EFFECT OF IRRIGATION WITH DRAINAGE WATER ON PEAS (*Pisum sativum*, L.)

II- YIELD AND ITS QUALITY

BY

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ABSTRACT

Two field experiments were conducted, at the Experimental farm of the Fac. of Agric. at Moshtohor in 1983/84 and 1984/85 seasons to study the effect of using drainage water in irrigation instead of the Nile water on yield and its physical and chemical characters for some pea cultivars. Obtained results show that, using drainage water in irrigation up to three times throughout the growing season increased number and weight of green pods per plant, total yield, average pod weight and diameter as well as number of seeds per pod, weight of 100 green seeds and netting percentage. Meanwhile, average pod length was decreased for all used pea cultivars, in addition, using drainage water increased seeds content from each of Na, Zn, Cu, Mn and carbohydrates while it caused a decrease in N, P, K and Ca concentration. On the other hand, irrigation with drainage water more than three times throughout the growing season, decreased all studied yeild parameters of all pea cultivars under study. Obtained results indicate also that, different used pea cultivars showed various responses for drainage water application. In this regard, little Marvel cv. was the most durable one among used cultivars.

INTRODUCTION

Egypt in the last decades facing a national problem due to the fact that the population increasing rate is greater than that of crop production. Increasing crop production can be achieved through many aids, one of them through increasing the cultivated area. This required much of well quality water which already is not sufficient to meet all the expected. One of the possibilities to overcome this difficult is to use the brakish water. Many investigators reported that using brakish water in irrigation affected the yield and its parameters as well as the chemical constituents of produced parts (Farrag, 1978) on broad bean (Abd El-Dayem 1982) and (Abdalla 1985) on pea plants.

MATERIALS AND METHODS

Two field experiments were carried out at the Experimental Farm of the Fac. of Agric. Moshtohor, Zagazig University, during the two successive winter seasons of 1983/1984 and 1984/1985. Each experiment included 15 treatments which were the combinations of 5 irrigation treatments within 3 cultivars. In the first irrigation i.e. pre-sowing, the Nile water for all treatments was used. The irrigation treatments were:

1- Irrigating plants four times only with Nile water throughout the growing season (Control treatment).

2- Irrigaiton once with drainage water i.e. the first irrigation after Sowing. While in other irrigations Nile water was applied.

3- Irrigation twice with drainage water i.e. the first two irrigations after sowing while in the other two irrigations, Nile water was used.

4- Irrigation three times with drainage water i.e. the first three irrigations after sowing and at the last irrigation, Nile water was used.

5- Irrigation with drainage water only where at all the four irrigations after sowing throughout the growing season, drainage water was used.

The pea cultivars used were, little Marvel, Lincoln and perfection. Seeds were sown in hills 15 cm apart on both sides of ridges 60 cm wide on October 17th and 15th in 1983 and 1984 seasons respectively. A split plot design with four replicates was adopted. Irrigation treatments were considered as main plots, while varieties were assigned as sub-plots. Plot area was about 1/400 Feddan. The chemical analysis for the soil of the experiment before and after investigation at 1984/1985 is shown at Table (1). Water samples for chemical analysis were taken at three intervals i.e. at beginning, mid and end of the growing season. The chemical analysis of water applied during 1983/1984 and 1984/1985 is shown at Table (2). Other cultural practices were carried out as commonly followed in the district. At harvest, the mature green pods for each treatment were collected and the following data were recorded:

Table (1): Chemical anaysis of water applied during (1983-1984) and (1984-1985) seasons.

Elements / Water sources		Cations meq./l Mg	Ca	K	Na	Anions meq./l Cl	HCO_3	CO_3	SO_4	Microelements ppm B	Mn	Zn	Cu	Fe	Microelements N	P	E.C. mmhos/cm at 25° C	pH
Nile water	1*	1.08	1.83	0.14	1.30	0.74	3.33	---	0.00	---	---	---	---	---	0.44	0.07	0.39	7.7
	2**	0.83	1.47	0.13	1.23	0.58	2.98	---	0.13	---	---	---	---	---	0.58	0.05	0.37	7.8
	3***	0.80	1.57	0.14	1.40	0.84	3.18	---	0.07	---	---	---	---	---	0.80	0.05	0.38	7.7
Mean		0.89	1.55	0.14	1.31	0.69	3.16	---	0.08	---	---	---	---	---	0.55	0.06	0.37	7.7
Drainage water	1*	21.14	14.50	0.44	1.70	7.50	8.80	---	19.93	0.73	0.01	0.032	0.022	0.020	2.11	0.080	1.32	7.8
	2**	26.48	12.50	0.45	2.00	13.50	6.80	---	35.90	0.96	0.03	0.034	0.022	0.038	2.23	0.040	1.64	7.7
	3***	30.63	23.57	0.36	2.40	12.25	11.20	---	33.42	1.12	0.05	0.035	0.029	0.050	0.41	0.002	2.01	7.7
Mean		26.08	16.58	0.42	2.03	11.08	8.88	---	29.01	0.94	0.03	0.033	0.024	0.030	1.58	0.070	1.65	7.8
							Second season 1985 - 1986											
Nile water	1*	0.93	1.62	1.14	1.23	0.69	3.18	---	0.00	---	---	---	---	---	0.35	0.01	0.37	7.8
	2**	0.88	1.80	0.10	1.23	0.84	3.00	---	0.15	---	---	---	---	---	0.58	0.01	0.37	7.8
	3***	0.87	1.40	0.12	1.23	0.59	2.98	---	0.05	---	---	---	---	---	0.38	0.09	0.38	7.8
Mean		0.89	1.59	0.45	1.23	0.84	3.04	---	0.00	---	---	---	---	---	0.42	0.04	0.37	7.8
Drainage water	1*	21.75	12.20	0.40	1.43	5.81	7.27	---	22.70	0.49	0.03	0.037	0.017	0.012	0.68	0.100	1.13	7.7
	2**	26.32	20.31	0.38	2.32	11.37	10.74	---	27.11	0.68	0.05	0.035	0.014	0.038	0.34	0.080	1.96	7.7
	3***	33.25	20.58	0.37	2.26	13.25	10.77	---	32.47	1.12	0.03	0.021	0.026	0.05	0.41	0.090	2.07	7.6
Mean		27.10	17.80	0.37	1.07	10.14	0.00	---	27.42	0.76	0.04	0.031	0.019	0.018	0.47	0.090	1.77	7.7

1* Sample at the beginning of growing season.
2** Sample at the middle of the growing season.
3*** Sample at the end of the growing season.

Table (2): Chemical analysis of experimental soil before and after investigation during 1984-1985 seasons.

No. of drainage water frequencies	Cations meq/l												Anions meq/l											
	Ca			Na			K			Mg			Cl			HCO_3			CO_3			SO_4		
	B**	A***	±	B	A	±	B	A	±	B	A	±	B	A	±	B	A	±	B	A	±	B	A	±
0*	18.0	13.0	5	7.32	7.32	-	1.44	1.65	0.21	14.4	15.0	1.2	4.0	4.5	1.5	7.14	6.97	0.22	-	-	-	4.4	4.05	1.8
1	18.0	2.00	2.0	7.32	7.45	0.13	1.44	1.44	0.12	14.4	17.7	3.3	4.0	3.75	0.25	7.10	7.31	0.22	-	-	-	4.4	4.25	0.8
2	18.6	25.2	7.4	7.32	7.77	0.45	1.44	1.59	5.15	14.4	10.5	4.4	4.0	3.25	0.75	7.10	6.05	0.14	-	-	-	4.4	4.14	1.1
3	18.6	2.00	2.2	7.32	7.27	5.05	1.44	1.21	0.23	14.4	21.6	7.2	4.0	3.30	0.62	7.10	5.52	2.17	-	-	-	4.4	7.62	3.2
4	18.6	2.02	1.6	7.32	8.50	0.70	1.44	1.47	0.03	14.4	15.0	0.6	4.0	3.5	0.50	7.10	4.5	2.60	-	-	-	4.4	3.62	0.8

No. of drainage water frequencies	Microelements ppm												Macroelements ppm						E.C.			Organic matter %		
	Cu			Zn			Mn			Fe			N			P								
	B	A	±	B	A	±	B	A	±	B	A	±	B	A	±	B	A	±	B	A	±	B	A	±
0	0.72	0.72	-	0.23	0.24	0.01	12.3	10.3	8.01	0.37	0.75	30	832	805	173	1.51	1.65	0.14	4.1	4.0	0.8	1.72	1.54	0.26
1	0.72	0.72	-	0.23	0.26	0.32	12.3	10.6	1.88	0.37	0.75	30	832	805	173	1.51	2.09	0.58	4.1	5.3	1.2	1.73	1.58	0.25
2	0.72	0.89	0.17	0.23	0.30	0.13	12.3	10.6	1.88	0.37	0.75	30	832	710	88	1.51	1.03	0.42	4.1	6.2	2.1	1.75	1.83	0.14
3	0.72	1.43	0.72	0.23	0.40	0.17	12.3	37.2	24.9	0.37	1.49	1.12	832	875	243	1.51	1.58	0.07	4.1	8.1	2.0	1.73	1.15	0.12
4	0.72	0.89	0.17	0.23	0.45	0.22	12.3	21.3	8.98	0.37	1.88	1.48	832	805	173	1.51	1.4	0.11	4.1	6.7	2.6	1.73	1.39	0.34

* Nile water only.
** Before investigation.
*** After investigation.

A- **Yield and its components:**

Number and weight of pods per plant, pod weight, diameter and length, number of seeds per pod, 100 seed weight, shellout percentage and total yield (ton/feddan) were measured.

B- **Chemical constituents of seeds:**

Nitrogen, phosphorus, potassium, sodium and calcium were determined according to the methods used by Pregl (1945), for N, Murphy and Riley (1962) as modified by John (1970) for P, Brown and Lilleland (1946) for both K and Na. Richards (1954) for Ca. Carbohydrates were also determined in produced seeds using method described by Michel et al., (1956). Moreover, microelements (Zn, Cu and Mn) were assayed according to the method described by Chapman and Pratt (1961).

All obtained data were subjected to statistical analysis according to Snedecor (1962).

RESULTS AND DISCUSSION

A- **Yield and its components:**

Data presented at Table (3) show clearly that, irrespective of number of green pods per plant, average pod weight, pod yield per plant and per feddan were significantly increased as a result of using drainage water in irrigation up to three times during the growing season compared with using the Nile water only. On the other hand, more drainage water applied than three times drastically reduced all studied yield components. The obvious depressive effect of drainage water irrigation more than three times may be attributed to the accumulation of some harmful salts in the growth media, which may be reflected in higher E.C. and Na concentrations as shown in Table (1). Obtained results are in agreement with those reported by Abd El-Dayem (1982) and Abdalla (1985) on pea.

Regarding the effect of used varieties, the same data at Table (3) reveal that, there were significant differences between the used cultivas regarding various yield parameters. In this connection, little Marvel cv. showed the highest response for drainage water application reflected in the greatest number of pods per plant and total yield either per plant or per feddan, followed by perfection cv., wereby lincoln ranked last during both seasons of study.

As for the interactional effect of both irrigation treatments and studied varieties, results tabulated at the

Table (3). Effect of drainage water frequency on yield and its components during (1983-1984) and (1984-1985) seasons.

Season / Var.	Drainage water frequencies	1983 - 1984				1984 - 1985			
		No. of pods/ plant	Average pod weight (gm)	Pod yield/ plant (gm)	Pod yield/ fed. (ton)	No. of pods/ plant	Average pod weight (gm)	Pod yield/ plant (gm)	Pod yield/ fed. (ton)
Little Marvel	0	5.9	4.9	29.3	5.256	5	4,9	25.1	4.581
	1	6.1	4.7	29.1	5.316	5.1	4.4	23.	4.236
	2	6.8	5.3	36,5	6.702	6.5	5.2	34.1	6.224
	3	6.8	5.3	36.8	6.714	7.1	5.2	37.1	6.780
	4	5	4.4	19,9	3.642	5.3	4,2	22.8	4.161
Perfection	0	5.9	4.8	28,4	5.180	4.1	5.1	21.4	3.909
	1	5.1	4.6	23,7	4.332	4.7	5	23.8	4.351
	2	6.7	5	34	6.209	5.5	5.4	30	5.514
	3	6.4	5.4	35,2	6.358	5.6	5,5	31	5.612
	4	6.3	4.3	27,8	4.938	4.4	4,6	20.4	3.815
Lincoln	0	4.6	3.7	17,3	3.153	6.1	3,6	22	4.019
	1	5.5	4.5	24,7	4.477	6	3.8	23.3	4.131
	2	5	5.8	29,9	5.440	5.6	5,1	28.8	5.265
	3	5.1	6.7	34,5	6.276	4.9	5,9	28.9	5.312
	4	4.7	3.6	16,9	3.090	6.4	3,4	21.3	3.900
L.S.D. at 5%		N.S.	.3	6.7	N.S.	0.4	0,6	N.S.	N.S.
Little Marvel		6.1	4.9	30.3	5.526	5.8	4,7	28.4	5.196
Perfection		6	4.8	29.8	5.403	4.8	5.1	25,3	4.640
Lincoln		4.9	4.8	24,6	4.487	5.8	4,3	24.9	4.525
L.S.D. at 5%		1.8	N.S.	3.0	0.563	0.2	0,3	1,8	0.343
	0	5.4	4.4	25.0	4.529	5.1	4,5	22,8	4.169
	1	5.5	4.6	25,8	4.708	5.2	4,4	23.3	4.239
	2	6.1	5.3	33,4	6.117	5.8	5,2	30,9	5,667
	3	6.1	5.8	35,5	6.449	5.8	5.5	32.4	5.901
	4	5.3	4.1	21,5	3.890	5.3	4,0	21,5	3.958
L.S.D. at 5%		N.S.	0.2	3.7	0.653	N.S.	0.4	2,5	0.453

same table proved that, the highest number of green pods and yield per plant was well as per feddan were produced by Little Mervel plants when irrigated two to three times with drainage water. However, regarding the average pod weight, the highest increase was obtained with using drainage water three times in irrigation especially in lincoln cv.

B- Fruit quality

1- Physical characteristics:

It is evident from data at Table (4) that application of drainage water two or three times significantly increased each of number of seeds per pod, netting percentage and 100 seeds weight, whereby pod diameter was not statistically affected, while pod length was significantly decreased compared with that produced from Nile water treatment.

Regarding the effect of studied cultivars, it is obvious from the same data at Table (4) that, there were signifiant differences among the used varieties in pod length and seed index. Moreover, variations in the other studied pod parameters did not reach level of significancy. In this regared, little Marvel cv. has the greatest number of seeds per pod and the highest weight of 100 green seeds as well as netting percentage, followed by perfection and licoln cv. On the other hand, lincoln cv. possessed the longest pods compared to the other two varieties.

Concerning the interactional effects of irrigation treamtents and varieties, data at Table (4) reveal that, both average pod length and number of seeds per pod were significantly affected, while pod diameter, 100 seeds weight and netting percentage were not affected by irrigation treatments for all vrieties under study. In this respect, the greatest value of pod length was obtained from plants of Lincoln variety when irrigated with Nile water while the highest number of seeds per pod was obtained from plants of little Marvel cv. when irrigated with drainage water two to three times.

2- Chemical composition of seeds

a- Macor-elements concentration:

Data illustrated at Table (5) show that, except Na concentration which was significantly increased all studied macroelements i.e. N, P, K and Ca concentrations in the seeds were decreased as a result of using drainage water in irrigation compared with the control (Nile water). Obtained results are in harmony with those reported by Said *et al.* (1966), on cow pea and Farrag (1978) and Moustafa *et al.* (1981), on broad bean.

Table (4): Effect of drainage water frequency on pod dimintions during (1983-1984) and (1984-1985).

Seasons		1983 - 1984					1984 - 1985				
Var.	Drainage water frequencies	Pod length (cm)	Pod diameter (cm)	No. of seeds/ pod	Weight of 100 seeds (gm)	Netting %	Pod length (cm)	Pod diameter (cm)	No. of seeds/ pod	Weight of 100 seeds (gm)	Netting %
Little Marvel	0	7.0	0.91	5.3	46.0	46.5	8.4	0.87	4.4	46.7	47.0
	1	6.9	0.90	5.3	43.2	47.5	8.3	0.92	5.4	47.2	49.3
	2	6.9	0.92	5.4	50.0	49.8	8.0	0.94	5.1	51.2	49.3
	3	6.6	0.92	5.4	50.2	49.3	7.4	0.99	5.4	51.6	49.0
	4	6.0	0.89	5.1	45.7	43.6	7.2	0.87	4.6	42.6	45.3
Perfection	0	7.2	0.88	5.1	45.7	47.5	9.5	0.91	4.6	45.8	45.0
	1	7.1	0.88	5.3	46.1	44.5	8.6	0.87	4.9	45.3	45.8
	2	6.9	0.89	5.3	48.7	50.1	7.8	0.94	5.4	49.2	47.0
	3	7.1	0.90	5.5	48.8	46.0	7.5	0.95	4.9	49.3	47.3
	4	6.0	0.84	5.2	44.3	44.6	7.7	0.91	4.5	45.0	45.0
Lincoln	0	10.7	0.87	4.5	43.2	44.9	10.3	0.77	4.8	43.6	43.5
	1	9.5	0.92	4.6	45.3	48.1	9.7	0.76	4.8	45.6	48.8
	2	9.3	0.92	5.6	49.3	48.3	9.2	0.83	5.1	48.6	49.2
	3	7.8	0.90	5.9	49.3	48.4	9.6	0.83	5.5	49.3	49.5
	4	7.4	0.88	5.0	43.2	44.1	8.7	0.82	4.3	42.3	43.3
L.S.D. at 5%		1.0	N.S.	0.5	N.S.	N.S.	N.S.	N.S.	0.6	N.S.	N.S.
Little Marvel		6.6	0.90	5.3	47.0	47.3	7.8	0.91	4.9	47.8	47.9
Perfection		6.9	0.87	5.2	46.7	46.5	8.2	0.91	4.8	46.9	46.0
Lincoln		8.9	0.89	5.1	46.0	46.7	9.5	0.80	4.9	45.8	46.8
L.S.D. at 5%		0.5	N.S.	N.S.	N.S.	N.S.	0.4	N.S.	N.S.	0.9	N.S.
	0	8.3	0.88	4.9	44.9	46.3	9.4	0.85	4.6	45.2	45.1
	1	7.8	0.90	5.0	44.8	46.7	8.8	0.85	5.0	46.0	47.9
	2	7.7	0.91	5.4	49.3	49.4	8.3	0.90	5.2	49.6	48.5
	3	7.1	0.90	5.6	49.4	47.9	8.1	0.92	5.3	50.0	48.6
	4	6.4	0.87	5.1	44.4	44.1	7.8	0.86	4.4	43.3	44.5
L.S.D. at 5%		0.7	N.S.	0.3	1.6	2.3	0.5	N.S.	0.3	1.5	2.2

Table (5): Effect of drainage water frequency on N, P, K, Ca, and Na concentration (mg/100gm dry weight in pea seeds during (1983-1984) and (1984-1985).

Seasons		1983 - 1984					1984 - 1985				
Var.	Drainage water frequencies	N	P	K	Ca	Na	N	P	K	Ca	Na
Little Marvel	0	5020	315	1775	1840	45	5125	297	1800	1842	51
	1	4900	306	1825	1830	53	4650	255	1750	1840	58
	2	4925	296	1725	1820	55	4600	258	1725	1715	59
	3	4825	262	1700	1800	55	4550	256	1750	1717	61
	4	4450	258	1725	1550	57	4550	253	1725	1697	62
Perfection	0	5050	315	1750	1890	46	5150	283	1750	1820	49
	1	4975	301	1775	1812	53	4975	280	1725	1800	52
	2	4700	292	1750	1687	53	4800	280	1700	1792	56
	3	4625	273	1725	1680	57	4825	272	1700	1730	55
	4	4600	273	1650	1645	59	4750	267	1725	1702	78
Lincoln	0	4950	288	1700	1872	46	4850	289	1825	1995	56
	1	4600	273	1700	1705	48	4825	256	1800	1977	58
	2	4500	270	1750	1680	53	4775	263	1750	1855	58
	3	4425	269	1550	1675	54	4750	246	1775	1782	58
	4	4375	265	1525	1660	60	4700	245	1775	1602	70
L.S.D. at 5%		N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Little Marvel		4824	288	1750	1768	53	4695	264	1750	1762	58
Perfection		4790	291	1730	1742	54	4900	276	1720	1769	58
Lincoln		4570	273	1645	1718	52	4780	260	1785	1842	60
L.S.D. at 5%		N.S.	10	N.S.	N.S.	N.S.	N.S.	10	N.S.	N.S.	N.S.
	0	5006	306	1742	1867	46	5042	290	1792	1886	52
	1	4825	293	1767	1782	51	4817	264	1758	1872	56
	2	4708	286	1742	1729	54	4725	267	1725	1787	58
	3	4625	268	1658	1718	55	4708	258	1742	1743	58
	4	4475	265	1633	1618	59	4667	255	1742	1667	70
L.S.D. at 5%		286	24	N.S.	229	6	N.S.	22	N.S.	155	N.S.

With regard to the effect of variety, it is obvious, from the same data at Table (5) that with the exception of P, no significant difference and clear trend were observed between varieties in this regard. In this connection, seeds of perfection cv. have the highest phosphorus concentration compared with other used cvs.

As for the interactional effects, data at Table (5) show that the concentration of N, P, K, Ca and Na in the seeds of all studied cultivars were not significantly affected due to drainage water application. In this respect, seeds of perfection and little Marvel cvs. produced from plants irrigated with Nile water possessed the highest N, P, K and Ca concentrations, and that produced from plants irrigated with drainage water four times having the highest Na concentration.

b- Micro-elements concentrations:

Data presented at Table (6) show clearly that, there was a significant increase in Zn, Cu and Mn concentrations in green seeds due to increasing number of drainage water irrigations. These results disagree with those found by Farrag (1978), on broad bean.

Concerning the effect of cultivars, it is obvious from data at the same table that no significant differences were found between the studied cultivars in the concentration of all determined micro-elements.

With regard to the effect of interaction between studied cultivars and drainage water irrigation treatments it is evident that in the three studied cultivars, all previously mentioned micro-elements tended to increase continuously in their concentration as number of drainage water irrigations increased. Such increments may be understood on the basis of the migration of these elements from the vegetative parts to the seeds, which are considered the main parts of storage for legume crope.

c- Carbohydrates:

Data at Table (6) indicate that, increasing drainage water frequencies up to three times increased the carbohydrates content of the seeds. Such increase may be connected with the increase in photosynthetic pigments. This result is in harmony with those found by Farrag (1978) on broad bean.

As for the effect of used cultivars, no significant differences in the carbohydrates content of pea seeds were detected.

Table (6): Effect of drainage water frequency on Cu, Zn, Mn and carbohydrates in pea seeds during (1983-1984) and (1984-1985) seasons.

Season / Var.	Drainage water frequencies	1983 - 1984				1984 - 1985			
		Micro-element concentration			Carbohydrates	Micro-element concentration			Carbohydrates
		Zn ppm	Cu ppm	Mn ppm	%	Zn ppm	Cu ppm	Mn ppm	%
Little Marvel	0	48	51	29	35.6	50	58	32	39.5
	1	51	55	35	37.4	62	70	33	38.2
	2	57	60	35	39.7	64	71	33	40.2
	3	59	62	42	43	66	72	39	41.9
	4	61	68	45	35.4	69	72	40	39.2
Perfection	0	49	35	32	36.7	52	65	31	35.7
	1	57	62	33	36.2	54	67	31	37.9
	2	64	64	36	40.2	61	67	36	40.8
	3	65	71	40	40.8	61	72	36	40.7
	4	67	74	41	33.5	72	74	37	36.3
Lincoln	0	52	54	31	36.5	43	65	29	38.6
	1	51	56	34	34.2	62	68	30	39.4
	2	57	68	32	39.7	63	69	36	40.7
	3	58	67	36	39.8	63	70	40	41.4
	4	70	68	44	34.7	68	74	40	35.2
L.S.D. at 5%		NS	7	6	NS	NS	NS	NS	NS
Little Marvel		55	59	37	38.2	62	69	35	39.8
Perfection		60	61	36	37.4	60	69	34	38.2
Lincoln		58	63	35	36.9	60	69	35	39.1
L.S.D. at 5%		NS	NS	NS	NS	NS	NS	NS	NS
	0	50	47	33	36.2	48	63	31	37.9
	1	53	58	34	35.9	59	68	31	38.5
	2	59	64	34	39.8	63	69	35	40.5
	3	61	67	39	41.2	63	71	38	41.3
	4	66	70	43	34.5	70	73	39	36.9
L.S.D. at 5%		7	4	5	1.8	4	4	6	1.2

Concerning the interactional effect between studied cvs. and drainage water irrigations, no significant differences were detected in this respect. However, seeds obtained from plants of little Marvel cv. irrigated with drainage water three times contained the highest percentage of carbohydrates compared with the other combinations of other varieties with other treatments.

Generally, it may be concluded that, using drainage water in irrigation of pea plants for three times, throughout growing season, will increase the green pod yield, Moreover, Little Marvel cv. proved to be the most durable (among other used cultivars) for applying drainage water in irrigation. Hence, such variety produced the highest yield of green pods with best quality.

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تأثير الري بمياه المصرف علي نباتات البسلة

٢ - علي المحصول وجودته

توفيق عبدالحميد عابد محمدالسعيد أحمدزكي فتحي أبوالنصر أبوسديره

أجريت تجربتان بمزرعة أبحاث كلية الزراعة بمشتهر خلال الموسم الشتوى لسنة ١٩٨٣ /١٩٨٤ ، ١٩٨٤/ ١٩٨٥ لدراسة تأثير استخدام مياه المصرف بدلا من مياه النيل في رى نباتات البسلة وتأثير ذلك علي المحصول وصفات الجودة الطبيعية والكيماوية لبعض أصناف البسلة .

وقد أوضحت النتائج مايلي :

أدى استخدام مياه المصرف في الرى ثلاث مرات خلال موسم النمو الي زيادة عدد ووزن القرون الخضراء للنبات والمحصول الكلي للفدان بالاضافة الي زيادة متوسط وزن وقطر القرن وعدد البذور بالقرن ووزن ١٠٠ بذرة وكذلك نسبة التصافي بينما نقص متوسط طول القرن لجميع الاصناف تحت الدراسة .

كذلك أدى استخدام مياه المصرف في الرى الي زيادة محتوى البذور من كل من الصوديوم - الزنك - النحاس - المنجنيز والمواد الكربوهيدراتية بينماقل محتواها من النتروجين ،الفوسفور - البوتاسيوم وكذلك الكالسيوم .

ومن ناحية أخرى فقد أدى الرى بمياه المصرف أكثر من ثلاث مرات خلال موسم النمو الي نقص ملحوظ في جميع القياسات المدروسة للمحصول ومواصفاته لجميع الاصناف تحت الدراسة .

كما أظهرت أصناف البسلة تحت الدراسة استجابة مختلفة لاستخدام مياه المصرف في الرى حيث كان الصنف لتل مارفل أفضل هذه الاصناف تحملا واستجابة لاستخدام مياه المصرف في الرى من بين الاصناف المستخدمة .