0.20	1.82	1.27	1.01



Fig(1) Effect of Typtophan and Aspsrtic on vegetative growth and flowering of ***Iberis amara*** in the frist and second season (1995 / 1996) and (1996/1997)

Similar results were obtained by, ***Bishr and Makarim (1988)*** on ***Datura stramonium , L.*** and ***Makarim and Bishr (1989)*** on coriander . The production of tall plants due to arginine might be attributed to stimualtion of cell division and growth promotion ***(Fliner , 1966)*** , altering the elasticity and plasticity of cell walls , or osmotic uptake of water , alteration permeability of the memberane . Such increase in height was recorded on sugarcane treated with arginine ***(Nickell , 1977)*** .Similar effects was described by ***El-Sherbeny and Hassan (1987)*** on ***Datura Stramonwm*** , who found that tryptophan increased the length of plant , ***salomen (1980)*** on ***Atropa belladonna*** who found that aspartic acid as produced the heaght of plant

I.A.2. Number of branches :-

The number of branches was affected by different rates of tryptophan and aspartic acid on ***Iberis amara*** On both seasons; All treatments gave more number of branches than the control and in most cases the differences were significant at 0.05 level. Aspartic acid at 50 p.p.m gave the maximum number of branches.While tryptophan at 25 p.p.m produced the next number of branches. Similar trend of results was obtained in the second season in the Table (2).

It is clear from the results shown in Fig (1) that aspartic acid treatments had more effect on number of branches as comparing with tryptophan treatments .

Similar effects was described by ***Mohamed et al (1992) on Alpinia nutans***. who found that tryptophan increasd the Number of branches due to tryptophan at 50 and 100 p.p.m as foliar spray

I.A.3. Fresh and dry weights of leaves per plant in gms:-

In both seasons data in Table (1&2) show that the fresh weight of leaves increased by spraying tryptophan and aspartic acid at different concentrations and the increases were highly significant with highest concentration 75 p.p.m. with tryptophan

in the two seasons of the experiment. It is clear also from the data presented in Table (1) that the increase in fresh weight of the leaves were proportion all to the increase in tryptophan and aspartic acid concentrations.
Similar trend of results was obtained in the second season in Table (2) .On the other hand , all concentrations of tryptophan were more effetive in increasing the fresh weight of leaves than all concentrations of aspartic acid, Fig (1)

It is clear from the results shown in Table (1) that tryptophan and aspartic acid had effect on the dry weight of leaves however 75 p.p.m of tryptophan gave the heaviest dry weight as compared to other treatments. The control treatment produced the least dry weight of leaves per. This plant proves that tryptophan may affect the weight through increasing cell division and assimilation of cell components. Similar results were obtained in the second season .Table (2) showing a trend of high increases in the dry weight of leaves per plant due to the application of tryptophan at 75 p.p.m and aspartic acid at 25 p.p.m , the increase over control were 55.51 % and 54. 84 % respectively. Also, the statistical analysis proved significant in this respect. The differences among the results were significant in both seasons. These effects of tryptophan may be due to the physiological roles in the plant aspicially the stimulation of cell division in apical meristens .It is generally considered that indoleacetaldehyde ***(Gordon , 1956)*** and indolepyruvic acid ***(Schneider et al . 1972)*** are the majior intermediates in the conversion of tryptophan to IAA.

These results agree with those reported by ***El-Sherbeny and Hassan (1987)***, on ***Datura Stramoniun and Mohamed et al 1992 on Alpinia nutans officinalis*** they found that tryptophan increased the fresh and dry weights of leaves per plant in g.

I.A.4. Mean length receptecle in cms :-

Data in Table (1) indicate that length of receptecle increased with tryptophan and aspartic acid spraying , this increase was significant as compared to control since spraying tryptophan at

50 or 75 p.p.m resulted in receptecle of hight 20.06 cm and 20.24 cm, respectively compared to 1 4.23 cm for control. The differences between treatments were significant in both seasons. In the second year, a trend of results similar to that obtained in the first season was noticed in Table (2) .On the other side, all tryptophan treatments gave the best result in this concern comparing with aspartic treatments in the both seasons Fig (1)

Tryptophan have their effects on synthesis of DNA, m RNA . It may be enhanced synthesis of DNA and RNA .
The results agree with those reported by ***Mohamed et al . (1992)*** on ***Alpinia nutans***,. Who mentioned that amino acids increased the mean branches of stem florets

I.A.5. Number of corymb per plant:-

In both seasons, statistical analysis of the data in Table (1&2) indicated that number of corymb has responsed to the different concentrations of tryptophan and aspartic acid. The most promising effect was due to spraying the plants with tryptophan at 75 ppm. Since this treatment produced 37.62 corymb plant and 38.95 corymb /plant as compared to 30.31 and 32.10 for control in the first and second season respectively, such increase was about 24. 11% and 21.11% in the first and second one, respectively over control. The other treatment gave more corymb than control and in most cases the differences were significant at 0.05 level. It is obvious that tryptophan had promoting effects on corymb which may be help to stimulate of cell division, also this may be attributed to some retardation of the apical dominance .

The above results agree with those reported by ***Mohamed and Khalil (1992)*** on ***Antirrhinum majus*** , L . who found that tryptophan and arginine significanty increased number of flortes .

I.A.6. Fresh weight of corymb per plant in gms:-

The fresh weight of a corymb, per plant was also affected with the different concentrations of tryptophan and aspartic acid, since the heaviest fresh weight of corymb as 17.36 g /plant produced with tryptophan at 75 p.p.m. While tryptophan at 50 p.p.m and aspartic acid at 75 p.p.m gave 16.97 and 16.27 gm, respectively. The least fresh weight as 14.40 g was noticed with untreated plants. The same trend is observed through the second season Table (2).

Statistical analysis showed significant differences among these treatments during the two seasons. In this connection Mohamed and ***Khalil (1992)*** on Delphium grandiflorum found that significant increase was recorded for number of florets. Generally, it can be say,Tryptophan treatments were more effective an this character than aspartic acid treatments, Fig (1)

I.B. Effect of the Tryptophan and Asparticacid on vegetative growth and flowering of *Antholyza aethiopica* in first and second seasons :-

I.B.1. Number of leaves per plant :-

Data in Table (3) indicate that the highest concentration of tryptophan as 75p.p.m gave the greatest number of leaves 36.5Lvs / plant. The next treatment which gave higher number of Lvs as 32.6Lvs / plant was 50p.p.m in the meantime control produced only 23.7Lvs. / plant. On the other hand all concentrations of aspartic acid increased the number of leaves comparing with untreated plants.

In the second season (1996 / 1997) in Table (4) the plant applicated with tryptophan gave the best number of leaves per plant, especially at 75p.p.m which produced the maximum number of leaves as 45.6Lvs. / plant. On the other side, all concentrations of aspartic acid gave the next effect in this connection. Untreated treatment gave the least number of leaves per plant as 32.5Lvs. / plant.

Table (3) Effect of Tryptophan and Aspartic acid on vegetative growth and flowering of *Antholyza aethiopica* in the frist season (1995 / 1996)

Treatment		No. of leaves	width of leaf No. 4 cm	fresh weight of leaves g	Dry wieght of leaves g	length of spike cm	circumof spike g	fresh weight of spike g	No. of flower on spike
control ppm	0.0	23.70	2.30	40.10	2.20	83.60	1.50	17.90	17.40
Tryptophan acid (ppm)	25	28.00	2.50	45.40	5.70	96.80	2.03	19.70	18.50
	50	32.60	2.70	47.00	6.40	95.70	1.90	18.10	20.70
	75	36.50	2.60	42.60	4.60	94.70	2.10	21.80	25.10
Aspartic acid (ppm)	25	29.60	2.50	45.10	4.60	83.20	1.70	25.10	24.90
	50	28.70	2.80	43.30	4.00	76.60	2.10	20.00	21.70
	75	29.60	2.70	43.60	4.80	75.00	2.20	23.20	17.70
L.S.D 5%		3.40	0.23	2.02	1.92	6.31	0.23	1.06	1.71

Table (4) Effect of Tryptophan and Aspartic acid on vegetative growth and flowering of *Antholyza aethiopica* in the sconed season (1996 / 1997)

Treatment		No. of leaves	width of leaf No. 4 cm	fresh weight of leaves g	Dry wieght of leaves g	length of spike cm	circumof spike g	fresh weight of spike g	No. of flower on spike
control ppm	0.0	32.50	1.40	25.06	3.00	78.7	1.80	13.70	15.90
Tryptophan acid (ppm)	25	42.60	2.20	34.60	5.10	83.50	2.30	15.90	17.70
	50	44.50	2.50	36.30	6.90	82.50	2.70	14.40	18.60
	75	45.60	2.30	26.40	3.60	80.90	2.40	16.80	20.70
Aspartic acid (ppm)	25	38.60	2.20	33.30	3.60	80.60	2.03	18.70	20.30
	50	36.06	2.80	32.80	3.20	73.30	2.40	16.06	18.70
	75	39.50	2.60	33.50	3.80	74.20	2.50	17.40	16.80
L.S.D 5%		13.35	0.34	1.50	1.90	2.17	0.23	1.30	0.81

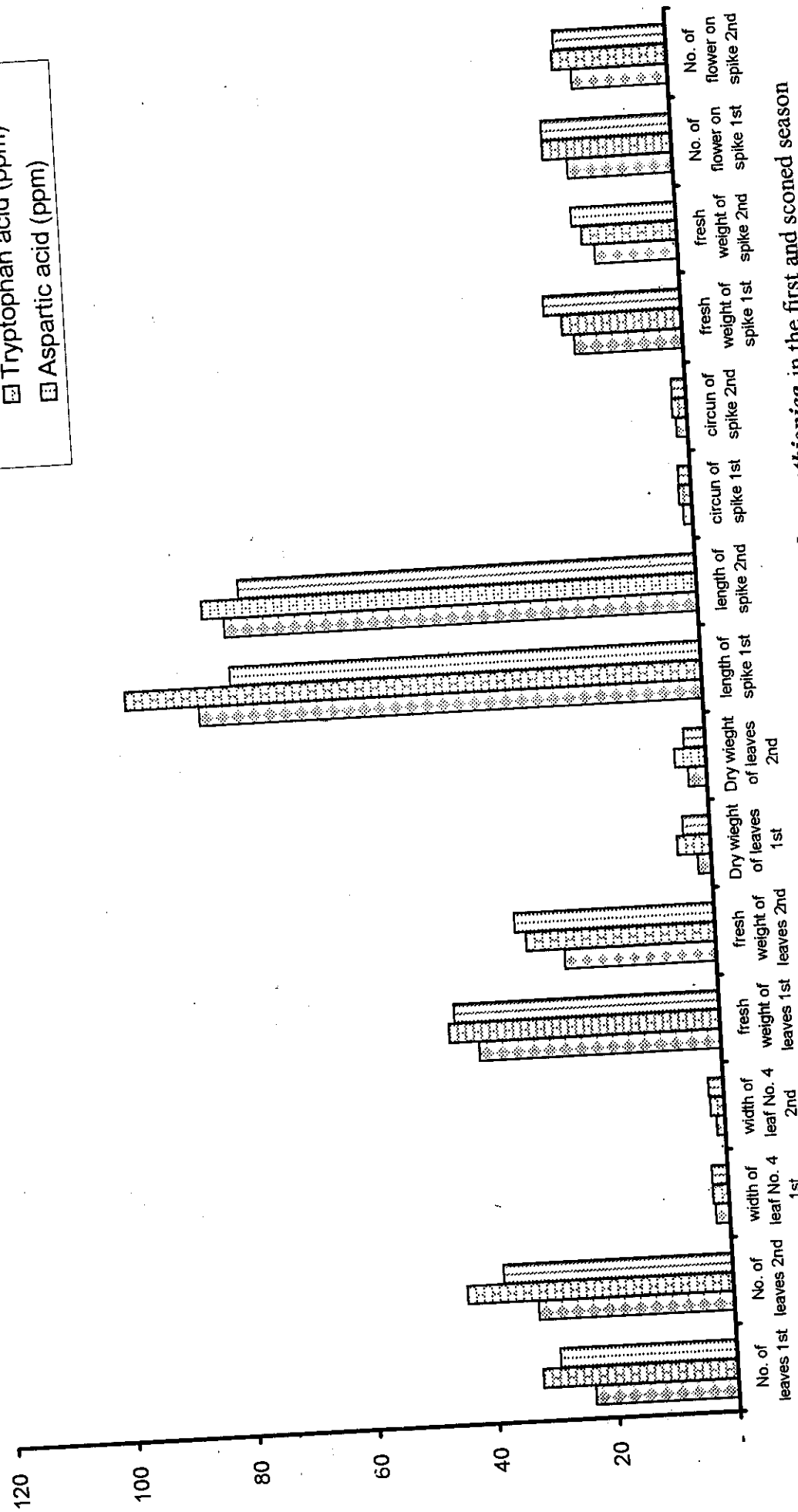


Fig (2) Effect of Tryptophan and Aspartic acid on vegetative growth and flowering of ***Antholyza aethiopica*** in the first and sconed season (1995/1996) and (1996/1997)

Generally, the highest concentration of tryptophan had the most responsive effect. The differences between treated and untreated plants was statistically significant in both seasons .

In this connection ***El – sherheny and Hassan (1987)*** on ***Datura stramonium*** , using tryptophan , phenylalonine and thiamin at the rate of 25 0 and 500 p.p.m , obtained significant increases in number of leaves at 250 p.p.m . Only with tryptophan or phenylalanine as well as , at 500 p.p.m thiamine . ***Mohamed et al.*** (1992) on ***Alpinia nutans***, they reported that, application of tryptoplan at 50 and 100p.p.m caused an increase the number of leaves per shoot.

I.B.2. The width of leaf No.4 cms :-

It is clearly noticed from data in Table (3) for seasons (1995 / 96) and (1996 / 97) that the midel concentration of aspartic acid as 50p.p.m increased the width of the fourth leaf as 2.8 cm in the first and second seasons. While tryptophan at 50p.p.m and aspartic acid at 75p.p.m produced the next width of fourth leaf. The least width as 2.3 g, 1.4cms were produced with untreated plants in both seasons, respectively. The aspartic acid at 50p.p.m would be most suitable for producing the bigest width of fourth leaf. The width of leaf response was strongly influenced by consistency of carbohydrate metabolism the differences between treatments were significant in both seasons. ***Dorer et al (1972)*** , found that treating belladonna seed or seedlings with glutamic and aspartic acids led to the largest leaf . ***Makarim and Bishr (1989)*** on ***Coriandrum sativum L*** , found that spraying tryptophan at a rate of 100 p.p.m gave the best growth .

I.B.3. Fresh and dry weights of leaves in gms : -

Data of first season (1995 / 96) indicate that the tryptophan at 50ppm was effective on increasing fresh weight of leaves by 17.2 % over the control. Subjecting plants to 25p.p.m of tryptophan produced the next value as (45.4 g). While,

untreated plants gave the least fresh weight of leaves as 40.1 g per plant.

Similar results were obtained in the data of the second season (1996 / 97) Table (4), the heaviest fresh weight of leaves were obtained from tryptophan at 50p.p.m and the next value in this concern was tryptophan at 25p.p.m. In both seasons the differences among the treatments were statistically significant.

As for dry weight of leaves, the treatments which increased fresh weight of leaves were the same which produced heaviest dry weight in both seasons. Tryptophan at 50 and 25p.p.m concentrations gave 6.4, 5.7 and 5.1, 6.9 g in the first and second seasons, respectively. The differences among treatments were significant in both seasons. The results agree with those obtained by ***Mohamed et al (1992)*** on ***Alpinia nutans***, they indicated that foliar spray with tryptophan at 50 and 100p.p.m caused highly significant increase in fresh and dry weight of leaves per shoot. ***El- Sherbeny*** and ***Hassan (1987)*** on ***Datura stramonium,*** when sprayed the plants with tryptophan, phenylalanine and thiamin at 250 and 500p.p.m obtained significant increase in fresh and dry weight of plant.

I.B.4. Mean longest length of spike in cms :-

In Tables (3 & 4) first and second seasons it is clearly noticed that tryptophan at 25p.p.m gave longest length of spoke as (96.8 , 83.5cms) in the first and second seasons, respectively. While tryptophan at 50 or 75p.p.m produced the next value in this concern. On the other hand aspartic acid at 50 or 75p.p.m gave the shortest length of Antholyza spike.

The differences were statistically significant and data of (1996 /97) shown in Table (4) appear similar results to those obtained in (1995 / 96)

In conclusion the most effective treatments were all the concentration of tryptophan as comparing with aspartic acid or control treatments.

Osman (1997), reported that tryptophan increased length of narcissus, also ***Mohamed and Khalil (1992)*** on Delphinum

grandiflorum found that tryptophan and agrinine significant increase was recorded for length of inflorescences stalk .

I.B.5. Mean circum ference of spike in gms :-

The results in Table (4) show that mean circumference of spike was influenced by two kind of amino acids and the differences in this respect were significant . Tryptophan at 50 p.p.m gave the maximum circumference of spike were as aspartic at 75 p.p.m gave the next value in this concern compared to the control plants which gave the minmum circumference of Antholyza spike .

Similar trend of reslts was noticed in the second season, and the differences between the results were significant , Table (4) . Observed effect on circumferce may be due to some physiological rolse of amino acid in plant . These amino acids can be incorporated into protenis .

I.B.6. Fresh weight of spike in gms :-

The least fresh weight of spike as 17.9 g . or 13.7 g were produced from control in both seasons, respectively. And the heaviest one as 25.1 and 18.7 g. were from the aspartic acid at 25p.p.m in the frist and second one , respectively. Table (3&4)

Generally, aspartic acid increased the fresh weight of spike comparing with tryptophan treatments while control plant gave the least fresh weight of spike. The differences among the treatments were statistically significant in both seasons.

This results agree with the finding of ***Salonen (1980)*** who demonstrated that aspartic acid increased the fresh weight of ***Atropa belladonna***

I.B.7. Number of florets per spike :-

As shown in Table (3) antholyza plants treated with tryptophan at 75p.p.m or aspartic acid at 25p.p.m produced

similar result as 25.1 and 24.9 florets spike compared to 17.4 florets spike with control plants.

In the second season, the plants treated with tryptophan at 75p.p.m or aspartic acid at 25p.p.m produced similar number of florets as 20.7 and 20.3 florets / spike, respectively .

The differences between the treated and untreated plants was statistically significant. This results agree with the finding of ***Gamal El – Din (1992)*** on ***Hyoscysamus muticus*** , found that application of ornithine, praline and cystenie at 10 , 50 and 100 p.p.m cause significant increase in the flowers number per plant The impproving effects of tryptophan and aspartic acid on growth and flowering parametars may be due to similar active roles in proces associated with flowering parameters . Tryptophan drives its active role from IAA formation which perform major role in cambial division and increased cell wall desposition . Also may be increased the differentiation of floral pre mordia .

II. Effect of tryptophan and Aspartic acid on corms-production of *Antholyza aethiopica* in the first and second seasons (1995 / 96) , (1997 / 97) .

II.B.1.Number of corms per plant :-

As shown in Table, (5) antholyza plants treated with tryptophan at 25p,p.m or asparetic acid at 75 p.p.m gave the maximum number of corms per plant as 3.4 and 3.1 corms / plant , respectively. Also tryptophan at 75p.p.m and aspartic acid at 50 p.p.m produced the next value in this concern. While the untreated plants gave the minimum number of corms per plant as 2.06 .

The differences between treatments were significant in both seasons.

Data in the second season produced the similar results in the first one Table (5) .

This data agree with the finding of ***Osman (1997)*** who demonstrated that tryptophan increases the number of bulbs per

Table (5): Effect of Ttyptophan and Aspartic acid on corms production of *Antholyza aethiopica* in the frist season(1995/1996)

Treatment		Number of corms	diameter of corms cm	Dry weight of corms g
control ppm 0.0		2.06	4.10	1.50
Tryptophan acid (ppm)	25	3.40	4.8	2.83
	50	2.50	5.06	2.27
	75	2.90	5.30	3.79
Aspartic acid (ppm)	25	2.50	4.40	2.54
	50	2.80	4.30	1.79
	75	3.10	4.60	1.79
L.S.D.5%		0.18	0.33	1.00

plant on *Narcissus*. ***Mohamed et al (1992)*** on ***Alpinia.*** They found that, application of tryptophan at 50 and 100p.p.m increased the fresh and dry weight of the rhizomes per plant .

II.B.2- Diameter of corms per plant in cms :-

The diameter of corm per plant was also affected with the different concentration of tryptophan and aspartic acid, since the largest diameter of corm as 5.06 cms was produced with at 150p.p.m gave the next value in this concern. The smallest diameter of corms gave with untreated plant Table (5) which aspartic acid at 75 p.p.m .

Statistical analysis showed significant differences among these treatments during two seasons .Table (6) appears similar results of (1996 / 97) to those obtained in (1995 / 96) . The largest diameter (4.9 , 4.7) were obtained from plants treated with tryptophan at 50p.p.m and aspartic acid at 75p.p.m respectively .

II.B.3- Dry weight of corm in gms :-

Generally,as shown in Table (5 & 6) antholyza plants benefited from tryptophan treatments , The increasing of dry weight of corms was mostly with tryptophan at high and moderate concentrations than lower concentration. Therefore tryptophan at 50 or 75p.p.m was more suitable for accumulation of minerals and dry matter rather than 25p.p.m.

As for aspartic acid , lower concentration as 25p.p.m produced the better result comparing with anther concentration Data of (1996 / 97) showin in Table (6) appear similar results to those obtained in the first season.

In this connection , ***Osman (1997)*** reported that spray applications of trytophan on Narcissus increased the averag weight of significant increases in the dry weight of bulb per plant. This indicated that tryptophan encourages the translocation of metabolites in the storage organs .

Table (6): Effect of Ttyptophan and Aspartic acid on corms production of *Antholyza aethiopica* in the seconed season(1996/1997)

Treatment		Number of corms	diameter of corms cm	Dry weight of corms g
control ppm 0.0		2.80	3.80	2.00
Tryptophan acid (ppm)	25	5.00	4.00	2.93
	50	4.00	4.9	3.26
	75	4.30	4.70	3.44
Aspartic acid (ppm)	25	4.00	3.90	2.64
	50	4.30	4.40	2.06
	75	4.50	4.70	2.29
L.S.D.5%		0.23	0.51	1.40

Table (6): Effect of Ttyptophan and Aspartic acid on corms production of *Antholyza aethiopica* in the seconed season(1996/1997)

Treatment		Number of corms	diameter of corms cm	Dry weight of corms g
control ppm	0.0	2.80	3.80	2.00
Tryptophan acid (ppm)	25	5.00	4.00	2.93
	50	4.00	4.9	3.26
	75	4.30	4.70	3.44
Aspartic acid (ppm)	25	4.00	3.90	2.64
	50	4.30	4.40	2.06
	75	4.50	4.70	2.29
L.S.D.5%		0.23	0.51	1.40

The second part

I. Effect of sulfur and phosphorus on the vegetative growth and flowering of *Iberis amara* in the first and second seasons (1995 / 96) and (1996 / 97)

I.A. Iberis amara

I.A.1. Plant height in cms :-

Highly significant increase in the plant height of ***Iberis amara*** was observed due to sulfur addition at 0.50 gm /plant as (52.1 cm) as shown in Table (7) while using 1.5 g of sulfur addition gave the next value in this concern . On the other hand using sulfur micron produced the shortest length of plant especially at 2.5 g / L or 5 g / L as 41.5 or 41.1 cms , respectively .

The trend of results was constant in both seasons of experiments 1995 / 96 and 1996 / 97 . Theses results come in harmony with those obtained by ***Khanpare et al .(1993)*** on ***Brassica juncea*** who reported that plant height increased with up to look g S/ ha (50 – 200 kg . ha). ***Abbas et al. (1995)*** on ***Carthamus tinctoris*** reported that plant height increased significantly at 40 kg S / ha .

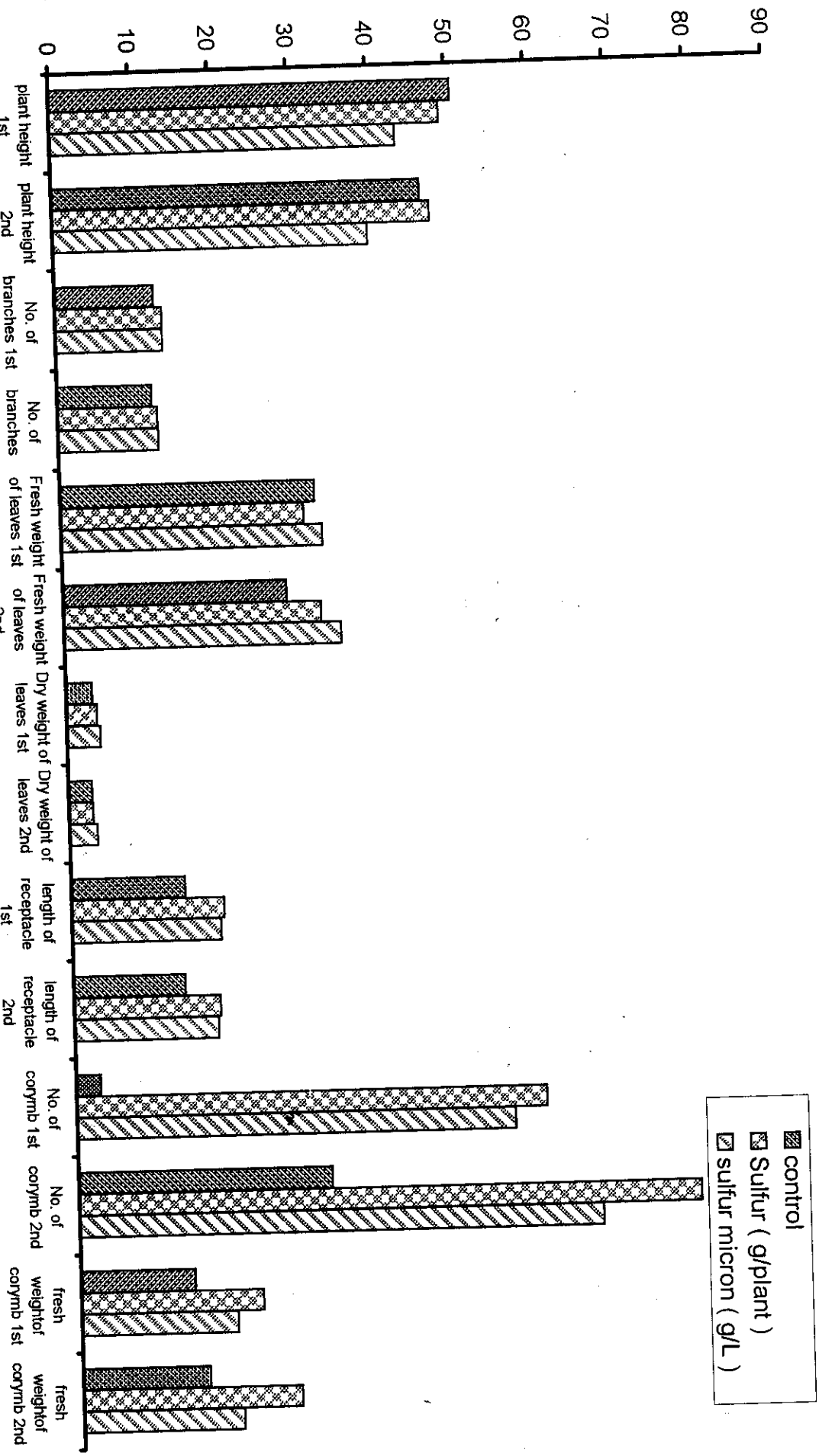
Generally , all concentrations of sulfur addition give the best data in this concern comparing with all concentrations of sulfur microne . Fig (3) .

I.A.2. Number of branches per plant :-

The data tabulated in Table (7&8) showed clearly that sulfur addition at 1 g / plant or sulfur micron at 5 g / L significantly increased the mean number of branches in the first season . The increase over control reased 16.12 % in the first season in the second season , using sulfur micron at 5 g / L produced the maximum number of branches as 14.10 branches / plant . While sulfur addition at 0.5 g/ plant gave the second

Table (7) Effect of Sulfur on vegetative growth and flowering of *Iberis amara* in the frist season (1995 / 1996)

Treatment		plant height (cm)	No. of branches	fresh weight of leaves\g	Dry weight of leaves\g	length of receptacle (cm)	No. of corymb	fresh weightof corymb\plant (g)
control Gms	0.0	50.70	12.40	32.10	3.30	14.23	30.31	14.40
Sulfur (G/P)	0.5	52.10	13.40	33.20	4.24	18.63	55.33	17.60
	1.0	44.50	14.40	29.06	3.34	19.43	74.00	21.40
	1.5	51.00	12.40	29.80	3.94	19.56	99.20	30.00
sulfur micron (G/L)	1.25	48.30	12.40	34.20	4.44	18.13	42.60	12.16
	2.50	41.50	13.40	35.50	4.54	18.63	58.70	28.00
	5.00	41.10	14.40	29.20	3.64	19.69	65.30	19.60
L.S.D 5%		1.99	0.26	2.35	0.233	0.31	3.50	1.94



Fig(3) Effect of Sulfur on vegetative growth and flowering of Iberis amara in the frist and second season (1995 / 1996) and (1996/1997)

Table (8) Effect of sulfur on vegetative growth and flowering of *Iberis amara* in the second season (1996 / 1997)

Treatment		plant height (cm)	No. of branches	fresh weight of leaves\g	Dry weight of leaves\g	length of receptacle cm	No. of corymb	fresh weightof corymb\plant (g)
control Gms	0.0	46.50	11.88	28.20	2.99	14.10	32.10	15.99
Sulfur (G / p)	0.5	50.30	13.10	34.30	3.58	15.80	66.00	26.20
	1.0	46.00	12.40	31.60	2.51	19.40	83.90	26.20
	1.5	47.30	12.10	31.70	2.98	20.30	86.20	30.65
Sulfur micron(G / L)	1.25	45.70	11.80	35.60	3.68	17.20	52.90	15.65
	2.50	38.10	12.00	36.90	3.84	18.40	69.60	26.29
	5.00	35.50	14.10	32.50	3.08	19.20	75.90	18.69
L.S.D 5%		3.11	0.77	2.07	0.48	0.88	2.83	13.12

value in this concern, as 13.10 branches / plant . The differences were significant in both seasons . The above results agree with those reported by ***Prasad etal (1991)*** on soybean who found that S fertilization increased number of branches .
Saran and Giri (1990) on mustard, found that significant increments in number of branches were recorded with 60 kg S .

I.A.3. Fresh and dry weights of leaves per plant in gms :-

In the first and second season data in Table (7&8) show that spraying with sulfur micron at 1.25 g / L or 2.5 g / L level increased the fresh weight of leaves per plant over any other treatments , were as the sulfur addition at 0.5 g / plant gave the next value in this respect . The differences among the results were significant in both seasons . In the second year , atrend of results similar to that obtained in the first season was noticed .

As for dry weight of leaves per plant , the application of sulfur micron of 2.5 g / L gave noticeable increases in the dry weight of leaves of ***Iberis amara*** . Also the statistical analysis proved significance in this respect . ***Dubey and Khon (1993)*** on ***Brassica juncea*** given 0-50 kg S / ha indicated that , dry matter production / plant increased with up to 30 kg S / ha .

I.A.4. Mean length of receptacle in cms :-

Results in Table (7) reveal that all sulfur treatments (under any kind of sulfur using) significantly increased the length of receptacle in both seasons the higher the concentration of sulfur addition or sulfur micron the more the length of the receptacle . The lengest receptacle were obtained due to treating plants with sulfur addition at 1.5 g / plant or sulfur micron at 5 g / L .While the control plants gave the shortest receptacle in the first season and also the second one , the differences were signifcant at level in both seasons .

The above mentioned results agree with those reported by ***Narwah et al (1991)*** working on ***Brassica juncea*** found that , stem yield increased with increased S appliction rate . ***Singh***

and vinay – singh (1990) on L in seed mentioned that greatest fresh weighr of stems .

I.A.5. Number of corymb per plant :-

Results in Table (7&8) of the first and second season , obviously show that the number of corymb was affected by sulfur applications .The differences between cases , were significant . The most promising effect was due to sulfur addition at 1.5 g / plant since this treatment produced 79.20 corymb / plant as compared to 30.31 for control , such in crease was about 161.2 % over control . The other treatment gave more corymb then control Similar results were obtained by ***singh and Sharma et al (1996)*** on ***Brassica juncea*** results indicated that siliquae / plant and seeds / siliqua increased significantly with increasing S level over the range tested .

I.A.6. Fresh weight of corymb per plant in gms :-

Highly signifcant increase in the fresh weight of ***Iberis amara*** was observed due to sulfur addition at 1.5 g / plant (30 g) . While sulfur micron at 2.5 g / L gave the next vatue in this concern . On the other hand , the control plants produced the minimum fresh weight of corymb per plant .
The results of (1996 / 97) season showed a similar trend to those of (1995 / 96) experiment .
These results agree with those of ***Hussein et al (1996)*** on Lavender plants showed that , the highest increased value of herb yield was obtained with application of S % + 1 % P . which reached to 85.1 % over the control .
Generally from all the above data it could be concluded that , all differents treatments of sulfur used clearly affected the vegatative growth and flowering of ***Iberis amara*** .
These effects of sulfur may be due to the physiological roles in plant , from PAPS , sulfur was reduced to sulphide .
The sulphide which produced by the reduction of APS does not accumulate in plant cells but is instead rapidly in coroported into

the sulfur containing amino acids (cysteme , cyteine and methionine) Morover these amino acides incoroporated into proteins . However , increasing the proteins in ***Iberis amara*** can be improving the vegetative growth and flowering .

I.B. Effect of sulpur on the vegetative growth, flowering and corms of *Antholyza aethiopica* in the first and second seasons .

I.B.1. Number of leaves per plant :-

Application of sulfur addition at 1 g / plant was effective on increasing the number of leaves per plant as 38.20 compared to 34.90 , 34.50 L vs / plant with 0.5 g of sulfur addition and 1.25 g / L of sulfur micron . While the control plants gave the least number of leaves per plant as 23.70 .

Statistical analysis showed significant differences among these treatments during two seasons . The maximum number of leaves per plant as 45.70 while sulfur microne produced the next value in this concern as 39.4 . The control plants gave the minimum number of leaves 32.5 L vs / plants .

The accelerating and increasing effect on leaves induced by sulfur has been showen by many in the second season (1996 / 97) , sulfur addition at 1 g / plant gave workers such as ***Prasad et al (1991)*** on soybeen gound that S fertilization increased number of leaves . And ***Fazal et al (1989)*** on soybean and wheat crops found that increased level of sulfur significantly increased number of leaves .

I.B.2. Mean width of leaf no 4 in cms :-

It is evident that all concentrations of sulfur micron recorded significant increase in the width of leaf no 4 to gave 3.00 , 3.03 ,310 cm for 1.25 , 2.5 and 5 g / L, recpectively . While all other concentrations of sulfur addition prodnced the next value in this concern .

The untreated plants gave the minimum width of leaf no 4 Table (9) . Data of the second season (1996 / 97) in Table (10) appear the differants between treatments unsignificant . And all treatment gave the same results approximetly .
The results agree with those reported by ***Hoking et al (1987)*** on sumflower showed that S dificiencle reduced leaf area . Singh and Singh (1995) found that application of 20 kg Zoxide / ha and 30 kg sulfur / ha independenty signifcantly increased area / plant .

I.B.3. Fresh and dry weight of leaves per plant in gms :-

The least fresh weight of leaves per plant as 40.1 g was obtained from control plant and the heaviest fresh weight as 55.1 and 53.3 g were from the sulfur microne at 1.25 g / L and 1.5 g plant of sulfur addition respectively . The differences among these treatments were statistically significant . Results of the second season (1996 / 97) in harmong with those of the first season (1995 / 96) Table (9) , as for dry weight of leaves . The treatments which increased fresh weight of leaves were the same which produced heavy dry weights Table (10) ***Hussein et al (1996)*** on lavender plants reported that , different fertilizer levels of sulfur increased fresh and dry weight of herb . ***Dubey*** and ***Khon (1993)*** on ***Brassica juucea*** stated that, dry matter production / plant increased with up to 30 kg S/ ha .

I.B.4. Mean length of spike in cms :-

In Tables (9&10) for first and second seasons it is clearly noticed that 2.5 g / L of sulfur microne in both seasons gave taller spike as 98.3 and 92.3 cms , respectively . While 1.25 g /L of sulfur micron gave the next value as 96.6 , 91.8 cm in the first and second seasons , respectively . The control plants produced the shortest spike in both seasons as 83.6 and 78.7 cm , respectively . The differences in concern were statistically significant in both seasons .

Table (9) Effect of sulfur on vegetative growth and flowering of *Antholyza aethiopica* in the frist season (1995 / 1996)

Treatment		No. of leaves	width of leaf No. 4 cm	fresh weight of leaves g	Dry wieght of leaves g	length of spike cm	circun of spike g	fresh weight of spike g	No. of flower on spike
control Gms	0.0	23.70	2.30	40.1	2.20	83.6	1.50	17.90	17.40
sulfur addition G/P	0.5	34.90	2.60	44.00	5.50	91.30	2.10	20.40	22.50
	1.0	38.20	2.80	50.00	5.80	89.60	2.10	24.10	21.10
	1.5	31.60	2.60	53.30	8.40	93.60	2.30	28.60	23.80
Sulfur Spary G/L	1.25	34.50	3.00	55.10	9.50	96.60	2.20	22.50	19.60
	2.50	32.10	3.03	49.30	7.90	98.30	2.06	19.10	18.80
	5.00	27.60	3.10	45.40	6.90	88.30	1.90	20.20	18.20
L.S.D 5%		4.20	0.308	5.60	2.17	5.90	0.20	1.50	1.80

Table (10) Effect of sulfur on vegetative growth and flowering of *Antholyza aethiopica* in the sconed season (1996 / 1997)

Treatment		No. of leaves	width of leaf No. 4 cm	fresh weight of leaves g	Dry wieght of leaves g	length of spike cm	circun of spike g	fresh weight of spike g	No. of flower on spike
control Gms	0.0	32.50	1.40	25.06	3.20	78.7	1.80	13.70	15.90
sulfur addition G/P	0.5	37.80	2.50	23.30	8.50	88.90	2.40	16.06	22.06
	1.0	45.70	2.50	27.30	8.80	86.06	2.40	19.60	21.90
	1.5	36.70	2.40	35.90	11.40	90.90	2.60	20.50	22.30
Sulfur Spary G/L	1.25	39.40	2.20	40.30	12.50	91.80	2.50	18.50	18.80
	2.50	35.30	2.30	33.80	10.90	92.30	2.30	15.60	18.80
	5.00	34.50	2.20	27.40	9.90	82.10	2.20	18.30	17.10
L.S.D 5%		3.70	N.S	2.80	2.10	1.50	0.20	1.94	1.20

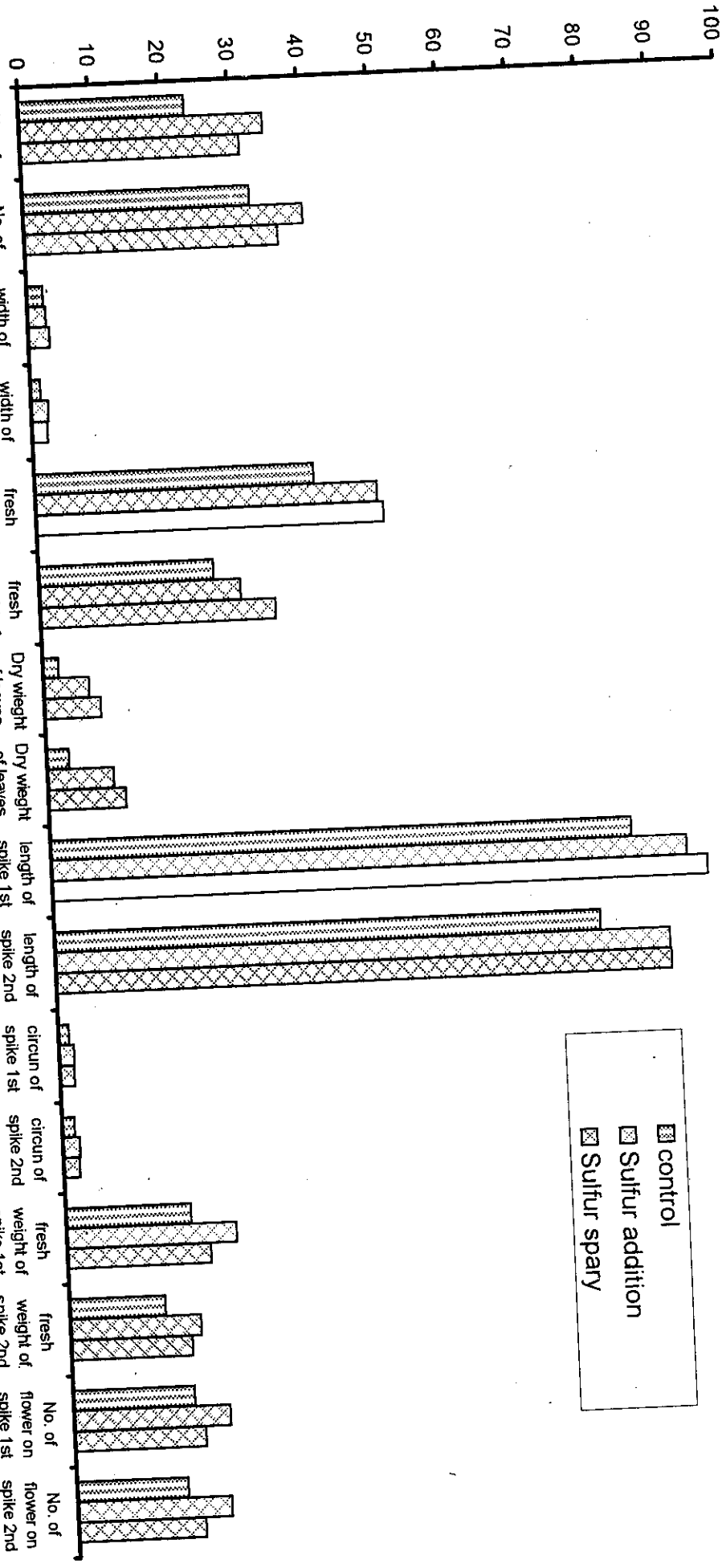


Fig (4)Effect of sulfur on vegetative growth and flowering of Antholyza aethiopica in the frist and sconed season (1995/1996) and (1996/1997)

In this respect , ***Hussein et al (1996)*** on lavender plants showed that , different fertilizer levels of sulfur and phosphorus increased value of herb yield was obtained with appliction of 1 % S+ 1 % P which reached to 85.1 % over the control .

I.B.5. Mean circumference of spike in cms :

The results in Table (9) show that mean circumference of Spike was in fluenced by two kind of sulfur and the differences in this respect were significant . Sulfur addition at 1.5 g / plant gave the maximum circumference of a spike were as sulfur microne at 1.25 g / L gave the next value in this concern compared to the control plants which gave the minmum circumference of Antholyza spike .Similar trend of results was noticed in the second season , and the differences between the results were significant , Table (10) . Observed effect on circumference may by due to some physiological rols of sulfur in plant , the most important is the incorporation of sulfur into amino acids . These amino acids can be incorporated into proteins . Similar effects was described by ***singh and vinay – singh (1990)*** on Lin seed mentioned that increased by S, K and Mg great test total vegetative parts (g / plant) .

I.B.6. Fresh weight of spike per plant in cms :-

In both seasons , data in Table (9&10) show that using sulfur addition at 1.5 g / plant increased the fresh weight of spike over the other treatments . The control plants gave the least fesh weight of spike per plant results were obtained in the second season showing similar trend to the first season . The differences among the results were significant in both seasons . This proves that sulfur may affect the weight through increasing the protein components in the cell . Similar trend of results was obtained by ***Singh and Vinay – Singh (1990)*** on Lin seed mentioned that increased by S. K. and Mg greatest fresh weighr of stems .

I.B.7. Number of florets per spike :-

Results in Table (9) of the first season , obviously show that the number of florets per spike was affected by sulfur treating . Generally all treatments of sulfur addition gave the most promising effect comparing with all concentrations of sulfur micron . The control plants gave the least number of florets per spike as 17.4 florets / spike . Sulfur addition at 1.5 g / plant gave the maximum of florets / spike as 23.8 . All other treatments gave more florets per spike than control in both seasons and in most cases the differences were significant in the first season and second one .

The above results agree with those finding by ***Varma and Reddy (1985)*** stated that the values of yield components of ***Brassica juncea*** were obtained 60 kg N and 60 kg S / ha and ***Nageshwaral et al (1995)*** on ***sesamum indicum*** revealed that , sulfur application at the rate of 10 kg/ha . Resulted significanthy in higher seed yield .

II. Effect of sulfur on corms preduction of *Antholyza aethiopica* in the first and second seasons (1995 / 96) and (1996 / 97) .

II.B.1. Number of corms per plant :-

As for effects of sulfur applications , it is clear from data in Table (11) that the most promising effect was due to spraying the plants with sulfur micron especially with 1.25 g / L , since this treatment produced 4 g corms / plant as compared to 2.06 corms for controls , such increase was about 137.8 over the control . Sulfur micron at 2.5 g / L or 5 g / L gave the next value in this concern and the same results as 4.5 corms / plant the differnces between the treated and untreated plant were statistically significant in both seasons .

Data of the second season shown in Table (12) appear similar results to those obtained in the first one . In this connection ,

Table (11): Effect of Sulfur on corms production of *Antholyza aethiopica* in the frist season(1995/1996)

Treatment		Number of corms	diameter of corms cm	Dry weight of corms g
control GMS	0.0	2.06	4.10	1.50
sulfur adition G/P	0.5	3.80	5.20	3.34
	1.0	4.40	5.36	2.66
	1.5	3.70	5.20	3.38
Sulfur spray G/L	1.25	4.90	5.80	7.80
	2.50	4.55	4.70	7.30
	5.00	4.50	4.60	6.81
L.S.D.5%		0.73	0.47	1.65

Table (11): Effect of Sulfur on corms production of *Antholyza aethiopica* in the frist season(1995/1996)

Treatment		Number of corms	diameter of corms cm	Dry weight of corms g
control GMS	0.0	2.06	4.10	1.50
sulfur adition G/P	0.5	3.80	5.20	3.34
	1.0	4.40	5.36	2.66
	1.5	3.70	5.20	3.38
Sulfur spray G/L	1.25	4.90	5.80	7.80
	2.50	4.55	4.70	7.30
	5.00	4.50	4.60	6.81
L.S.D.5%		0.73	0.47	1.65

Table (12): Effect of Sulfur on corms production of *Antholyza aethiopica* in the seconed season(1996/1997)

Treatment		Number of corms	diameter of corms cm	Dry weight of corms g
control GMS	0.0	2.80	3.80	2.00
sulfur adition G/P	0.5	3.94	4.60	3.84
	1.0	4.14	4.8	3.16
	1.5	3.34	4.50	3.88
Sulfur spray G/L	1.25	4.84	5.10	7.3
	2.50	4.54	4.60	7.8
	5.00	4.44	4.50	6.31
L.S.D.5%		0.43	0.91	1.05

Mohamed (1980) on gladiolus, found that addition of sulfur powder at the rate 600 per plot produced the highest number of cormes .

II.B.2. Diameter of corm per plant in cms :-

The diameter of corm per plant was affected with sulfur largest treatments in both seasons Table (11&12) . The largest diameter of corm per plant as 5.80 cms was produced with sulfur micron at 1.25 g / L .Whearse sulfur addition at 1g / plant gave the second value in this respect as 5.36 cms . The control plants produced the smallest diameter of cormes 4.1 cms .
The differences between treatments were signifcant in both seasons . The data in the second season appears similar results in the first one Table (11)

II.B.3. Dry weight of corm in gms :-

Generally , sulfur treatments were significantly effective on producing heavier corm as compared with untreated plants Table (11) . The heavist weight of a cormes 7.80 g were produced from plants treated with sulfur microne at 2.5 and 1.25 g / L , respectively. The last dry weight of corm as 2.66 and 3.34 g was notice with plants of control and sulfur addition at 1 g / plant .

Results of the first season were in harmong with those obtained in the second season Table (12).

II. Effect of phosphorus on the vegetative growth and flowering in the *first and second seasons (1995/96 and (1996/97)*

II.A. *Iberis amara* :-

II.B.1. plant height in cms:-

It is evident that super phosphorus at 2 g/plant significantly produced long plant as 56.50 cm compared to any

other super phosphate treatments regardless the kind of addation. Using super phosphorus at 1g/plant gave the next value in this concern.

On the other hand using super phperphosphate as spraying method produced the shortest plant height in both seasons, and the differences among these treatments were significant in both seasons.

Accoiding to ***Jayanthi and Gowda (1988)*** on chrysanthemum found that phosphorus fertilizer to chrysanthemum increased plant height ***Also Chattopadyay et al (1992)*** on gladiolus found that , plant hight was greatest with N50 P30 .

II.A.2. Number of branches per plant

Compared to other treatments, the maximum number of branches per plant was attined by spraying superphosphate solution at 4g/L.

The number of branches was increased to 15.53 per with 4g/L compared with 13.40 branches/plant for control.

Also significant number of branches was recorded as 15.4. branches/plant from plants treated with 3 g superphosphate per plant. Also similar trend of results is observed in the second season Table (13).

The increasing in the number of branches could be explained by the actis of superphasphate solution which stimulates the biosynthesis by supplying phosphorus element needed for nucleatides, co-enzymes , ATP and protein formatis.

The results agree with those obtained by ***Singh and singh (1969)*** on ***Mentha arvensis*** and ***Jayanthi and Gowda (1988)*** found that, application of phosphorous fertilizer to chrysanthemum increased number of shoots.

II.A.3. Fresh and dry weights of leaves per plant in gms:-

The heaviest fresh weight of leaves as 42.50 g/leaves `Table(13) was produced from plants sprayed with 4g/L, while

Table (13) Effect of phosphorus on vegetative growth and flowering of *Iberis amara* in the frist season (1995 / 1996)

Treatment		plant height cm	No. of branches	fresh weight of leaves\g	Dry weight of leaves\g	length of receptacle cm	No. of corymb	fresh weightof corymb\plant (g)
control G	0.0	50.70	12.40	32.10	3.30	14.23	30.31	14.4
Phosphorus addition G/P	1	55.00	13.40	32.80	3.64	17.73	40.30	19.50
	2	56.50	12.60	33.70	3.37	20.03	41.30	16.90
	3	50.80	15.40	35.20	3.85	18.13	48.90	22.30
Phosphorus spray G/L	2	42.20	13.50	38.70	4.23	20.53	46.10	16.00
	4	41.20	15.53	42.50	4.64	21.43	54.80	23.00
	6	40.20	13.40	33.96	3.84	20.23	36.10	11.16
L.S.D 5%		3.30	0.25	2.87	0.64	0.55	3.64	2.21

control plants gave the least fresh weight as 32.10g/Lvs. Wheares the plants which spraying with 2g/L gave the second value as 38.7 g/Lvs. It is also noticed that most effective treatments which produced heavy freash weight were the same which produced the heavy dry weight.

Statistical analysis showed significant differences among there treatments during two seasons showed similar trend.

However,using solution of superphosphate 4g/L concentration alone was more effective on increasing fresh and dry weight of leaves per plant compared with any other treatments.

In this connection, ***Nofal (1976)*** found that superphosphate gave the highest fresh and dry weights as Majorana Leaves.

El- Koholy (1968) on sweet peas found that phosphorus fertilization affected plant fresh and dry weights of plant leaves.

II.A.4. Mean length Receptacle in gms:-

The mean length of receptacle comparing with addition the superphosphate on soil the control plant gave the shortes length of receptacle.

The superphosphate solution at 4g/L increased the receptacle length during the two seasons as 21.43 , 19.50cm. For first and second on, respectively Tables (13 & 14)) the least length of receptacle was 14.10 cm with untreated plants.

Statistical analysis showed significant differences among these treatments during two seasons (1995/96 and 1996/97).

The results agree with the finding of ***Mohamed (1992)*** on gerbera who found that using phosphorus as foliar or as soil addition gave the highest growth and ***Chattopadhyay et al (1992)*** on gladiolis found that, resulted in longest spikes was greatest with N50 P30 .

II.A.5. Number of corymb per plant:-

As shown in Table (13), Iberis plants treated with solution of superphosphate at 4 g/L produced the maximum number of coryml.

Table (14) Effect of phosphorus on vegetative growth and flowering of *Iberis amara* in the sconed season (1996 / 1997)

Treatment		plant height cm	No. of branches	fresh weight of leaves\g	Dry weight of leaves\g	length of receptacle cm	No. of corymb	fresh weightof corymb\plant (g)
control G	0.0	46.50	11.88	28.20	2.99	14.10	32.10	15.99
Phosphorus addition G/P	1	52.30	12.28	28.80	3.89	18.20	38.90	22.06
	2	61.60	12.58	31.80	3.95	18.90	39.90	19.80
	3	46.70	14.28	35.30	4.10	18.70	43.40	20.20
Phosphorus spray G/L	2	49.50	12.38	36.20	4.30	19.10	46.80	24.50
	4	48.30	15.28	39.70	4.59	19.50	50.30	15.40
	6	42.70	12.48	32.90	3.81	16.10	32.90	13.06
L.S.D 5%		4.12	0.30	2.25	0.51	0.97	3.90	3.07

Where as superphosphat at 3 g/plant gave the next value in this concern , while the untreated plants gave the minimum number of corymb.

Statistical analysis showed significant differences among these treatments during the first and second seasons, also the roults of both seasons showed similar trend.

As regard for two the end of applications, data showed that the solution of superphosphate was more effects in this concentration.

The results agree with the reported by ***Winsor (1962)*** recorded that phosphorus fertilization had the most marked effect on the flowering of carnation increase of 20% in flower number.

Mohamed (1992) recorded that by using foliar or as soil addition to gerbera gave the highest flowering.

II.A.6. Fresh weight of corymb per plant in gms:-

The best treatment which gave the heaviest fresh weight of corymb was the superphosphate solution at 4 g/L which gave 23 g. Table(13).

Al the meantime, superphosphate at 3 g/plant (addition on the soil) gave the next value in this connection (22.30g).

Untreated plants produced the least fresh weight of corymb per plant.

The differences among the treatments were statistically significant and the data of (1996-97) in Table (14) appear similar trend of results as first season.

Similar conclusions were reported by ***Jaynthi and Gowda (1988)*** found that P fertilizer to chrysanthemum increased flower yield.

Singh et al (1990) on chrysathemum found that P nutrition improved earliness of visible bud, complete flowering.

Swiader and Morse (1984) found that the increase in yield of pepper resulted by using different levels of P solution.

II. Effect of phosphorus on vegetative growth and flowering in the first and second seasons (1995 /1996), (1996 / 1997) .

B. Antholyza aethipoica :-

II.B.1. Number of leaves per plant :-

Data in Table (15) indicate that the solution of superphosphate 4 g/L increased leaf number/plant to 34.80 Lvs/plant compared to 23.70 Lvs/plant with untreated plants. Superphosate solution at 2 or 6 g/L gave 30.3 , 31.1 , Lvs/ plant. respectively .

Generally, superphosphate solution at 4 g/L accelerated leaf formation than other treatments.

The differences between treatments were significant in both seasons. Next season showed similar trend of the first results. Table (16). The increasing effect on leaves induced by phosphorus has been shown by many workers such as ***Singh and Singh (1971)*** on ***Japanese mint*** ***Mohamed (1992)*** on gerbera found that, using pas foliar gave the highest growth ***El-Labban (1969)*** on ***Datura Stramonium*** found that increasing in the vegetative growth .

II.B.2. Width of leaf No. 4 cm :-

All application of, superphosphate were effective on increasing the width of leaf no 4,. Table (15). The plants without any application of phosphorus produced the least width leaf no 4of antholyza correlation between the application of phosphorus and the width of leaf of antholyza plants.

Result of (1995/96) season were in harmony with those obtained in (1996/97) Table (16).

The differences amonge the treatments and control was significant in both seasons.

Table (15) Effect of phosphorus on vegetative growth and flowering of *Antholyza aethiopica* in the frist season (1995 / 1996)

Treatment		No. of leaves	width of leaf No.4 cm	fresh weight of leaves g	Dry wieght of leaves g	length of spike cm	circun of spike g	fresh weight of spike g	No. of flower on spike
control Gms	0.0	23.70	2.30	40.1	2.20	83.6	1.50	17.90	17.40
phosphorus addition G/P	1.0	34.60	3.30	40.06	7.10	84.30	2.03	33.20	25.80
	2.0	36.50	3.03	53.00	9.10	85.20	1.97	27.20	29.70
	3.0	40.40	3.00	58.60	11.80	86.60	2.20	32.60	30.03
phosphorus Spary G/L	2.00	40.30	3.10	33.30	8.60	87.20	2.69	25.80	26.10
	4.00	44.80	3.20	51.20	9.00	95.90	2.80	36.10	33.10
	6.00	41.10	3.20	48.90	8.10	92.80	2.09	22.70	27.00
L.S.D 5%		4.13	0.500	6.02	1.23	6.41	0.16	3.50	1.70

Table (16) Effect of phosphorus on vegetative growth and flowering of *Antholyza aethiopica* in the sconed season (1996 / 1997)

Treatment		No. of leaves	width of leaf No. 4 cm	fresh weight of leaves g	Dry wieght of leaves g	length of spike cm	circun of spike g	fresh weight of spike g	No. of flower on spike
control Gms	0.0	32.50	1.40	25.06	3.20	78.7	1.80	13.70	15.90
phosphorus addition G/P	1.0	30.70	2.30	22.30	5.10	82.60	2.32	20.40	16.90
	2.0	38.10	2.10	33.70	9.10	83.30	2.23	14.60	18.70
	3.0	44.60	2.10	39.40	7.80	87.30	2.54	19.06	20.80
phosphorus Spary G/L	2.00	40.60	2.06	31.10	6.60	88.40	2.59	12.70	17.90
	4.00	45.30	2.20	30.30	5.10	90.06	2.68	22.10	21.30
	6.00	40.60	2.40	38.50	6.10	89.40	2.90	15.80	18.50
L.S.D 5%		2.20	0.160	1.98	1.20	3.90	0.16	1.70	1.40

The results agree with the finding of ***Attoa (1981)*** on sweet peas found that high level of P increased leaf area and ***Singh and Singh (1971)*** on ***Japanese mint***, the plants grown under full mutrition of phosphorus showed a reduction in total leave area.

II.B.3. Fresh and dry weights of leaves per plant in gms.

Results in Table (15) indicate that the fresh and dry weights of leaves were also effected with different concentrations of superphosphate, since the heaviest fresh weight of leaves as 56.60 g/Lvs. was produced with superphosphate at 3 g/plant, while 2 g superphosphate/plant and 4g/L (spraying) gave 51.0 and 49.20 g, respectively .

The least fresh weight as 40.10 g leaves noticed with untreated plants. The same trend is observed with the dry matter, Table (15).

Statiatical analysis showed significant differences among these treatments during the two seasons.

Table (16) appears similar results of (1996-97) to those obtained in (1995/96) the heaviest fresh and dry weights 39.40, 7.8 g, respectively were obtained from plants treated with 3 g/plant.

The results agree with those reported by ***El-Koholy (1968)*** on sweet peas mentioned that phosphorous fertifization affected fresh and dry weight of plant leaves and ***Dafert et al (1936)*** on ***Atropa belladonna*** found that the addition of phosphorous fertilizer increased dry weight ***Dalen (1958)*** obtained the highest weight of ***Atropa belladonna*** leaves .

II.B.4. Mean length of spike cm:-

Superphosphate at 4 g/L (using as spraying) significantly increased the mean length of flower spike to 95.90 cm compared to 83.60 for control plants. At the meantime 6 g/L (application as spraying) gave the next value as 92.8 cm.

Data of (1996/97) in Table (16) appear similar results to those obtained in (1995/96).

The lowest value as 78.70 cm for the length of spike obtained when the plants were untreated by superphosphate .While superphosphate at 4 g/L as foliar produced the longest spike of antholyza plants.

The results agree with those finding by ***chattopadhyay et al (1992)*** on gladiolus found longest spikes , greatest with $N_{50} P_{30}$.

II.B.5. Mean circum ference of a spike in cm:-

The thickest circumference of a spike (2.80 g) resulted from super phosphorus at 4 g/L using as foliar.

The untreated plants gave significantly thinner flower spike. While foliar superphosphate at 2 g/L gave the next value in this concern.

However the differences were very narrow for other treatments.

Results of the ***second season (1996/97)*** were in hormony with those obtained in the first one Table (15).

The results agree with the reporting of ***Baas et al*** (1995)on ***pelargonium zonale*** found that the general effects of suboptimal P. were reduced plant diameter

II.B.6. Fresh weight of spike per plant in gm:-

The heavist fresh weight of a spike per plants as 36.10 g was obtained from superphosphate spraying at 4 g/L. and the least fresh weight of spike as 17.9 g from control plants.

Generally superphosphate increased the fresh weight as a spike compering with untreated plants. The differences among the treatments were statistically significant.

Data of (1995/96) season in harmony with those (1996/97) Table (16) similar effects was described by ***Singh and Singh (1971) on Japanese mint*** who sugested that phosphorus showed reduction in total fresh weight

II.B.7. Number of florets per spike:-

Data of number florets spike in the first season Table (15) revealed that the superphosphate at 4 g/L using as foliar addition gave the maximum number of florets per plant. The least number of florets/spike produced with the untreated plants. While 3 g/plant of superphosphate give the next value in this respect. Statistical analysis showed significant differences among these treatments during the two seasons.

Results of the second season shown in Table (16) appear similar trend of Results those obtained in the first season .

Similar effects was described by ***lemeni et al (1966)*** on gladiolus found that the highest level of mineral fertilization namely 600kg super phosphate 300 kg per ha. Resulted in the greatest flower number per plant .

Chattopadhyay et al (1992) on gladiolus found that greatest flowers / spike with N 50 P 30.

III. Effect of superphosphorus on corms production of Antholyza aethiopica in the first (1995/96) and second season (1996/97)

III.B.1. Number of corms per plant :-

As shown in Table (17) antholyza plant treated with superposphate as foliat at 4 g/L concentration produced the maximum number of corms/plant as 3.6. The least number of corms/plant was 2.06 with untreated plants. The other treatments increased the number of corms per plant comparing with control plants. And the differences between there treatments were very narrow.

Reaults of (1995/96) season were in harmony with those of (1996/97) in Table (18) and the differences among the treatments were statistically significant.

Aly (1986) recorded that increasing P significantly increased the number of ***capsicum*** fruits per plant ***zuraval and seberstov (1971)*** recorded that the P increased capsule yields of poppy.

Table (17): Effect of phosphorus on corms productin of *Antholyza aethiopica* in the frist season(1995/1996)

Treatment		Number of corms	diameter of corms cm	Dry weight of corms g
control GMS	0.0	2.06	4.10	1.50
phosphorus adition G/P	1.0	3.00	5.10	4.82
	2.0	3.00	5.3	6.74
	3.0	3.50	5.50	6.96
phosphorus spray G/L	2.00	3.30	4.30	4.13
	4.00	3.60	4.80	4.33
	6.00	3.20	5.03	4.81
L.S.D.5%		0.49	0.26	2.57

Table (18): Effect of phosphorus on corms productin of *Antholyza aethiopica* in the second season(1996/1997)

Treatment		Number of corms	diameter of corms cm	Dry weight of corms g
control GMS	0.0	2.80	3.80	2.00
phosphorus adition G/P	1.0	4.30	4.90	5.33
	2.0	4.30	5.01	7.25
	3.0	4.90	5.60	7.4
phosphorus spray G/L	2.00	4.50	4.00	4.64
	4.00	5.08	4.50	4.84
	6.00	4.40	4.60	5.32
L.S.D.5%		0.38	0.25	2.70

III.B.2. Diameter of corm per plant in cms:-

Generally all superphosphate treatments were significantly effective on producing larger diameter of corm as compared with untreated plants Table (17) the maximum diameter of a corm as 5.2 cm produced from the plants treated with superphosphate at 3 and 2 g/plant.

While the next value of diameter as 4.8 cm was ***chattopadhyay et al (1992)*** on gladiolus found that the corms were largest with N 50 P 10 noticed with 1 g/plant of superphosphate.

The differences between the treatments was significant in both seasons and data of both seasons showed similar trend.

In this connection ***Fernandes et al (1977b)*** on gladiolus reported that the response of corms to NPK varied with corm size P stimulated earlimess. And ***lemeni et al*** (1966) ongladiolus showed that the highest level of mineral fertilization resulted in the greatest plant.

III.B.1. Dr y weight of a corm in gms :-

Generally as shown in Table (17 & 18) antholyza plant benefiled from the superphosphate treatments, the increasing of dry weight of corm was mostly with superphosphate at 3 or 2 gm/plant than any other applications. The untreated plants gave least dry weight of corm. Therefore superphosphate at 2 or 3 g/plant was more suitable for accumulation of minerals and dry matter rather than any concentrations. The differences among the treatments were significant in both seasons also the data of the second season showen in Table (18) appear similar results to those obtained in the first one .

The third part

Different effects of plant extracts of *Iberis amara* and *Antholyza aethiopica* on cotton leaf worm .

1- Toxicological activity of petroleum ether and acetone extracts against :-

1.a -The 1 st instar larvae .

The effect of petroleum ether extracts on the1 st. instar larvae of cotton leaf worm is given in Table (19). The results indicated that 5 and 2.5 % concentration of emulsified petroleum ether extract of ***Iberis amara*** was remarkably toxic to the first instar larvae after 72h from feeding (100 and 97.2 ± 1.34 % mortality ,respectively) , which is taken as indication to compare between the efficiency of the concentrations . On the other hand 5 % concentration of the ***Antholza aethiopica*** extracts gave the highest mortality percent than other concentrations . Generally , it could be concluded that petroleum ether extracts of ***Iberis amara*** and ***Antholza aethiopica*** gave high toxic effect against the 1 st instar larvae of ***S. littoralis*** with all concentrations after 72h from feeding . In this respect . ***El – Gengaih et al . (1993)*** found that petroleum ether extract of harmful seed caused higher mortality or mite , ***Tetranychus urticae (koch)*** .

Data in Table (20) clarified of effect acetone extracts of the two plants under study at different concentrations on the 1 st instar larvae of ***Spodoptera littoralis*** .Whereas, results showed that the two plant extracts gave 100 % correlated mortality to the 1 st instar larvae with all concentrations as compared to the control ones , which caused , only , 4.0 % mortality after 72 hours from feeding .

The above results in Tables (19&20) indicate that toxic compounds in these plants are extracted by petroleum ether and acetone . but the 2 nd solvent is active than the 1 st one in this

Table (19): Toxicological activity of petroleum ether extract of *Iberis amara* and *Antholyza aethiopica* against the 1st instar larvae of Spodoptera littoralis,L

plant extract of	Concent-ration %	No. of larvae used	(%) Mortality					
			24 h.	Correlated mortality	48 h.	Correlated mortality	72 h.	Correlated mortality
Iberis amara	5.000	75	76.0	75.0	93.3	93.0	100.0	100.0 ± 0.0
	2.500	75	65.3	63.9	81.3	80.5	97.3	97.2 ± 1.34
	1.250	75	25.3	22.2	78.7	77.8	92.0	91.7 ± 2.31
	0.625	75	17.3	13.9	41.3	38.9	88.0	87.5 ± 4.00
Antholyza aethiopica	5.000	75	44.0	41.7	64.0	62.5	96.0	95.8 ± 2.31
	2.500	75	28.0	25.0	44.0	41.7	90.7	90.3 ± 1.34
	1.250	75	18.6	15.2	33.3	30.5	86.7	86.1 ± 2.67
	0.625	75	14.7	11.1	28.0	25.0	81.3	80.5 ± 1.34
Control	0.0	75	4.0	–	4.0	–	4.0	–

Values are means (+ SE), n = 3

Table (20) Toxicological activity of acetone extracts of *Iberis amara and Antholyza aethiopica* against the 1st instar larvae of *Spodoptera littoralis, L.*

Plant extract of	Concent-ration %	No. of larvea used	(%) Mortality					
			24 h.	Correlated mortality	48 h.	Correlated mortality	72 h.	Correlated mortality
Iberis amara	5.000	75	100.0	100.0	100.0	100.0	100	100 ± 0.0
	2.500	75	100.0	100.0	100.0	100.0	100	100 ± 0.0
	1.250	75	96.0	95.5	100.0	100.0	100	100 ± 0.0
	0.625	75	73 3	72.2	98.7	98.6	100	100 ± 0.0
Antholyza aethiopica	5.000	75	100.0	100.0	100.0	100.0	100	100 ± 0.0
	2.500	75	98.7	98.6	100.0	100.0	100	100 ± 0.0
	1.250	75	98.7	98.6	100.0	100.0	100	100 ± 0.0
	0.625	75	81.3	50.5	100.0	100.0	100	100 ± 0.0
Control	0.0	75	4.0	_	4.0	_	4.0	_

Values are means (± SE), n = 3

scale . Also, it can be concluded that acetone extract is a potent insecticidal agent against this insect .

I.b -The fourth instar larvae :-

The effect of petroleum ether and acetone extracts on 4 th larval instar of ***S. littoralis*** presented in Tables (21&22) . Results showed that petroleum ether and acetone extracts of ***Iberis amara*** at 10 % concentration caused highest mortality 83.8 and 84.6 % after 72 hours from application followed by 74 and 76.9 % for 10 % concentration of *Antholyza* , respectively . While , the lowest mortality was 1.3 % after the treatment with 1.25 % concentration of petroleum ether extracts of ***Antholyza aethiopica*** . The treatment with solvent, only, as control did not give any mortality .

From the above results , it can be concluded that petroleum ether and acetone extracts were more active when used at high concentrations .Also , it cleared that the two extracts (petroleum ether & acetone) of the two plants under study gave higher toxic activity against the 1 st instar than the 4 th instar larvae of **S . littoralis.** So, must be used these extracts in cotton fields. When most larval instar population of cotton leaf worm is in the 1 st .

2- Effect of plant extracts as antifeedant :-

This trial was run only on 4th larval instar of ***S. littoralis*** to detect or establish the presence of antifeeding properties in these plant extracts .

2.a- Petroleum ether extracts :-

Data in Table (23) show the effect of different petroleum ether extracts os the antifeeding to larvae of 4 th instar larvae of S. littoralis These data revealed that 10 % concentration of both ***I.amara*** and ***A. aethiopica*** possess the highest reduction in feeding of larvae and show 91.70 and 86.64 % antifeeding

Table (19): Toxicological activity of petroleum ether extract of *Iberis amara* and *Antholyza aethiopica* against the 1st instar larvae of Spodoptera littoralis,L

plant extract of	Concent-ration %	No. of larvae used	(%) Mortality					
			24 h.	Correlated mortality	48 h.	Correlated mortality	72 h.	Correlated mortality
Iberis amara	5.000	75	76.0	75.0	93.3	93.0	100.0	100.0 ± 0.0
	2.500	75	65.3	63.9	81.3	80.5	97.3	97.2 ± 1.34
	1.250	75	25.3	22.2	78.7	77.8	92.0	91.7 ± 2.31
	0.625	75	17.3	13.9	41.3	38.9	88.0	87.5 ± 4.00
Antholyza aethiopica	5.000	75	44.0	41.7	64.0	62.5	96.0	95.8 ± 2.31
	2.500	75	28.0	25.0	44.0	41.7	90.7	90.3 ± 1.34
	1.250	75	18.6	15.2	33.3	30.5	86.7	86.1 ± 2.67
	0.625	75	14.7	11.1	28.0	25.0	81.3	80.5 ± 1.34
Control	0.0	75	4.0	–	4.0	–	4.0	–

Values are means (+ SE), n = 3

Table (20) Toxicological activity of acetone extracts of *Iberis amara and Antholyza aethiopica* against the 1st instar larvae of *Spodoptera littoralis, L.*

Plant extract of	Concent-ration %	No. of larvea used	(%) Mortality					
			24 h.	Correlated mortality	48 h.	Correlated mortality	72 h.	Correlated mortality
Iberis amara	5.000	75	100.0	100.0	100.0	100.0	100	100 ± 0.0
	2.500	75	100.0	100.0	100.0	100.0	100	100 ± 0.0
	1.250	75	96.0	95.5	100.0	100.0	100	100 ± 0.0
	0.625	75	73 3	72.2	98.7	98.6	100	100 ± 0.0
Antholyza aethiopica	5.000	75	100.0	100.0	100.0	100.0	100	100 ± 0.0
	2.500	75	98.7	98.6	100.0	100.0	100	100 ± 0.0
	1.250	75	98.7	98.6	100.0	100.0	100	100 ± 0.0
	0.625	75	81.3	50.5	100.0	100.0	100	100 ± 0.0
Control	0.0	75	4.0	–	4.0	–	4.0	–

Values are means (± SE), n = 3

scale . Also, it can be concluded that acetone extract is a potent insecticidal agent against this insect .

I.b -The fourth instar larvae :-

The effect of petroleum ether and acetone extracts on 4 th larval instar of ***S. littoralis*** presented in Tables (21&22) . Results showed that petroleum ether and acetone extracts of ***Iberis amara*** at 10 % concentration caused highest mortality 83.8 and 84.6 % after 72 hours from application followed by 74 and 76.9 % for 10 % concentration of *Antholyza* , respectively . While , the lowest mortality was 1.3 % after the treatment with 1.25 % concentration of petroleum ether extracts of ***Antholyza aethiopica*** . The treatment with solvent, only, as control did not give any mortality .

From the above results , it can be concluded that petroleum ether and acetone extracts were more active when used at high concentrations .Also , it cleared that the two extracts (petroleum ether & acetone) of the two plants under study gave higher toxic activity against the 1 st instar than the 4 th instar larvae of **S . littoralis.** So, must be used these extracts in cotton fields. When most larval instar population of cotton leaf worm is in the 1 st .

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Table (21) Toxicological activity of petroleum ether extracts of *Iberis amara and Antholyza aethiopica* against the 4th instar larvae of *Spodoptera littoralis, L.*

Plant extract of	Concent-ration %	No. of larvae used	(%) Mortality		
			24 h.	48 h.	72 h.± SE
Iberis amara	10.000	75	41.5	64.7	83.8 ± 076
	5.000	75	21.3	51.5	70.7 ± 1.34
	2.500	75	12.0	45.3	62.0 ± 1.15
	1.25	75	3.3	21.17	41.3 ± 1.34
Antholyza aethiopica	10.000	75	14.7	64.0	74.0 ± 1.34
	5.000	75	10.7	41.3	61.1 ± 0.59
	2.500	75	4.7	16.7	47.0 ± 1.00
	1.25	75	1.3	9.3	22.0 ± 0.00
Control	0.0	75	0.0	0.0	0.0

Values are means (± SE), n = 3

Table (22) Toxicological activity of acetone extracts of *Iberis amara and Antholyza aethiopica* against the 4th instar larvae of *Spodoptera littoralis, L.*

Plant extract of	Concent-ration %	No. of larvae used	(%) Mortality					
			24 h.	Correlated mortality	48 h.	Correlated mortality	72 h.	Correlated mortality
Iberis amara	10.000	75	33.3	33.3	53.3	50.0	80	76.9 ± 0.0
	5.000	75	26.6	26.6	46.6	42.8	66.6	61.5 ± 8.18
	2.500	75	13.3	13.3	33.3	28.6	53.3	46.1 ± 8.18
	1.25	75	6.6	6.6	26.6	21.4	46.6	38.5 ± 8.18
Antholyza aethiopica	10.000	75	40.0	40.0	60.0	57.1	86.6	84.6 ± 8.18
	5.000	75	33.3	33.3	53.3	50.0	73.3	69.2 ± 8.18
	2.500	75	20	20	40.0	35.7	60	53.8 ± 0.0
	1.25	75	13.3	13.3	33.3	28.6	53.3	46.1 ± 8.18
Control	0.0	75	0.0	–	6.6	–	13.3	–

Values are means (± SE), n = 3

Table (23)Antifeedant effect of different plant extracts of petroleum ether against 4th instar larvae of cotton leafworm

Plant extracts	Concentrations %	No. of larvae used	Consumed area in (mm)treated after 24h.	% Of eaten area	Anyifeedant activity
Iberis amara	10.00	60	1.025 ± 0.014	8.30	91.70
	5.00	60	1.92 ± 0.101	15.55	84.45
	2.50	60	2.6 ± 0.147	21.05	78.95
	1.25	60	3.3 ± 0.046	26.72	73.28
Means			2.211		
Antholyza ringens	10.00	60	1.65 ± 0.069	13.36	86.64
	5.00	60	2.72 ± 0.050	22.02	77.98
	2.50	60	3.92 ± 0.060	31.74	68.26
	1.25	60	4.22 ± 0.173	34.17	65.83
Means			3.127		
Control	0.00	60	11.5	0.931	99.07

Values are means (± SE),n=3

L.S.D. 5% plant (p) 0.14
conc.(c) 0.21
pxc 0.29

Table (24)Antifeedant effect of different plant extracts of acetone against 4th instar larvae of cotton leafworm

Plant extracts	Concentration %	No. of larvae used	Consumed area in (mm)treated after 24h.	% Of eaten area	Anyifeedant activity
Iberis amara	10.00	60	1.37 ± 0.124	11.09	88.91
	5.00	60	1.78 ± 0.128	14.41	85.59
	2.50	60	2.47 ± 0.000	20.00	80.00
	1.25	60	4.38 ± 0.187	35.47	64.53
Means			2.56		
Antholyza ringens	10.00	60	1.50 ± 0.039	12.15	87.85
	5.00	60	1.85 ± 0.045	14.98	85.02
	2.50	60	2.53 ± 0.130	20.49	79.51
	1.25	60	4.29 ± 0.073	34.47	65.26
Means			2.54		
Control	0.00	60	11.5	0.931	99.07

Values are means (+ SE),n=3

L.S.D. 5% plant (p) N.S
conc.(c) N.S
pxc N.S

activity , respectively . Also , in the same Table all the used plant extracts possess antifeeding activity and this activity increase by increasing the concentration of extract .

Statistical analysis showed significant differences between the two plant extracts and between all used concentration from the side of antifeeding activity .

In this respect ***El- Gengaihi et al (1996)*** indicated that the application of spray emulsified petroleum ether extract of ***Antholzia ringens*** hindered the fourth instar larvae to feed on treated castor leaf disc .

2.b-Acetone extracts :-

Results tabulated in Table (24) revealed that the two plant extracts used possess antifeeding activity and this activity decrease by decreasing the concentration . Also acetone extract of both ***I. amara*** and ***A. aethiopica*** gave the same antifeeding activity , approximately , with the all used concentration . The highest antifeeding activity was 88.91 and 87.85 % at 10 % concentration with ***I.*** **amara and A.** ***aethiopica*** , respectively . But , no significant differences between all used concentration from the side of antifeeding activity .

The comparison between . petroleum ether and acetone extracts reveal that , first group possessed better properties than the second group .

This results obtained by agreement with the results of ***El .khyat (1985)*** who found that petroleum ether was better than other solvents in the extraction of antifeedang components from plant materials .

Chemical analysis

I. Effect of amino acids on some chemical analysis

I.A. ***Iberis amara*** **.**

I.A.1. Nitrogen content :-

It is clearly noticed from data in Table (25) that ***tryptophan*** treatments led to an increases in total nitrogen content in iberis leaves . The higher nitrogen value resulted from spraying plants

activity , respectively . Also , in the same Table all the used plant extracts possess antifeeding activity and this activity increase by increasing the concentration of extract .

Statistical analysis showed significant differences between the two plant extracts and between all used concentration from the side of antifeeding activity .

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The comparison between . petroleum ether and acetone extracts reveal that , first group possessed better properties than the second group .

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It is clearly noticed from data in Table (25) that ***tryptophan*** treatments led to an increases in total nitrogen content in iberis leaves . The higher nitrogen value resulted from spraying plants

Table (25) Effect of Tryptophan and Aspartic acid on chemical analyses of *Iberis amara* in the frist and second seasons (1995 / 96 , 1996 / 97)

Treatment		N		P		K	
		1st	2nd	1st	2nd	1st	2nd
control ppm	0.0	1.00	1.00	0.157	0.165	1.1	1.0
Tryptophant acid (ppm)	25	1.00	1.03	0.205	0.200	1.1	1.1
	50	1.10	1.13	0.265	0.225	2.1	2.2
	75	1.70	1.29	0.275	0.240	1.1	1.1
Aspartic acid (ppm)	25	0.80	0.90	0.225	0.180	1.1	1.1
	50	1.00	1.00	0.235	0.230	1.1	1.1
	75	0.70	0.80	0.235	0.190	1.1	1.1

with the high concentration of 75 p.p.m in the two seasons with the means of 1.70 and 1.49 mg/g in the first and second seasons, respectively. While aspartic acid at 25 p.p.m or 75 p.p.m produced least value of nitrogen content in both seasons .

I.A.2. Phosphorus content :-

Data in Table (25) indicate that all treatments increased the total phosphorus as compared to control plants . The higher value of phosphorus content resulted from spraying plants with tryptophan at 50 and 57 p.p.m in both seasons . Untreated plants produced the least value in this concern .

I.A.3. Potassium content :-

The results in Table (25) clear that treating plants with tryptophan at 50 p.p.m increased the total potassium content in Iberis leaves during the two seasons comparing to other treatments . On the other hand , all other treatments and control plants gave the same result in the first and second seasons .

I.A.4. Total carbohydrat :-

Data in Table (26)indicate that tryptophan treatments led to increase in total carbohydrat in iberis leaves . The higher total carbohydrat value resulted from spraying plants with the high concentration of 75 p.p.m in the two seasons with the means 14.90 and 15.76 % in the first and second seasons , respectively . While aspartic acid at 25 p.p.m or 50 p.p.m produced least value of carbohydrat content in both seasons .
Similar results were found by ***Joy (1969)*** on Lemna minor , revealed that, arginine gave considerable stimulation of growth , more than doubling the yield given by media conraining only nitrate nitrogen . This amino acid was also shown to cause an increase in the growth rate of the sugarcane plant resulting in increased production of both cane and sugar .

Table (26): Effect of Ttyptophan and Aspartic acid on total Carbohydrat on *Iberis amara* in the frist and sconed seasons

Treatment		1st %	2nd %
control ppm	0.0	8.13	7.68
Tryptophan acid (ppm)	25	11.12	11.59
	50	12.55	12.45
	75	14.90	15.76
Aspartic acid (ppm)	25	10.13	10.30
	50	11.09	11.21
	75	12.12	12.08

I.B. Antholyza aethiopica :-

I.B.1 Nitrogen content :-

As shown in Table (27) it is noticed that content of nitrogen was increased in the leaves of antholyza especially with the high concentration of tryptophan .
The obtained values show that the higher value was 1.42 % in the first season and 1.33% in the second one when sprayed with 75 p.p.m While untreated plants gave only 0.80 , 0.70 in the first and second seasons , respectivly .

I.B.2. Phosphorus content :-

From the above data , the results also reveal that the total phosphorus content was increased with the high level of tryptophan in both seasons . The best value resulted from spraying the plants with 75 p.p.m were 0.325 and 0.345 % in the first and second seasons , respectively . While tryptophan at 50 p.p.m gave the next value in this concern . Untreated plants gave the least value in both seasons .

I.B.3. Potassium content :-

The maximum potassium content in antholyza leaves was produced due to modrate level of tryptophan Table (27) .However , application with 50 p.p.m gave the highest value as 0.18 , 0.17 % in the first and second seasons , respectively . In the same time , tryptophan at 75 p.p.m gave the next value in this concern as 0.14, 0.16 %in the first and second seasons are respectively .

I.B.4. Total carbohydrat :-

As shown in Table (28) it is notice that conten of carbohydrat was increased in the leaves of Antholyza especially with the high concentration of tryptophan . the obtained values

Table (27) Effect of Tryptophan and Aspartic acid on chemical analyses of *Anthollyza aethiopica* in the frist and second seasons (1995 / 96 , 1996 / 97)

Treatment		N		P		K	
		1st	2nd	1st	2nd	1st	2nd
control ppm	0.0	0.80	0.70	0.205	0.205	0.11	0.10
Tryptophan acid (ppm)	25	0.83	0.84	0.205	0.197	0.12	0.13
	50	1.30	1.10	0.215	0.205	0.10	0.10
	75	1.42	1.33	0.290	0.295	0.18	0.17
Aspartic acid (ppm)	25	1.01	1.20	0.325	0.345	0.14	0.16
	50	1.10	1.10	0.280	0.285	0.12	0.14
	75	1.00	0.90	0.215	2.300	0.10	0.11

Table (28): Effect of Ttyptophan and Aspartic acid on total Carbohydrat on *Anthalyza aethiopica* in the frist and sconed seasons

Treatment		1st %	2nd %
control ppm	0.0	7.08	7.41
Tryptophan acid (ppm)	25	11.06	11.32
	50	12.85	12.98
	75	13.36	13.52
Aspartic acid (ppm)	25	9.94	9.15
	50	10.96	11.16
	75	10.26	10.53

show that the higher value was 13.36 % in the first season and 13.52 % in the second one when sprayed with 75 p.p.m . While untreated plants gave only 7.08 , 7.41 % in the first and second seasons , respectively

The results here are in harmony with those reported by ***Mighahid (1982)*** on Jasminum sambac mentioned that lower dose of N_1, and N_2 even in the two forms applied slightly increased the carbohydrate content and soluble sugars .

II. Effect of sulphar on some chemical analysis in both seasons

II.A. *Iberis amara* .

II.A.1. Nitrogen content :-

As for the results in Table (29) , it is shown that nitrogen content at leaves was increased with spraying sulfur at 5 gm / L or 2.5 gm / L in both seasons . While sulfur applied on the soil at 0.5 gm / plant produced the least nitrogen content in leaves . Also foliar application of sulfur at 1.25 gm / L decreased the nitrogen content comparing with control plants in both seasons . Similar results were found by ***Good- Rosd et al (1989)*** on wheat was stated that concentration of nitrogen in the plant tissue increased with increasing S concentration .

II.A.2. Phosphorus content :-

Results in the same Table(29) cleared that phosphorus content in leaves of iberis was increased by different concentrations of sulfur than untreated plants . Foliar application of sulfur at 5 g / L and 2.5 g / L resulted in the higher increased values with means of 0.361 , 335 % in the first season and 0.370, 345 % in the second season , respectively .

II.A.3. Potassium content :-

Data presented in Table (29) reveal that content of potassium was increased in iberis leaves at any treatments than

Table (29) Effect of sulfur on chemical analyses of *Iberis amara* in the frist and second seasons (1995 / 96 , 1996 / 97)

Treatment		N		P		K	
		1st	2nd	1st	2nd	1st	2nd
control Gms	0.0	1.10	1.00	0.159	0.165	1.10	1.00
sulfur addition G/P	0.5	0.75	0.70	0.260	0.233	1.40	1.30
	1.0	1.00	0.90	0.235	0.245	1.50	1.50
	1.5	1.20	1.10	0.262	0.275	1.60	1.70
sulfur micron G/L	1.25	0.95	0.80	0.197	0.200	1.20	1.30
	2.50	1.25	1.20	0.335	0.345	1.20	1.20
	5.00	1.35	1.30	0.361	0.370	2.10	1.90

the control plants .The highest value was obtained with foliar application of sulfur at 5 g / L in both seasons , the means of 2.0 % in the first and 1.90 % in the second season . Whereas sulfur at 1.5 g /plant as soil application gave the next value in this concern with the means of 1.6 and 1.7 % dry mater in the two seasons respectively .

II.A.4. Total carbohydrat :

As for the results in Table (30) , it is shown that carbohydrat content at leaves was increased with spraying sulfur at 5 g / L or 2.5 g / L in both seasons . While sulfur applied on the soil at 0.5 g / plant produced the least value of carbohydrate content in both seasons . ***Shannugam (1985)*** found that amanium sulfate was considered a much more suitable nitrogen fertilizer for sugar eime than area . because its 24 % sulfur content

II.B. Antholyza aethiopicia

II.B.1. Nitrogen content

Sprays with sulfur at 5 g / L gave the highest value of nitrogen content in both seasons while sulfur at 1.5 g / plant as soil additions gave the next value in this concern in the two seasons . The lowest values resulted from control plants in the first and second seasons . The results were agree with those obtained by ***Abo – Rady and Nabuist (1989)*** on barley whiis reported that plant Ncontent increased with up to 4 g S/Pot .

II.B.2. Phosphorus content :-

From the above data , the results also reveal that the total phosphorus content was increased with all treatment in both seasons than the control plants . The best value resulted from spraying the plants with sulfur at 5 g / L were 0.365 and 0.325

Table (30): Effect of sulfar on total
Carbohydrat on *Iberis amara* in the frist and sconed seasons

Treatment		1st %	2nd %
control Gms	0.0	8.13	7.68
Sulfar G/P	0.5	10.13	10.25
	1.0	10.97	11.42
	1.5	11.09	11.79
Sulfar micron G/L	1.25	10.49	10.69
	2.50	11.69	11.95
	5.00	12.59	13.08

dry matter in the two season , respectively . Also, spraying sulfur at 2.5 g / L gave the next value in this concern .

II.B.3. Potassium content :-

In the previous Table (31) , it is clear that the higher content of potassium resulted from spraying sulfur at 5 g / L in two seasons with the means of 0.16 , 0.18 % in the first and second seasons , respectively . Whereas soil application with sulfur at 1 g / plant gave the next higher value of potassium content in both seasons .

II.B.4. Total carbohydrate :-

Data in Table (32) indicate that the sprays with sulfur at 5 gm / L gave the highest value as carbohydarte content in both seasons . While sulfur at 1.5 g / plant as soil addition gave the next value in this concern in the first and second seasons . The lowest values resulted from control plants in the first and second seasons .

III. Effect of superphosphorus on some chemical compostion in the first and second seasons :-

III.A. *Iberis amara* .

III.A.1. Nitrogen content .

Data in Table (33) indicate that superphosphate as soil additions at 1 g / plant increased the total nitrogen content in iberis leaves in both seasons with the means of 1.30 , 1.60% respectively.In the same time foliar application of super phosphate at 4 g / L gave the next value in this concern as 1.25 and 1.40 % in the first and second seasons , respectively .
The results were in agree next with that stated by ***Abou – Dahab et al (1984)*** on coriander whorecorded that N content plant foliage increased with P fertilizer suplly .

Table (31) Effect of sulfur on chemical analyses of *Anthollyza aethiopica* in the frist and second seasons (1995 / 96 , 1996 / 97)

Treatment		N		P		K	
		1st	2nd	1st	2nd	1st	2nd
control Gms	0.0	0.80	0.70	0.205	0.205	0.11	0.10
sulfur addition G/P	0.5	0.90	1.10	0.290	0.270	0.14	0.15
	1.0	1.10	1.30	0.315	0.310	0.15	0.16
	1.5	1.20	1.60	0.300	0.305	0.10	0.10
sulfur micron G/L	1.25	1.10	1.00	0.215	0.300	0.11	0.16
	2.50	1.10	1.50	0.350	0.315	0.11	0.15
	5.00	1.50	1.70	0.365	0.325	0.16	0.18

Table (32): Effect of sulfar on total

Carbohydrat on *Anthalyza aethopica* in the frist and sconed seasons

Treatment		1st %	2nd %
control Gms	0.0	7.08	7.41
Sulfar G/P	0.5	8.86	8.23
	1.0	9.49	10.10
	1.5	10.36	10.86
Sulfar micron G/L	1.25	9.61	9.47
	2.50	9 80	9.63
	5.00	9 82	11.95

Table (33) Effect of phosphorus on chemical analyses of *Iberis amara* in the frist and second seasons (1995 / 96 , 1996 / 97)

Treatment		N		P		K	
		1st	2nd	1st	2nd	1st	2nd
control Gms	0.0	1.10	1.00	0.159	0.165	1.10	1.00
phosphorus addition G/P	1.0	1.30	1.60	0.355	0.320	1.20	1.40
	2.0	1.30	1.30	0.330	0.275	1.40	1.40
	3.0	1.10	0.90	0.355	0.330	1.20	1.40
phosphorus spray G/L	2.0	1.00	0.30	0.355	0.325	1.90	1.60
	4.0	1.25	1.40	0.345	0.330	1.70	1.50
	6.0	0.80	0.60	0.295	0.216	1.20	1.10

III.A.2. Phosphorus content :-

Results in Table (33) indicate that all superphosphate treatments led to an increase in total phosphorus content in iberis leaves . The higher phosphorus value resulted from super phosphate as soil addition at 1 or 3 g / plant and spraying super phosphate at 2 g / L with the mean of 0.355 % in the first season . In the other hand foliar application of superphosphate at 4 g / L gave the second value in this concern as 0.345 % in the first seasons .

The results of the second season are in harmony with the first one .The results were with those obtained by ***Kandeel (1982)*** on chamomile observed that phosphorous application with content level of nitrogen and potassium increased that phosphorous percentage of vegetative of the plants .

III.A.3. Potassium content :-

As shown in Table (33) it is clear that content of potassium was increased in the leaves of iberis with all treatments of super phosphate in both seasons . The obtained value show that the higher value was 1.9 % in the first season and 1.6 mg/g in the second one , when sprayed with super phosphate at 2 g / L . While sprays superphosphate at 4 g / L gave the next value in this respect in both seasons. Similar results were obtained by ***Hhanafy (1984)*** on the coriander found the phosphorus treatments increased K contents .

III.A.4. Total carbohydrate :-

Data in Table (34) indicate that superphosphate as soil addition at 1 g / plant increased the total carbohydrate content in iberis leaves in both seasons . With the means of 13.10 , 14.26 % , respectively . In the same time foliar application as super phosphate at 4 g / L gave the next value in this concern as 12.24, 12.9 % in the first and second seasons , respectively . ***Hanafy***

Table (34): Effect of phosphorus on total Carbohydrat on *Iberis amara* in the frist and sconed seasons

Treatment		1st %	2nd %
control Gms	0.0	8.13	7.68
Phosphorus adition G/P	1.0	13.1	14.26
	2.0	11.32	12.36
	3.0	11.59	12.86
phosphorus spray G/L	2.00	11.36	12.43
	4.00	12.24	12.91
	6.00	9.92	9.47

(1984) showed that rising P- fertilizer rate decreased the carbohydrate rates content in cariander plant organs .

III.B. *Antholyza aethiopica* .

III.B.1.Nitrogen content :-

Data presented in Table (35) cleared that nitrogen content in antholyza leaves increased by all superphosphate treatments in the two seasons . The highest value of nitrogen content as 1.5 and 1.4 % were obtained from treating plants with spraying super phosphate at 2 or 4 g / L , respectively . While super phosphate as soil addition at 2 g / plant gave the next value in this concern as 1.2 % The untreated plants gave the lowest value in both seasons .

The results were agree with those obtained by ***Goma (1958)*** and ***Thomas and Mclean (1967)*** working on squash reported that phosphorus application results in decreasing total nitrogen in leaf blades .

III.B.2. Phosphorus content :-

The data obtained showed that phosphorus content in leaves increased by all treatments compared to control plants . The higher value of phosphorus as 0.299 , 0.289 % for the first and second season, respectively , were obtained from foliar application of super phosphate at 6 g / L Table (35). At the same time superphosphate at 1g / plant as soil addition produced the second value in the first and second seasons . The control plants gave the lower means of phosphorus content in both seasons .There result may be due to that application by phosphorus induce a higher accumulation of phosphorus element in leaves .

The results were agree with those obtained by ***Shelton (1976)*** on apple trees mentioned that the application of superphosphate gave phosphorus concentration in leaves as 0.2. % which was associated with the maximum growth .

Table (35) Effect of phosphorus on chemical analyses of *Antholyza aethiopica* in the frist and second seasons (1995 / 96 , 1996 / 97)

Treatment		N		P		K	
		1st	2nd	1st	2nd	1st	2nd
control Gms	0.0	0.80	0.70	0.205	0.205	0.11	0.10
phosphorus addition G/P	1.0	1.00	0.80	0.290	0.270	0.14	0.15
	2.0	1.20	1.40	0.205	0.265	0.13	0.14
	3.0	1.20	1.10	0.225	0.265	0.13	0.11
phosphorus spray G/L	2.0	1.40	1.50	0.205	0.255	0.13	0.12
	4.0	1.50	1.30	0.265	0.280	0.10	0.11
	6.0	1.00	0.90	0.299	0.289	0.10	0.10

III.B.3. Potassium content :-

In the previous Table (35) , it is clear that the higher content of potassium resulted from sulfur addition at 1 g / plant in to seasons with the means of 0.14 , 0.15 % in the first and second seasons , respectively . whereas sulfur spray at 2 g / L gave the next higher value of potassium content in both seasons.
Abou – Dahab et al (1984) working on coriander stated that N,P and K contents of plant foliage increased with P fertilizer apply

III.B.4. Total carbohydrate :-

Data presented in Table (36) cleared that carbohydrate content in antholyza leaves increased by all super phosphate treatments in the two seasons . The highest value of carbohydrate content as 11.83 , 12.38 % were obtained from treating plants with spraying superphosphate at 2 or 4 g / L respectively . While superphosphate as soil addition at 3 g / plant gave the next value in this concern 10.76 mg/g . The untreated plants gave the lowest value in both seasons .
Mahmoud (1970) found that increasing P- fertilizer raised sucrose in mint plants

Table (36): Effect of phosphorus on total Carbohydrat on *Anthalyza aethopica* in the frist and sconed seasons

Treatment		1st %	2nd %
control Gms	0.0	7.41	7.08
Phosphorus adition G/P	1.0	8.71	8.45
	2.0	9.71	9.86
	3.0	10.76	10.41
phosphorus spray G/L	2.00	11.82	11.16
	4.00	12.38	12.83
	6.00	8.92	8.62

I.V. Total glucosinolates in seed of *Iberis amara*

Glucosinolates are of interest because their enzymatically meleased a glucones are physiological active compounds . They are responsible for the biting taste of important condiments and contribute to characteristic flavors of many plants whose leaves (Brussels sproutes , Cabbage ,) flower buch (Broccoli , Couliflower), stem (Kohlrabi , or root) , (Radish , Rutabaga , Turnip) are consumed as vegetables .

I.V.1. Effect of amino acid :-

Data presented in Table (37) show that the total glucosinolates percent and glucosinolates yield of seeds was remarkably affected with both tryptophan and aspartic at different concentrations . Since there were noticeable increases in the total glucosinolates percentage and glucosinolates yield over control plants . It could be observed from the some data that highest value of total glucosinolates yield was noticed with 75 p.p.m aspartic 349 g / feddan . While the second value was with tryptophan at 50 and 75 p.p.m which gave about the same value (235 and 186 g/ feddan) , respectively .

I.V.2. Effect of sulfur :-

Regarding the results in Table (38) , it can be show that different concentrations of sulfur addition and sulfur micron increased total glucosinolates as compared to control plants in seeds of iberis . The maximum values (287 and 272 g / feddan) were obtained with 1 g / plant sulfur addition and 1.25 g / L sulfur micron . respectively . ***Adas et al. (1992)*** seed glucosinolate concentration was slightly but significantly increased by ammonium sulphate at 3 chalky sites and increased 3- fold by 50-80 kg s / ha on the sandy soil.

Table (37): Effect of Ttyptophan and Aspartic acid on the total glucosinalates percent in seedsof *Iberis amara* during the second season

Treatment		Total glucosinalates content %	Total glucosinalates yield g/plant	Total glucosinalates yield g / fed.
control ppm	0.0	0.160	0.025	151
Tryptophan acid (ppm)	25	0.269	0.028	167
	50	0.198	0.039	235
	75	0.228	0.031	186
Aspartic acid (ppm)	25	0.202	0.020	153
	50	0.232	0.003	209
	75	0.345	0.005	349

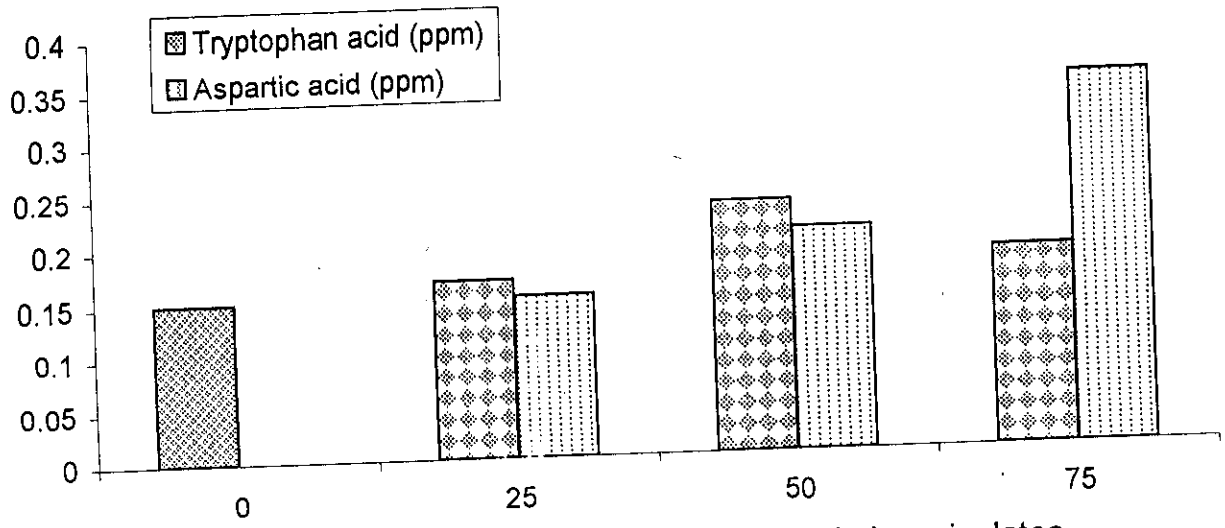


Fig (5) Effect of Ttyptophan and Aspartic acid on the total glucosinalates in seeds of ***Iberis amara*** during the seconed season

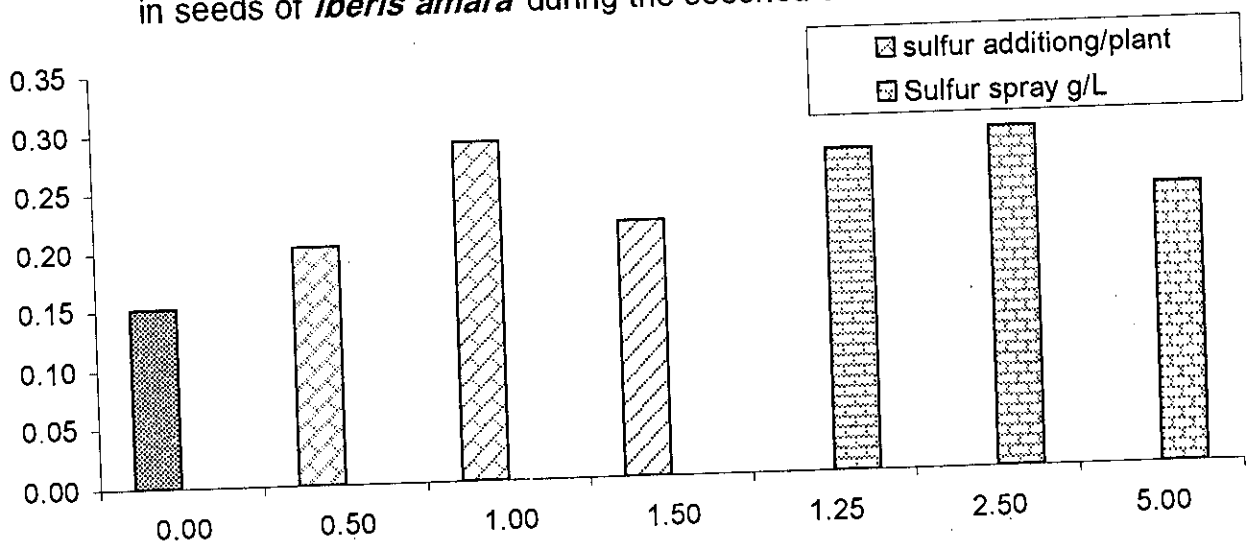


Fig (6) Effect of sulfur on the total glucosinalates in seeds of ***Iberis amara*** during the seconed season

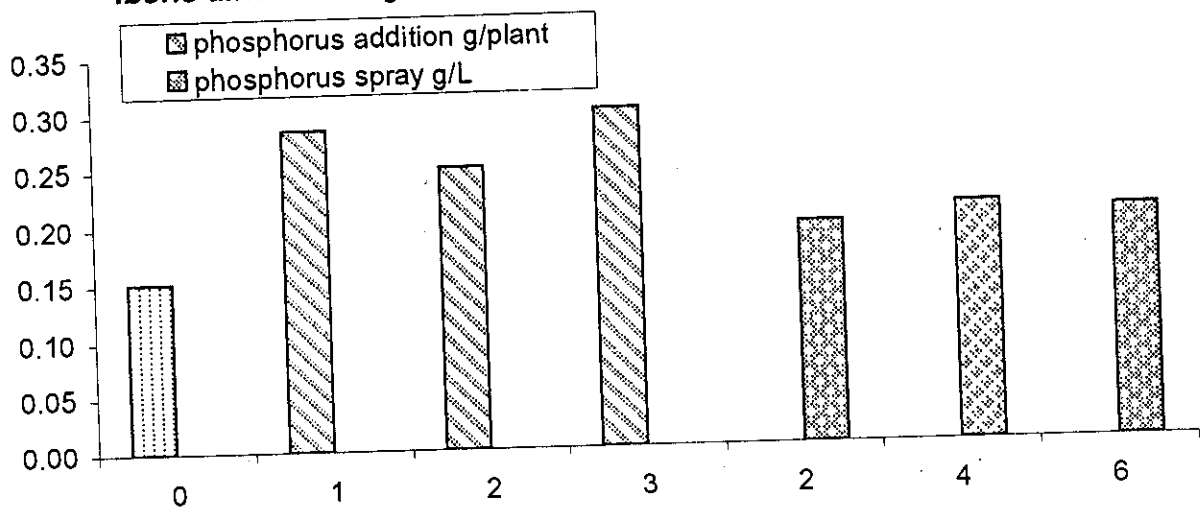


Fig (7) Effect of phosphorus on the total glucosinalates in seeds of ***Iberis amara*** during the seconed season

Table (38): Effect of sulfur on the total glucosinalates percent in seedsof *Iberis amara* during the second season

Treatment		Total glucosinalates content %	Total glucosinalates yield g/plant	Total glucosinalates yield g / fed.
control g	0.0	0.160	0.00250	151
sulfur addition g/plant	0.5	0.208	0.0034	202
	1.0	0.226	0.0048	287
	1.5	0.203	0.0036	217
Sulfur spray g/L	1.25	0.243	0.0045	272
	2.50	0.249	0.0048	287
	5.00	0.195	0.0039	236

Table (39): Effect of phosphorus on the total glucosinalates percent in seedsof *Iberis amara* during the second season

Treatment		Total glucosinalates content %	Total glucosinalates yield g/plant	Total glucosinalates yield g / fed.
control g	0.0	0.160	0.0034	151
phosphorus addition g/plant	1.0	0.191	0.0048	285
	2.0	0.209	0.0042	250
	3.0	0.250	0.0050	300
phosphorus spray g/L	2.00	0.206	0.0033	196
	4.00	0.207	0.0035	210
	6.00	0.252	0.0034	204

I.V.3. Effect of phosphorus :-

From the data in Table (38) it can be noticed that the total glucosinolates percentage and total glucosinolates yield was increased by using super phosphate addition at different concentrations in comparing with the control plants . The highest value of total glucosinolates yield was noticed with 1 g/ plant 287 g / feddan . Also the total glucosinolates percentage and glucosinolates yield increased by the application of different concentration of phosphorus spraying in comparison with the control plants . Raising the concentration up to 2.5 g/L increased the glucosinolates percent in seeds then with the treatment 1.25 and 6g/L.

II.V. Fatty acids

Data presented in Table (40) and illustrated in figure (8) show the composition of fatty acid in seed oil of ***Iberis amara*** . The chromatogram revealed the presence of 30 peaks from which 20 peaks of fatty acids were identified . Names , number of peaks and num ber of carbon atoms are shown in same Table . The obtained results indicated that the major saturated fatty acids were caprilic (16.65%) , palmitic (10.35%) and heptadecanoic (21.48%) . Which maked up about (48.48%) of the oil .

Generally . saturated fatty acids make up about (69.25%) , while unsaturated fatty acids make up (24.48%) .

Sandhya and Gupt (1998) on ***Brassica juncea*** L. found that sulfur addition at different concentrations 10 , 20, 30, or 60 p.p.m. Seed weight oil content and erucic acid content were greatest at 10 or 20 p.p.m

Table (40) GLC analysis of fatty acid of seeds oil of *Ibris amara*

paek No.	Rt. min.	carbon No. and No. of double bonds	fatty acid methyl esters	concentration
4	4.80	–	unknown	0.129
5	5.43	–	unknown	0.302
6	5.93	8:00	caprilic	16.165
7	7.00	–	unknown	0.850
8	7.77	–	unknown	0.660
9	8.67	10:00	capric	0.980
10	9.15	–	unknown	0.420
11	10.45	–	unknown	0.100
12	11.53	12:00	Lauric	0.860
13	12.17	–	unknown	0.980
14	12.63	–	unknown	0.380
15	13.23	14:00	Myristic	0.940
16	14.10	14:01	Myristoleic	1.830
17	14.50	15:00	pentadecanoic	1.860
18	15.25	15:1	pentadecenoic	2.841
19	15.75	–	unknown	1.596
20	16.65	16:00	palmitic	10.350
21	17.98	16:1	palmitoleic	1.910
22	18.77	17:00	Heptadecanoic	21.480
23	20.30	18:00	stearic	5.850
24	20.93	18:1	oleic	5.090
25	22.55	18:2	Linoleic	6.890
26	25.00	18:3	Linolenic	5.650
27	27.30	20:00	Arachidic	6.270
28	31.45	20:4	Arachidic	0.272
29	35.38	22:00	Behenic	3.980
30	37.52	–	unknown	0.250
	Total saturated fatty acids		69.250	93.70
	unsaturated fatty acids		24.483	

ne Channel 1 Run Number : 5 126 01:08 Thu May 25 2000

Type : Unknown Batch Name : FATTYAC

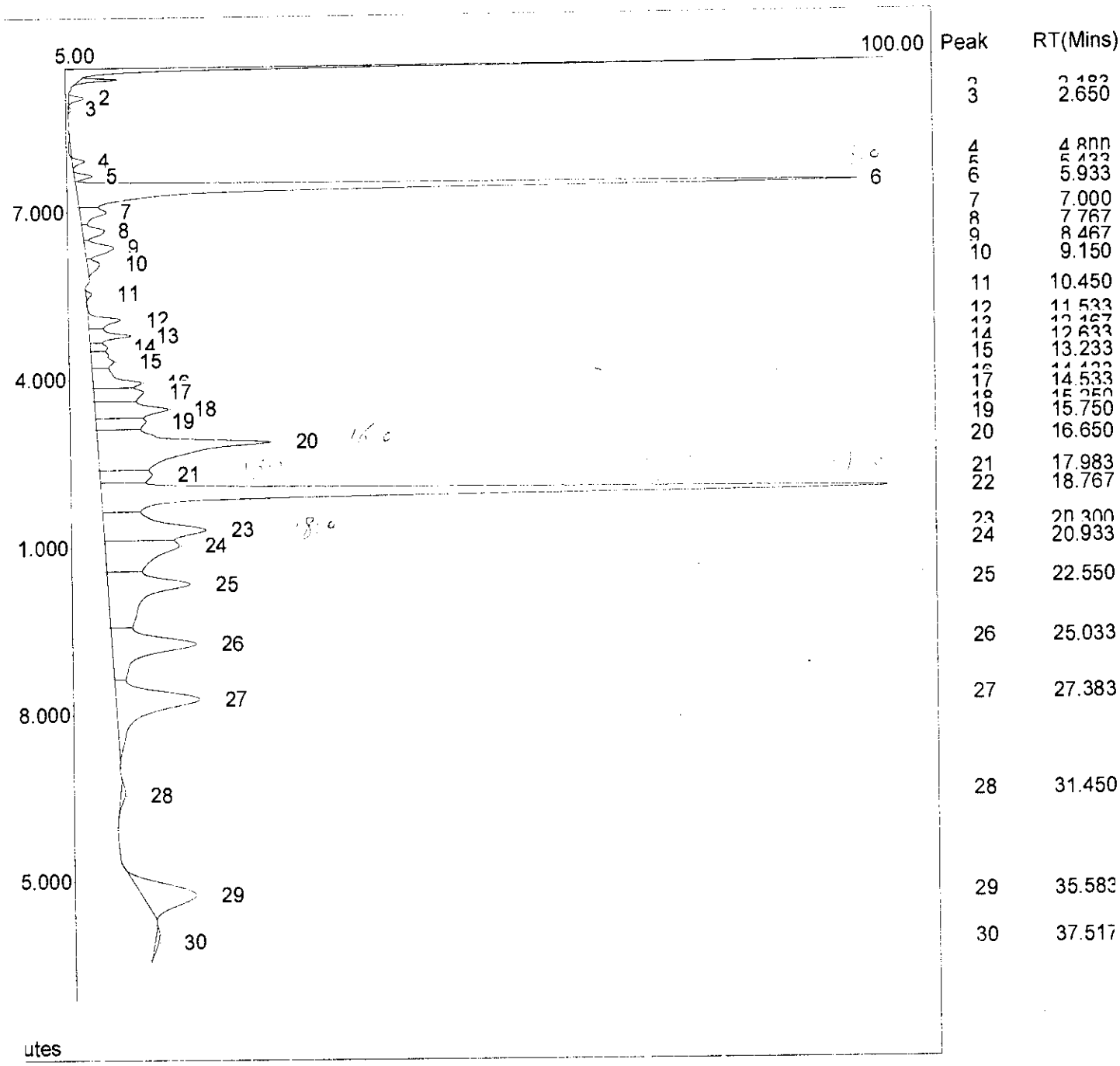
Description	Date	Name
ple Strip:	20:52 Wed May 24 2000	C:\PROGC\SYSTEM\FATTYACI.STR
ıod:	20:52 Wed May 24 2000	C:\ProGC\METHODS\FATTYACI
) File:	21:19 Wed May 17 2000	C:\ProGC\METHODS\FATTYACI
Data:	01:08 Thu May 25 2000	C:\ProGC\RAWDATA\FATTYAC.418
ılts:	01:08 Thu May 25 2000	C:\ProGC\RESULTS\RFATTYAC.418

ɜ : Manual

ple Name : Sample**F.A. مى محمد احمد

ɜ : 1.0000000 Sample Amount : 1.0000000

ment:



Peak	RT(Mins)
3	2.650
6	5.933
7	7.000
8	7.767
9	8.467
10	9.150
11	10.450
14	12.633
15	13.233
17	14.533
19	15.750
20	16.650
21	17.983
22	18.767
24	20.933
25	22.550
26	25.033
27	27.383
28	31.450
29	35.583
30	37.517

utes

BT	1.433	33.368	4.308	6.647	0.346
BV	2.183	23.285	1.890	5.373	0.241
VT	2.650	3.795	0.331	5.311	0.039

ine Channel 1 Run Number : 5 127 01:08 Thu May 25 2000

Type : Unknown Batch Name : FATTYAC

Description	Date	Name
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ıod:	20:52 Wed May 24 2000	C:\ProGC\METHODS\FATTYACI
ɔ File:	21:19 Wed May 17 2000	C:\ProGC\METHODS\FATTYACI
Data:	01:08 Thu May 25 2000	C:\ProGC\RAWDATA\FATTYAC.418
ılts:	01:08 Thu May 25 2000	C:\ProGC\RESULTS\RFATTYAC.418

ə : Manual

ple Name : Sample**F.A. مى محمد احمد

ə : 1.0000000 Sample Amount : 1.0000000

ment:

Name	Type	RT(Mins)	Area	Height	Base	Conc %
	BV	4.800	12.416	1.418	5.683	0.129
	VV	5.433	29.155	2.057	5.883	0.302
	VV	5.933	1607.148	90.809	6.068	16.656
	VV	7.000	81.666	3.124	6.462	0.846
	VV	7.767	63.617	2.584	6.745	0.659
	VV	8.467	94.634	3.421	7.003	0.981
	VB	9.150	40.714	1.472	7.256	0.422
	BB	10.450	9.949	0.658	7.079	0.103
	BV	11.533	82.875	3.757	7.301	0.859
	VV	12.167	94.129	4.827	7.407	0.976
	VV	12.633	36.553	2.022	7.485	0.379
	VV	13.233	90.891	2.629	7.585	0.942
	VV	14.133	176.392	5.625	7.736	1.828
	VV	14.533	179.923	5.777	7.803	1.865
	VV	15.250	274.154	8.446	7.923	2.841
	VV	15.750	153.985	5.813	8.007	1.596
	VV	16.650	998.429	19.951	8.158	10.347
	VV	17.983	184.077	6.054	8.381	1.908
	VV	18.767	2072.752	91.488	8.512	21.481
	VV	20.300	564.695	11.750	8.769	5.852
	VV	20.933	491.359	8.616	8.875	5.092
	VV	22.550	664.778	9.517	9.146	6.889
	VV	25.033	545.059	9.712	9.562	5.649
	VB	27.383	605.435	9.649	9.955	6.274
	BT	31.450	26.199	0.523	10.403	0.272
	BB	35.583	383.833	6.262	12.757	3.978
	BB	37.517	23.908	0.409	14.178	0.248

F- Fixed oil

1-Effect of amino acids :-

Data in Table (41) revealed that the application of amino acids (tryptophan and aspartic) at different concentrations increased the fixed oil percentage and fixed oil yield . As for tryptophane treatments , generally the fixed oil percentage and fixed oil yield increased gradually with increasing the concentration from 25 to 75 p.p.m . While the high level of asparatic (75p.p.m) gave maximum of fixed oil percentage and fixed oil yield per plant and per feddan .

Vollosovich and Butenko (1970) on ***Rauwolfia serpentina , Garnier and Morel (1972)*** on ***Vinca rosea and Koriesh (1984)*** on ***Catharanthus roseus . Harridy (1986)*** on ***C. roseus , Makarim and Bishr (1989)*** on ***Coriandrum sativum L.*** plants , they found that the best growth , oil yield , dry weight and total alkaloids were a chieved when plants were sprayed by tryptophan at a rate of 100 p.p.m

2- Effect of sulfur :-

From the results presented in Table (42) and Fig (10) , it can be noticed that all concentrations of sulfur addition and sulfur micron increased the fixed oil percentage and fixed oil yield per plant and per feddan in seeds of iberis plants during the two growing seasons than the control . The low concentration of sulfur addition (1.5 g / Plant) gave the maximum value of fixed oil yield per plant and per feddan during the first and second season . The second value in this respect was sulfur addition at (1 g / plant) . As for sulfur micron , the high concentration (5 g/ L) gave the highest value for fixed oil percentage and fixed oil yield per plant and feddan .

Fazal and Sisodia (1989) reported that increasing levels of phosphorus and sulfur increased oil content in soybean.

Table (41) Effect of Tryptophan and Aspartic acid on the fixed oil % and fixed oil yild in *sedds of Iberis amara* during *two seasons*

Treatment		frist season			seconed season		
		fixed oil %	fixed oil yield (g/plant)	fixed oil yield (kg/fed.)	fixed oil %	fixed oil yield (g/plant)	fixed oil yield (kg/fed.)
control ppm	0.0	5.606	0.081	4.870	5.790	0.090	5.40
Tryptophant acid (ppm)	25	8.800	0.083	5.016	8.900	0.093	5.60
	50	9.740	0.161	6.810	9.930	0.119	7.14
	75	12.420	0.163	9.780	12.610	0.172	10.33
Aspartic acid (ppm)	25	11.460	0.141	8.450	11.650	0.148	8.85
	50	9.610	0.133	8.020	9.800	0.147	8.83
	75	12.530	0.208	12.520	12.720	0.216	12.97

Table (42) Effect of sulfur on the fixed oil % and fixed oil yild in *seeds of Iberis amara* during *two seasons*

Treatment		frist season			seconed season		
		fixed oil %	fixed oil yield (g/plant)	fixed oil yield (kg/fed.)	fixed oil %	fixed oil yield (g/plant)	fixed oil yield (kg/fed.)
control g	0.0	5.606	0.081	4.870	5.790	0.090	5.40
sulfur adition g\plant	0.5	6.840	0.102	6.150	7.020	0.113	6.82
	1.0	9.830	0.196	11.790	10.010	0.212	12.73
	1.5	12.200	0.228	13.680	12.380	0.222	13.29
Sulfur spray g\L	1.25	6.000	0.102	6.120	6.180	0.112	6.74
	2.50	8.960	0.161	9.670	9.140	0.175	10.52
	5.00	9.220	0.175	10.510	9.400	0.188	11.39

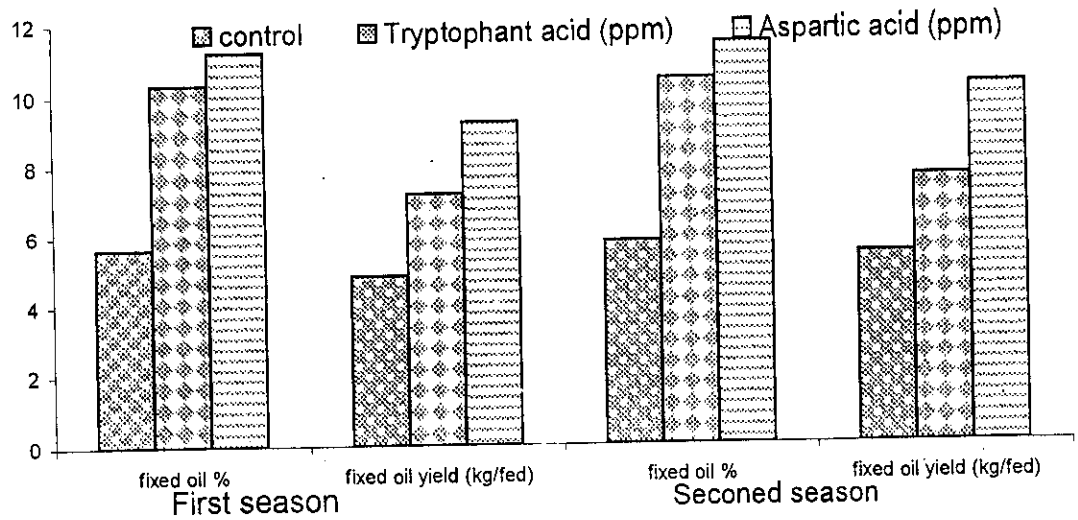

Fig (9) Effect of amino acid on the fixed oil % and fixed oil yield in seeds of ***Iberis amara*** during two seasons

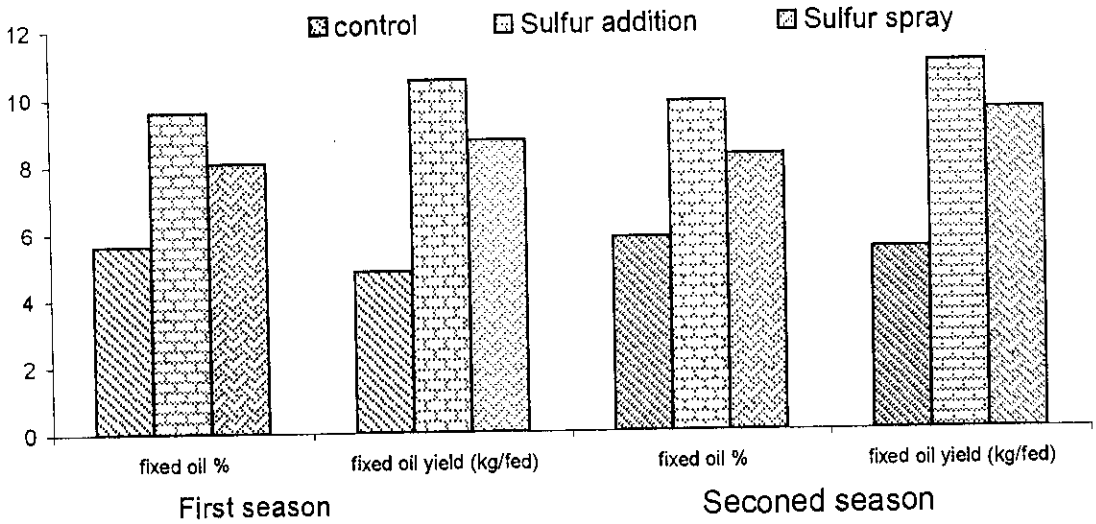

Fig (10) Effect of sulfur on the fixed oil % and fixed oil yield in seeds of ***Iberis amara*** during two seasons

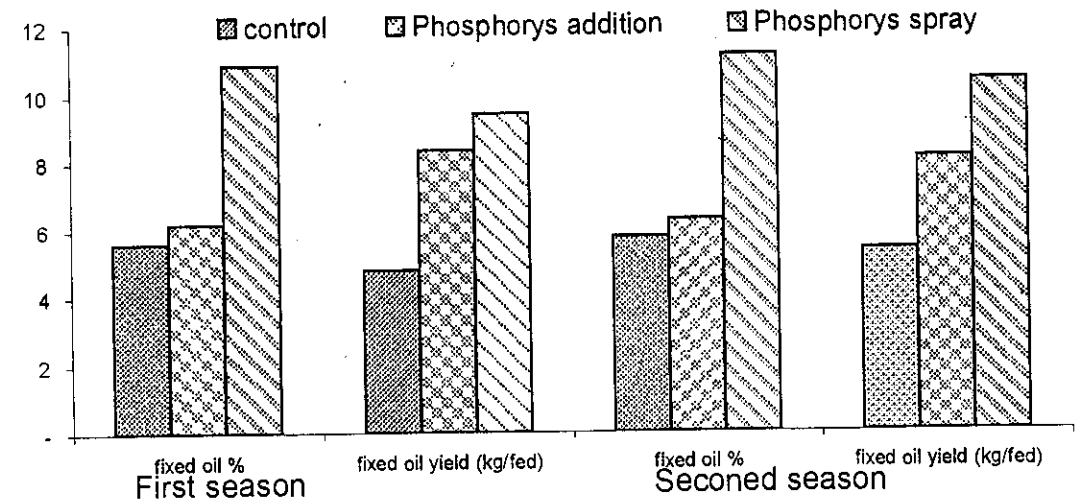

Fig (11) Effect of phophorus on the fixed oil % and fixed oil yield in seeds of ***Iberis amara*** during two seasons

Maximum oil content in soybean (23.33 %) was achieved at 75 kg. Sulfur + 50 kg phosphorus/hectar. Rathore and

Manohar (1989) on ***Brassica juncea*** reported that oil yield and oil conten increased significantly with increase in sulfur rates up to 160 kg/ha.

3- Effect of phosphorus :-

Phosphorus is a major element in plant nutrition .
It is essential for healthy growth , strong roots , fruit development and greater resistance to diseases . Phosphorus is found in plants as a constituents of nucleic acid . A T P shospholipids , NAD and NAD P . It help in photosynthesis and respiration . phosphorus deficency results in inhibition of growth of root . inhibition in protein synthesis .

Data in Table (43) and Figure (11)
exhibit that high level of superphosphate addition gave 3g/plant gave the maximum value of fixed oil percentage in seeds , while the other treatments 1 and 2g/ plant had no effect on this parameter . On the other hand , the all concentrations of phosphorus spraying treatments increased the fixed oil percentage as compared to untreated plants and plants which were treated with superphosphate addition . The fixed oil yield per plant and per feddan increased gradully by increasing the concentrations of super phosphate addition , while the medium concentration of phosphorus spraying treatments gave the highest value of these prameters . The results obtained are in agreement with those obtained by ***Jain et al (1990)*** . they found that phosphorus rate from 0 , 4.9 , 8.8 or 13.2 kg P_2O_5 / ha on ground nut increased phosphorus up take , seed protein and oil content . ***Napha and Naphade (1992)*** on sunflower indicated that up take and concentration of N, P, K, Ca, Mg, and S were increased by phosphorus application at rates of 80 kg $P_2 O_5$ /ha and seed oil content increased from 28.89 to 32.22 % with 80 kg $P_2 O_5$.

Table (43) Effect of phosphorus on the fixed oil % and fixed oil yild *in seeds Iberis amara* during *two seasons*

Treatment		frist season			seconed season		
		fixed oil %	fixed oil yield (g/plant)	fixed oil yield (kg/fed.)	fixed oil %	fixed oil yield (g/plant)	fixed oil yield (kg/fed.)
control g	0.0	5.6060	0.08100	4.8700	5.7900	0.0900	5.40
sphorus adition g\p	1.0	4.4500	0.11600	6.9420	4.6340	0.1160	6.82
	2.0	5.9100	0.13500	8.1150	5.9860	0.1200	7.18
	3.0	8.3300	0.16700	9.9960	8.5140	0.1700	10.21
hosphorus spray g\	2.00	10.2000	0.15300	9.1800	10.3840	0.1660	9.96
	4.00	11.4900	0.17200	10.3410	11.6740	0.1980	11.91
	6.00	11.2300	0.14500	8.7500	11.4140	0.1540	9.24

G- Total coumarins percentage in scale leaves of *Antholyza aethiopica* corms .

1-Effect of amino acid :-Data presented in Table (44) show that the total coumarin percent of scale leaves of antholyza was remarkably effected with both tryptophan and aspartic at different concentrations . Since there were noticeable increases in the total coumarin percent over control plants . It could be observed from the same data that highest value of total coumarin percent was noticed with 50 p.p.m aspartic (8.06%) , while the second value was with tryptophan at 50 and 75 p.p.m which gave about the same value (7.56 and 7.15 %) , respectively .

2-Effect of sulfur :-

Regarding the results in Table (44) , it can be show that different concentrations of sulfur addition and sulfur micron increased total coumarins as compared to control plants in scale leaves of antholyza corms . The maximum values (8.36 and 7.3%) were obtained with 1.5 g / plant sulfur addition and 1.25 g / L sulfur micron , respectively .

3-Effect of phosphorus :-

From the data in Table (42) , it can be noticed that the total coumarin percentage was increased by using super phosphate addition at different concentrations in comparing with the control plants . Total coumarin percentage increased by increasing super phosphate addition concentration 3g / plant which gave maximum value (7.04%). Also the total coumarin percentage increased by the application of different concentrations of phosphorus spraying in comparison with the control plants . Raising the concentration up to 4 g / L increased the coumarin percent in seeds than with the other treatments (2 g/ L and 6g/ L) .

Table (44) Effect of amino acids, sulfur and phosphorus on the total cumarins % in sale leaves of *Antholyza aethiopica* corms during the second season

Treatment		Total cumarins content %	Treatment		Total cumarins content %	Treatment		Total cumarins content %
control g	0.0	3.40	control g	0.0	3.40	control ppm	0.0	34.00
Tryptophan acid (ppm)	25	5.12	sulfur adition g/plant	0.5	6.62	phosphorus adition g/plant	1.0	6.42
	50	7.56		1.0	6.16		2.0	5.66
	75	7.15		1.5	8.36		3.0	7.04
Aspartic acid (ppm)	25	5.82	Sulfur spray g/L	1.25	7.30	phosphorus spray g/L	2.00	4.84
	50	8.06		2.50	3.99		4.00	7.54
	75	5.60		5.00	4.98		6.00	4.28

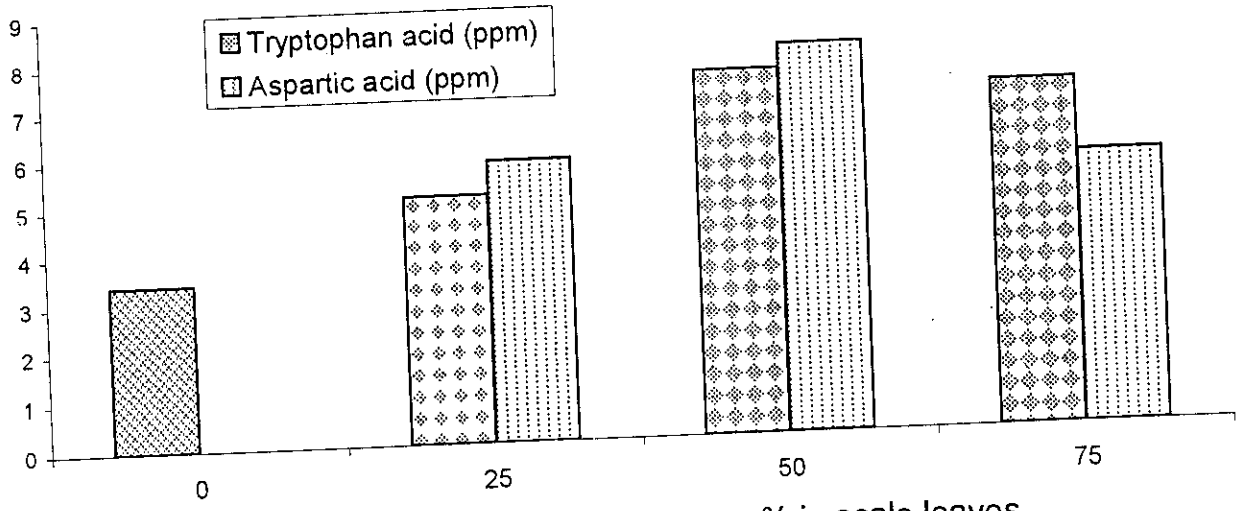

Fig (12)Effect of amino acids on the total cumarns % in scale leaves of ***Antholyz aethiopica*** corms during the second season

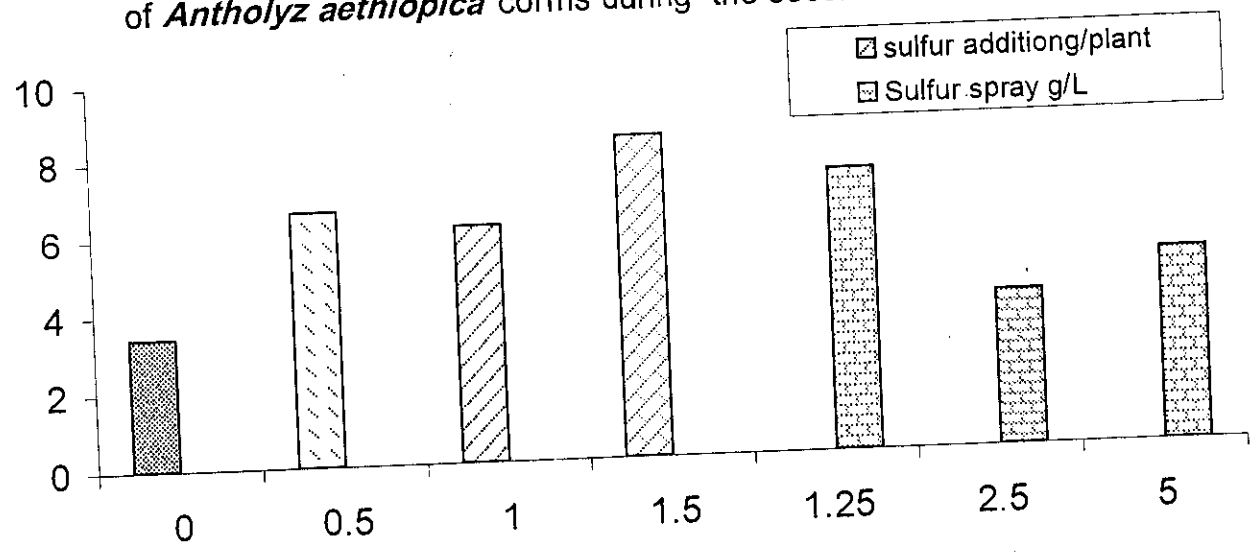

Fig (13)Effect of sulfur on the total cumarns % in scale leaves of ***Antholyz aethiopica*** corms during the seconed season

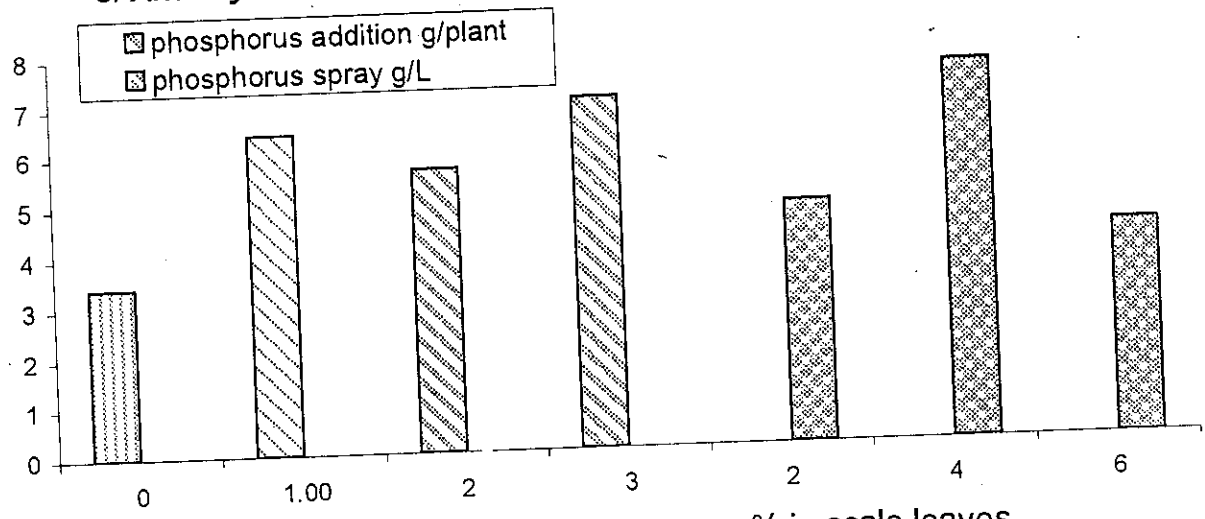

Fig (14) Effect of phosphorus on the total cumarns % in scale leaves of ***Antholyz aethiopica*** corms during the seconed season