Assiut J. Agric. Sci., 52 (2) 2021 (50-59) *ISSN: 1110-0486*
Website:www.aun.edu.eg/faculty_agriculture/journals_issues_form.php *E-mail: ajas@aun.edu.eg*

Effect of Foliar Application with Faba Bean and Chickpeas Seed Sprout Extract on Growth and Fruiting of Ewaise Mango Trees

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Accepted for publication on: 5/5/2021

Abstract

An experiment was conducted during two successive seasons 2019 and 2020 on mango trees cv. Ewaise to study the effect of foliar application faba bean and chickpea seed sprout extract at 0.25 to 1% applied three times along each season (at growth start, fruit set after immediately and one month later) either each extract was sprayed. The influence was evaluated through the response of vegetative growth, leaf N, P, K content, yield and some fruit physical and chemical characteristics.

The obtained results showed that, spaying faba bean and chickpea seed sprout extract at 0.25 to 1% significantly improved the growth traits and nutritional status of trees compared to untreated one. Also, spray treatments significantly increased yield and improved the fruit quality. No significant difference seen in these studied traits due to increase concentration of used extract from 0.5 to 1%. Therefore from economical point view it could be to use faba bean or chickpea seed sprout at 0.5%. Using chickpea seed sprout extracts spray had a noticeable positive effect particularly on some fruit physical and chemical characteristics than using faba bean seed sprout extracts. Therefore, use two plant seed sprout extracts could be safely recommended as a natural biostimulants application for improving growth and fruiting of Ewaise mango trees grown under the same experimental condition.

Keywords: *Seed sprout, mango, yield, fruit quality, environmental pollution.*

Introduction

Mango (*Mangifera indica* L.) belongs to the family Anacardiaceae considered as one of the most important fruits of the tropical and subtropical countries of the world. It grows under a wide range of climatic and soil conditions. In Egypt, mango ranks the second after citrus, whereas its total area of fruitful orchards reached approximately 285973 fed. producing about 1091535 tons annually (M.A.L.R., 2020). However, lower yield with poor quality is one of the main problems facing mango growers. Many trials were done to raise the productivity and fruit quality of much fruit species by the wasteful use of chemical fertilizers especially mineral ones. For avoiding the excessive use of the mineral chemical fertilizers and their harmful effect particularly on human health consequently, using of some natural biostimulants such as plant extracts that characterized by their richer contents with nutrient elements, growth regulators, antioxidants and vitamins were investigated for being applied as an effective nutritive

application that could be replace partially or completely the aforesaid harmful ones (Spinelli *et al*., 2009; Ahmed *et al*., 2013 and Anwar *et al*., 2013).

Recent studies supported the beneficial effects of using crop seed sprouts to promote growth, tree nutrition status, yield and fruit quality in fruit crops and at the same time protecting our environment from pollution (Cazuola *et al*., 2004; Cairney, 2005; Biommerson, 2007 and Dhekney, 2016; Oraby, 2018 and Ali *et al*., 2018).

Previous studies showed using all nutrients via all forms were responsible for improving growth, yield and fruit quality of mangoes (Kassim and Marzouk, 2004; Ebeid-Sanaa, 2007; Ibrahiem *et al*., 2007; El-Sayed-Esraa, 2007; El-Sayed-Esraa, 2010; Refaai, 2014; El-Khawaga and Mansour, 2014; Ahmed, 2015; Abdel-Rahman, 2015; El-Sharony *et al*., 2015; Abdelaziz *et al*., 2015; Mohamed *et al*., 2015; Oraby, 2018 and Ali *et al*., 2018).

The aim of the work was examining the effect of foliar application of faba bean and chickpeas seed sprout on growth and fruiting of Ewaise mango trees grown under Upper Egypt conditions.

Materials and Methods

This investigation was carried out during 2019 and 2020 seasons on Ewaise mango cv. trees onto seeding rootstocks, grown in silty clay soil in a private orchard situated at El-Biora region, Kom Ombo district, Aswan governorate Egypt. The selected trees were 18- years old, healthy, nearly uniform in vigour, planted at 7x7 meters apart and received the same cultural practices. Surface irrigation system was used. Soil analysis was done according to the procedures outlined by Wilde *et al.* (1985) and the data are shown in Table (1).

Table 1. Analysis of the tested soil and chemical composition of fenugreek sprout.

Constituents	Values	Constituents	Values (mg/100g F.W.)
Particle size distribution		**Faba bean**	
Sand %	10.60	Folate	0.64
Silt %	32.80	Niacin	31.40
Clay %	56.60	Protein	4500.00
Texture grade	Silty clay	Riboflavin	2.78
pH (1: 2.5 extract)	7.88	Thiamin	3.98
E.C. (1:2.5 extract)	0.91	Vitamin B_6	0.91
Organic matter %	2.15	Vitamin C	416.00
$CaCO_3$ %	1.88	**Chickpea**	
Total N %	0.12	Thiamin	0.486
P (Olsen, ppm)	22.00	Riboflavin	0.106
K (ammonium acetate, ppm)	420.00	Folate	0.44
Mg (ppm)	79.00	Vitamin B_6	0.492
S (ppm)	6.95	Vitamin A (International units)	41.00
EDTA extractable		Potassium	846.00
Zn (ppm)	1.36	Calcium	45.00
Fe (ppm)	11.11	Sodium	64.00
Mn (ppm)	10.25	Zinc	2.81
Cu (ppm)	1.63		

This study included the following seven treatments:

1- Control (water).
2- Spraying faba bean seed sprout extract at 0.25%
3- Spraying faba bean seed sprout extract at 0.50 %.
4- Spraying faba bean seed sprout extract at 1.0%.
5- Spraying chickpeas seed sprout extract at 0.25%.
6- Spraying chickpeas seed sprout extract at 0.50%.
7- Spraying chickpeas seed sprout extract at 1.0%.

The experiment was set up as a complete randomized block design. Each treatment was replicated three times, one tree per each. Faba bean and chickpeas seed sprout extract was prepared by sowing the seeds in dark place, then sprouts were harvested after 3-4 days from seed sowing. Sprouts were homogenated with distilled water at 1: 10 using an electric blender for five minutes, then filterated and kept under 4°C in refrigerator till use.

Faba bean and chickpeas seeds sprout extract were sprayed three times at growth start (first week of March) after fruit set immediately (third week of April) one month later (third week of May) in both seasons. Analysis of this extract was carried out using the procedures methods that outlined by A.O.A.C. (2000) and data are shown in Table (1). Triton B as a wetting agent was added to all spraying solutions at 0.05%, and spraying was done till runoff.

During both seasons, the following parameters were measured, spring shoot length (cm), shoot thickness (cm), leaves number/shoot, leaf area (cm^2) (Ahmed and Morsy, 1999), total chlorophylls and total carotenoids as mg/100 g F.W. (Hiscox and Isralstam, 1979); percentages of nutritional elements (Wilde *et al.,* 1985), Fruit retention%, number of fruit/tree, total yield/tree (kg), fruit weight (g), pulp percentage; T.S.S.%, total acidity, sugars contents %, vitamin C content mg/ 100 ml juice and total fibres (A.O.A.C., 2000).

Statistical analysis was done using new L.S.D. test at 5% to differentiate among the seven treatment means (Gomez & Gomez, 1984 and Mead *et al.,* 1993).

Results

1- Vegetative growth and leaf chemical composition

Tables 2, 3 & 4 showed the effect of plant seed sprout extracts spraying on the length and thickness of shoot, number of leaves/shoot and leaf area as well as total of chlorophylls and carotenoids and leaf N, P, K, Mg, Ca, Zn, Fe and Mn contents of Ewaise mango trees during 2019 and 2020 seasons. It is obvious that the results showed a similar trend during the two studied seasons. Such results indicate that the spraying faba bean and chickpeas seed sprout extract significantly increased such traits compared to water sprayed (control). The promotion on such growth traits was associated with increasing the extract used concentration from 0.25 to 1.0%. Increasing concentrations of faba bean or chickpeas seed sprout extract from 0.50 to 1.0% failed significantly to stimulate these

studied growth and leaf traits. Therefore, from economical point view, it is the best to use faba bean or chickpeas seed sprout extract at 0.50%. Moreover, using chickpeas significantly stimulated the shoot growth and leaf traits area as well as total chlorophylls, carotenoids and nutrient contents of leaves more than using faba bean seed sprout. The maximum values of shoot growth, as well as leaf traits and leaf nutrient contents were recorded on the trees that were spraying chickpeas at 1%. Thus the highest values were (18.4 cm, 0.85 cm, 19.2 leaf, 84.9 cm^2, 8.94 mg/g, 2.33%, 1.85%, 0.211%, 1.23%, 0.67, 3.03, 65.2 ppm, 67.38 ppm and 57.83 ppm as an av. two studied seasons for shoot length, shoot thickness, leaf no/shoot, leaf area, total chlorophylls, carotenoids, N, P, K,. Mg, Ca, Zn, Fe and Mn ppm, respectively. On other hand, the lowest values of the growth traits as well as leaf total chlorophylls, total carotenoids and leaf nutrient contents were recorded on the trees that were sprayed with water (check trees). The corresponding least values were 16.2 cm, 0.61 cm, 12.9 leaf, 78.0 cm^2, 5.58 mg/g, 1.27%, 1.62%, 0.118%, 1.06%, 0.50%, 2.76%, 59.5 ppm, 60.06 ppm and 50.48 ppm, respectively. Then, the attained increment were 13.58, 39.34, 48.84, 8.85, 60.22, 83.46, 14.20, 78.81, 16.04, 34.0, 9.78, 9.58, 12.19 and 14.56%, respectively. Therefore, spraying faba bean or chickpeas seed sprout extract significantly increased the total leaf surface area, nutritional status and vegetative growth of mango trees.

2 – Yield components

It is clear from Table 5 that the spraying of Ewaise mango trees with faba bean or chickpeas sprout extract significantly increased the mango yield components, i.e. fruit retention %, number of fruits/tree and total yield/tree compared to water sprayed (check treatment). The promotion in the yield component was associated with increasing the applied level concentration of extract used. No significant difference found due to increase concentration of extracts used from 0.5 to 1%, thus from economical view it must be use the sprout extract at 0.50 to get the high economical yield. Using chickpeas seed sprout extract showed more significant increase in the yield than using faba seed sprout extract. The heaviest total yield/tree was recorded on the trees that sprayed with 1% chickpeas extract. The obtained values of total yield/tree were (42.9, 47.1, 50.9, 51.6, 49.2, 52.9 and 53.6 kg/tree) due to spray with water (control) (T_1), faba bean seed sprout at 0.25 (T_2), 0.50 (T_3) & 1% (T_4), chickpeas seed sprout at 0.25 (T_5), 0.50 (T_6) and 1% (T_7), respectively as an average of two studied seasons. The obtained increment of yield/tree as averages of two seasons was 9.79, 18.65, 20.28, 14.69, 23.31 & 24.94 as a result of using T_2, T_3, T_4, T_5, T_6 and T_7, respectively, compared to T_1 (check treatment). Therefore, it is clear that spraying with plant seed sprout extract on mango trees has beneficial effects.

Table 2. Effect of spraying faba bean and chickpeas seed sprouts on some shoot and leaf traits of Ewaise mango trees during 2019 and 2020 seasons.

Treat.	Shoot length (cm)			Shoot thickness (cm)			No. of leaves/shoot			Leaf area (cm^2)		
	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean
Control (water)	15.3B	17.1 C	16.2	0.58C	0.63D	0.61	11.9E	13.8E	12.9	76.1C	79.8B	78.0
Faba bean 0.25%	15.8B	18.0BC	16.9	0.63C	0.68D	0.66	13.4D	15.0D	14.2	78.6BC	81.9B	80.3
Faba bean 0.50%	16.2AB	18.9AB	17.6	0.72 B	0.74C	0.73	14.4CD	16.1C	15.3	81.5A	84.2AB	82.9
Faba bean 1.0%	16.4AB	19.7 A	18.1	0.75B	0.78BC	0.77	15.2C	17.0C	16.1	82.3AB	84.9A	83.6
Chickpeas 0.25%	16.2AB	18.7 B	17.5	0.77B	0.81B	0.79	16.4B	18.3B	17.4	80.8B	83.2B	82.0
Chickpeas 0.50%	16.9A	19.6 A	18.3	0.80AB	0.83AB	0.82	17.6A	19.8A	18.7	82.7AB	85.9A	84.3
Chickpeas 1.0%	17.0A	19.8 A	18.4	0.83A	0.86A	0.85	18.3A	20.1A	19.2	83.7A	86.0A	84.9
New LSD 5%	**0.82**	**0.98**		**0.05**	**0.05**		**1.02**	**1.06**		**2.81**	**2.68**	

Table 3. Effect of spraying faba bean and chickpeas sprouts on some leaf chemical composition of Ewaise mango trees during 2019 and 2020 seasons.

Treat.	Total chlorophylls			Total carotenoids			N %			P %			K %		
	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean
Control (water)	5.09D	6.06D	5.58	1.10E	1.43D	1.27	1.60D	1.64D	1.62	0.108E	0.127E	0.118	1.05D	1.06D	1.06
Faba bean 0.25%	6.03C	6.82C	6.43	1.35D	1.58D	1.47	1.66C	1.69C	1.68	0.141D	0.158D	0.150	1.10C	1.14C	1.12
Faba bean 0.50%	6.81B	7.74B	7.28	1.68C	1.95C	1.82	1.73B	1.75B	1.74	0.188B	0.204B	0.196	1.16B	1.20B	1.18
Faba bean 1.0%	7.18B	8.03B	7.61	1.80C	2.05BC	1.93	1.76B	1.79B	1.78	0.193B	0.210A	0.202	1.18A	1.22B	1.20
Chickpeas 0.25%	6.95B	7.76B	7.36	1.92BC	2.19B	2.06	1.74B	1.76B	1.75	0.174C	0.189C	0.182	1.15B	1.1B8	1.17
Chickpeas 0.50%	8.26A	8.93A	8.60	2.13A	2.38A	2.26	1.81A	1.84A	1.83	0.199AB	0.211A	0.205	1.20A	1.25AB	1.23
Chickpeas 1.0%	8.53A	9.33A	8.94	2.18A	2.48A	2.33	1.85A	1.85A	1.85	0.206A	0.216A	0.211	1.19A	1.26A	1.23
New LSD 5%	**0.51**	**0.49**		**0.12**	**0.14**		**0.05**	**0.05**		**0.011**	**0.012**		**0.04**	**0.04**	

Table 4. Effect of spraying faba bean and chickpeas sprouts on some leaf nutrients of Ewaise mango trees during 2019 and 2020 seasons.

Treat.	Mg %			Ca %			Zn ppm			Fe ppm			Mn ppm		
	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean
Control (water)	0.50D	0.50D	0.50	2.71C	2.80C	2.76	60.8D	58.1C	59.5	58.30D	61.82C	60.06	49.33D	51.63C	50.48
Faba bean 0.25%	0.55C	0.57C	0.56	2.85B	2.90B	2.88	63.3C	61.4B	62.4	60.81C	63.38C	62.10	52.54C	54.28B	53.41
Faba bean 0.50%	0.60B	0.62B	0.61	2.9B	2.99AB	2.96	64.7BC	63.6A	64.2	63.34B	66.21B	64.78	54.63BC	56.79A	55.71
Faba bean 1.0%	0.61B	0.63B	0.62	2.95AB	3.00AB	2.98	65.5B	63.8A	64.7	63.92B	66.64A	65.28	55.58B	57.26A	56.42
Chickpeas 0.25%	0.60B	0.62B	0.61	2.91B	2.92B	2.92	64.1BC	60.9B	62.5	62.11BC	64.67BC	63.39	53.18C	54.58B	53.88
Chickpeas 0.50%	0.65A	0.67A	0.66	2.99AB	3.06A	3.03	66.7AB	63.6A	65.2	65.68AB	68.65A	67.17	56.82AB	57.60A	57.21
Chickpeas 1.0%	0.66A	0.68A	0.67	3.03A	3.03A	3.03	68.1A	62.2A	65.2	66.53A	68.23A	67.38	57.80A	57.85A	57.83
New LSD 5%	**0.03**	**0.03**		**0.10**	**0.09**		**1.93**	**2.11**		**2.23**	**2.15**		**1.65**	**1.52**	

Table 5. Effect of spraying faba bean and chickpeas sprouts on yield components and fruit weight of Ewaise mango trees during 2019 and 2020 seasons.

Treat.	Fruit retention			No. of fruits/tree			Total yield/tree (kg)			Fruit weight		
	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean
Control (water)	0.61B	0.70B	0.66	223.8C	235.9D	229.9	41.5E	44.2E	42.9	185.8C	187.4C	186.6
Faba bean 0.25%	0.68A	0.79A	0.74	234.9B	249.8C	242.4	45.1D	49.1D	47.1	192.3B	196.9B	194.6
Faba bean 0.50%	0.69A	0.77A	0.73	247.1AB	262.3B	254.7	48.6B	53.1B	50.9	197.8A	203.1AB	200.5
Faba bean 1.0%	0.69A	0.77A	0.73	248.5AB	264.1A	256.3	49.3B	53.9B	51.6	199.6A	204.8A	202.2
Chickpeas 0.25%	0.68A	0.76A	0.72	241.4B	256.5BC	249.0	47.1C	51.2C	49.2	195.3A	200.9B	198.1
Chickpeas 0.50%	0.70A	0.78A	0.74	252.6A	271.8AB	262.2	49.8AB	55.9A	52.9	198.9A	206.5AB	202.7
Chickpeas 1.0%	0.69A	0.77A	0.73	253.2A	273.1A	263.2	50.7A	56.5A	53.6	200.8A	208.8A	204.8
New LSD 5%	**0.05**	**0.06**		**9.39**	**10.31**		**1.18**	**1.90**		**6.42**	**7.28**	

3- Fruit Quality

It is evident from Tables 6, 7 & 8 that treating faba bean and chickpeas seed sprout extract at 0.25 to 1% significantly improved the fruit quality in terms of increasing the fruit weight, pulp %, T.S.S.% and sugar contents as well as, vitamin C content and decreasing the total acidity and total fiber compared to untreated ones (control). The spraying of mango trees with 0.25 to 1% chickpeas seed sprout extract significantly improved the fruit quality more than using 0.25 to 1% faba bean seed sprout extract. The highest values of mango fruit traits were recorded on the trees that sprayed with 1.0% chickpeas seed sprout extract and compared to other treatments and untreated ones (control). On other hand, the lowest values of fruit quality were found on the trees that sprayed with water (control). No significant differences were found due to increase the concentration of any extract used from 0.50 to 1%.

The highest fruit weight (204.8 g), pulp % (72.15%), TSS (16.60%), total sugar (10.39%), V.C (48.0 mg/g) and total acidity (0.294%) due to spray chickpea at 1% chickpeas seed sprout extract. On other hand, the lowest corresponding values were (186.6 g, 64.04%, 15.33%, 9.50%, 41.0 mg/g and 0.352%), respectively, due to water sprayed (control).

Hence, the increment percentages of these traits were 9.75, 12.66, 8.25, 9.37 and 17.07% due to using 1% chickpeas, respectively. In addition, the respective decrement of total acidity was attained 16.48%.compared to (check treatment).

Hence, the cost wise evaluation of the application of faba bean or chickpeas at 0.5% three times. Such applications is very important for the production of mango fruits, since improving of the fruit quality induces an increase in the packable yield.

Discussion

Crop the higher content of all seed sprouts from nutrients amino acids ,vitamins, antioxidant and plant pigments surely reflected an enhancing growth tree, nutritional status, yield and fruit quality (Cazuola, 2004 and Cairney, 2005).

In addition, germination of seeds lead to enhance the availability of most organic and mineral nutrients (Biommerson, 2007; Anwar *et al.*,

2013 and Dhekney, 2016) the promotion on growth and tree nutrition of status surely reflected on enhancing yield and fruit quality. Our results indicated that treating the Ewaise mango trees with faba bean and chickpeas seed sprout extract at 0.5% three time improved the growth and fruiting of trees which increased the leaf area about 7.2% total chlorophyll 42.3%, N 10.2%, K 13%, yield 20%, fruit weight 8.3%, total sugars 8% and vitamin C about 16.0%. These results are in harmony with those obtained by Ebeid-Sanaa, 2007; Ibrahim *et al*., 2007; El-Sayed-Esraa, 2010; Refaai, 2014; El-Khawaga and Mansour, 2014; Ahmed, 2015; El-Sharony *et al*., 2015; Abdelaziz *et al*., 2015; Mohamed *et al*., 2015; Oraby, 2018 and Ali *et al*., 2018.

Table 6. Effect of spraying faba bean and chickpeas sprouts on some fruit quality of Ewaise mango trees during 2019 and 2020 seasons.

Treat.	Fruit pulp %			TSS ^			Total sugar %			Reducing %		
	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean
Control (water)	64.45C	63.63	64.04	15.12C	15.53C	15.33	9.35C	9.65D	9.50	2.72C	2.78C	2.75
Faba bean 0.25%	65.78BC	66.36	66.07	15.53C	15.76C	15.65	9.68B	9.98C	9.83	2.83B	2.90B	2.87
Faba bean 0.50%	68.93AB	69.50	69.22	16.10B	16.38AB	16.24	9.98AB	10.32B	10.15	2.90A	2.99AB	2.95
Faba bean 1.0%	69.28AB	69.81	69.55	16.28AB	16.35B	16.33	10.05A	10.40AB	10.23	2.91AB	2.98AB	2.95
Chickpeas 0.25%	68.60B	68.48	68.24	15.95B	16.11B	16.03	9.73B	10.05BC	9.89	2.83B	2.89B	2.86
Chickpeas 0.50%	71.83A	72.15	71.99	16.38AB	16.62AB	16.50	10.18A	10.55AB	10.37	2.96A	3.05A	3.01
Chickpeas 1.0%	72.11A	72.18	72.15	16.50A	16.70A	16.60	10.15A	10.62A	10.39	2.96A	3.08A	3.02
New LSD 5%	**3.18**	**3.06**		**0.31**	**0.32**		**0.26**	**0.28**		**0.10**	**0.11**	

Table 7. Effect of spraying faba bean and chickpeas sprouts on some fruit quality of Ewaise mango trees during 2019 and 2020 seasons.

Treat.	Non-reducing %			Total acidity %			V.C. mg/100 ml			Total fiber		
	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean	2019	2020	Mean
Control (water)	6.63D	6.87D	6.75	0.345A	0.358A	0.352	41.2C	40.8C	41.0	1.11A	1.16A	1.14
Faba bean 0.25%	6.83C	7.08C	6.96	0.326B	0.318B	0.322	43.4B	45.3B	44.4	1.03B	0.99B	1.01
Faba bean 0.50%	7.08A	7.33B	7.20	0.308C	0.299C	0.304	46.1A	48.9A	47.5	0.96C	0.92C	0.94
Faba bean 1.0%	7.14A	7.42AB	7.28	0.303C	0.292C	0.298	46.8A	48.5A	47.7	0.95C	0.91C	0.93
Chickpeas 0.25%	6.90B	7.16BC	7.03	0.318B	0.310B	0.314	44.3B	46.1B	45.2	0.98BC	0.94BC	0.96
Chickpeas 0.50%	7.22A	7.50A	7.36	0.301C	0.289C	0.295	46.6A	48.5A	47.6	0.91C	0.87C	0.89
Chickpeas 1.0%	7.19A	7.54A	7.37	0.298C	0.290C	0.294	47.1A	48.8A	48.0	0.92C	0.86C	0.89
New LSD 5%	**0.18**	**0.17**		**0.012**	**0.012**		**1.28**	**1.35**		**0.06**	**0.06**	

Conclusion

Through the results obtained, it was found that both the extracts gives a significant effect compared to the control and spraying trees sprout three times at growth started, just after fruit setting and one month later of faba bean or chickpeas at 0.5% was responsible for improving or promoting yield and fruit quality of Ewaise mango trees under Aswan Governorate and it's similar conditions.

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تأثير الرش الورقي لنبت بذور الفول والحمص علي نمو وإثمار أشجار المانجو العويس

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الملخص

أجريت هذه الدراسة خلال موسمي ٢٠١٩ ، ٢٠٢٠ علي أشجار المانجو العويس بمزرعة خاصة تقع في كوم أمبو بأسوان – مصر لدراسة تأثير رش مستخلص نبت بذور الفول والحمص علي النمو الخضري والحالة الغذائية والمحصول وخصائص الثمار – حيث تم رش مستخلص نبت هذه البذور ثلاث مرات خلال موسم النمو بتركيزات من ٠,٢٥% حتي ١%.

وقد أوضحت النتائج التالي:

- سبب الرش بمستخلص نبت بذور الفول والحمص زيادة مؤكدة في خصائص النمو الخضري والحالة الغذائية للأشجار من حيث مساحة الأوراق ومحتواها من الكلوروفيل وكذلك العناصر الغذائية مقارنة بالرش بالماء (معاملة المقارنة).
- أدت جميع المعاملات إلي زيادة مؤكدة في المحصول وتحسين خصائص الثمار من حيث زيادة وزن الثمرة وكذلك محتواها من المواد الصلبة الذائبة والسكريات وفيتامين (C) مقارنة بالرش بالماء.
- لم تسجل فروق معنوية لكل من سمات النمو الخضري والحالة الغذائية والمحصول وخصائص الثمار بزيادة تركيز محلول الرش من ٠,٥ إلي ١%، ولذا من الناحية الاقتصادية يفضل استخدام الرش بتركيز ٠,٥%.

من نتائج هذه الدراسة يمكن التوصية بأهمية الرش بمستخلص نبت أي من بذور الفول والحمص بتركيز ٠,٥% ثلاث مرات خلال موسم النمو (بداية النمو – بعد العقد مباشرة – مرة ثالثة بعد شهر) – حيث تؤدي هذه المعاملة إلي تحسين النمو الخضري والحالة الغذائية لأشجار المانجو العويس مع إنتاج محصول عال ذو خصائص ثمرية جيدة فضلاً عن تقليل التلوث الناشئ عن استخدام المواد الكيماوية في البساتين حيث أنها مستخلصات طبيعية.