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(Original Article)

Enhancing Fruiting Attributes of Naomi Mango Using Certain Growth Regulators

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Abstract

In the two seasons of 2023–2024, an experiment was conducted in Balat district of Afaq Farm, located in New Valley Governorate, Egypt to look at how gibberellin and naphthalene acetic acid affect in Mango Naomi cv. in fruit quality and yield. Three replications and seven treatments NAA (20, 40 and 80 ppm) and GA_3 (25, 50 and 100 ppm) compared with control (water spray) were used in a complete randomized block design (RCBD) experiment. Together with total soluble solids, sugar content, and vitamin C, these treatments markedly increased fruit set, fruit retention, and yield compared with control.

According to the current findings, spraying NAA at 40 or 80 ppm greatly increased fruit set, fruit retention, and yield compared to spraying water (control); on the other hand, spraying GA_3 at 50 or 100 ppm was found to be more effective on fruit retention and fruit quality. However, the fruit quality improved more successfully when GA_3 was sprayed at 50 or 100 ppm. There were no appreciable changes as a result of raising the GA_3 or NAA concentrations from 50 to 100 ppm or 40 to 80 ppm. Therefore, using 40 ppm NAA or 50 ppm GA_3 for spraying is better from an economic perspective. The productivity and quality of Naomi mango trees can be effectively increased by spraying GA_3 and NAA.

Keywords: *Fruit Quality, Gibberellic acid, Mango, Naomi, Naphthalene acetic acid, Yield.*

Introduction

In many nations, the mango (*Mangifera indica* L.), a member of the Anacardiaceae family, is referred to as the "king of fruits." In tropical and subtropical areas, mangos are a popular commercial fruit. About 50 million tons of mango fruits were produced worldwide (FAO, 2022). Mangos are the second most popular fruit in Egypt after citrus, with an estimated 309488 hectares of fruitful orchards, yielding 1429552 tons of fruit yearly (M.A.L.R. 2023).

With its fiber content, micronutrients like carbohydrates (10–32% in ripe pulp), proteins (0–5%), amino acids (alanine, arginine, glycine, serine, leucine, and isoleucine), lipids (0.75% to 1.7%), and organic acids (citric is the main organic acid, 0.13% to 0.71% Fw), the mango is a valuable fruit from a nutritional standpoint.

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(Maldonado-Celis *et al.,* 2019).

The Naomi tree is generally upright and of medium size. The leaves are reddish-brown when young. The seed has only one embryo. The flesh has a moderate flavor, is yellow in color, and has no fiber. The medium-sized fruits have an oval or rectangular form and change color when ripe. A mid-season mango is Naomi (Tomer *et al.,* 1993).

GA_3 and NAA, two plant growth regulators, are crucial for boosting fruit set, production, and quality. In contrast, naphthalene acetic acid (NAA) is also very helpful in inducing flowering, preventing the shedding of flower buds, flowers, and unripe fruits, increasing fruit size, and increasing the yield and quality of many fruits. GA_3 application is found to be more effective in achieving the maximum fruit retention percentage per panicle with an increase in fruit size and fruit weight in mango and many other fruit crops (Maurya *et al*., 2020).

The number of fruits per plant was greatly increased by the foliar treatment of 30 ppm GA_3 during the pea and marble stages of mango fruit, maximizing the overall fruit output. The foliar spray of GA_3 at 30 ppm was also found to improve the average fruit size, average fruit weight, peel weight, pulp weight, and fruit volume of mango cv. Amrapali. (Kundu *et al.,* 2023).

All vegetative growth metrics, fruit set and retention parameters, yield as measured in kilograms per tree, and the number of fruits or weight (kg) per tree were all improved by spraying mango trees with GA_3, NAA, and algal extract at all doses. Additionally, results showed that, in comparison to control, all treatments improved total soluble solids (TSS), total and reducing sugars, and ascorbic acid in both seasons, while also marginally increasing all fruit physical attributes. In contrast to the control treatment, it decreased the percentage of acidity. When compared to control and other treatments, spraying mango trees with GA_3 at 40 ppm produced the greatest outcomes for all criteria and the highest values in both seasons. (Abd El-Rhman *et al.,* 2017).

In particular, the 50 ppm NAA treatment in Keitt mango trees outperformed GA_3 and citric acid in terms of improving the features under study. Therefore, to improve fruiting and fruit quality on Keitt mango trees, it is better to spray NAA at 50 ppm at full bloom and two months later. (Osama *et al*., 2015).

Fruit retention and fruit drop were considerably reduced when Zebda mango trees were treated with 30 ppm NAA and 50 ppm GA_3 during the pea stage. Applying a 50 ppm NAA treatment at full bloom and two months later (the second date) had the greatest beneficial impact on the Keitt mango trees' investigated fruiting and fruit quality characteristics. (El Gammal *et al.,* 2015; Kassem and Marzouk, 2004).

Under Sohag Governorate circumstances, foliar treatments of 3000 ppm fulvic acid and 45 ppm NAA improve the vegetative growth and nutritional status of "Taimour" mango trees and yields a high yield of high-quality fruit. Hussein *et al*., (2023)

Fruit set, fruit retention, fruit weight, fruit output, and the number of fruits per cluster and per plant were all greatly enhanced when "Keitt" mango trees were sprayed with 25 mg/l of GA_3 or NAA during full bloom. Among these horticulture techniques

that lower fruit drop and improve mango output and quality are foliar sprays of growth regulators NAA and GA_3. (Muarya and Singh, 1981; Anila and Radha, 2003 and Nkansah *et al*., 2012). Therefore, the purpose of the current study was to use certain growth regulators to improve the fruiting characteristics of the Naomi mango.

Materials and Methods

Mango trees cultivated in the Balat district on the farm of Afaq, New Valley Governorate, Egypt (25°32'22.8"N 29°10'44.4"E) were the subject of the current study during the two consecutive seasons of 2023 and 2024. The horticulture department of New Valley University's Faculty of Agriculture in Egypt conducted the laboratory analysis. At the start of the trial, the trees were 8 years old, spaced 2 by 3 meters apart, and were under drip watering. They were healthy, had comparable development, and were free of various injuries. Every horticultural procedure, including fertilization, irrigation, and disease and pest management, was carried out Hobbs (2003).

The following seven spray treatments were done twice, as shown in Table1, three replicates, two trees each, were used in a randomized complete block design.

Table 1. Dose and time of application for each treatment

Treatments	Treatment Details	Dose of application
T1	NAA (20 ppm)	Spraying at bloom stage and 15 later
T2	NAA (40 ppm)	Spraying at bloom stage and 15 later
T3	NAA (80 ppm)	Spraying at bloom stage and 15 later
T4	GA_3 (25 ppm)	Spraying at set stage and 15 day later
T5	GA_3 (50 ppm)	Spraying at set stage and 15 day later
T6	GA_3 (100 ppm)	Spraying at set stage and 15 day later
T7	control	Spraying water at bloom stage and 15 later

To evaluate the effect of these treatments on yield and fruit quality, the following parameters were studied:

1. **Yield parameters**
   a. **Fruit set%**: fruit set percentage was calculated by dividing number of fruit set at pea stage per panicle to number of hermaphrodite flowers and expressed in percentage.

$$\text{Fruit set \%} = \frac{\text{Number of fruit set}}{\text{Total number of perfect flowers}} \times 100$$

   b. **Fruit retention%:** fruit retention percentage was calculated by dividing number of fruits at mature stage per panicle to the number of hermaphrodite flowers and expressed in percentage.

$$\text{Fruit retention \%} = \frac{\text{Number of fruits at mature stage}}{\text{Total number of perfect flowers}} \times 100$$

   c. **Yield per tree:** The yield per tree (kg) was calculated by multiplying the average fruit weight (g) by the total number of tree fruits.
2. **Fruit quality parameters:** At harvest time, ten ripe fruits from each tree were sampled in order to assess their physical and chemical characteristics.

a. **Fruit physical characteristics:** Fruit weight (g), fruit dimensions (in cm) as determined by the Vernier Caliper, and the percentage of fruit pulp and peel were also noted.
b. **Fruit chemical characteristics:** Total soluble solids (T.S.S.) were measured using a hand refractometer. The percentage of total acidity was calculated as g citric acid/100 g F.Wt., total sugars %, reducing sugars %, and vitamin C content (mg/100 ml juice) according to A.O.A.C. (2000).

Statistical analysis

According to Snedecor and Cochran (1990), a complete randomized block design with three replications and a factorial was used throughout the entire study. The least significant difference (NEU LSD) test was performed at the 5% level to distinguish between means.

Results

Yield components and fruit characters

The data represented in Table (2) declared the effect of the spraying of Naomi mango trees with NAA and GA_3 during 2023 and 2024 seasons. It appears that the results followed the same trend during the two studied seasons.

The previous data showed that spraying NAA at 40 or 80 ppm significantly increased the fruit set, fruit retention and hence yield per tree compared to spray water (check treatment) of Naomi mangoes, moreover, spraying GA_3 at 50 or 100 ppm significantly stimulated the fruit retention and yield per tree.

The maximum values for yield components were recorded on trees sprayed with NAA at 80 ppm (T3), followed by spraying NAA at 40 ppm (T2), spraying GA_3 50 ppm (T5) and 100 GA_3 ppm (T6). On other hand, the minimum values were observed in the control treatment (T7). Therefore, the corresponding increment of fruit set over control was (53.90%), fruit retention was (45.71%) and yield per tree was (46.69%) due to spray 80 ppm NAA (T3) compared to control (T7) as average of the two studied seasons, respectively.

The recorded yield per tree were (13.53, 15.00, 15.05, 13.40, 14.51, 14.38 and 10.26 kg/tree as an average of two studied season) for trees that sprayed with NAA at 20 ppm, NAA at 40 ppm, NAA at 80 ppm, GA_3 at 25 ppm, GA_3 at 50 ppm, GA_3 at 100 ppm and (control), respectively.

Hence, the increment percentage of yield/ tree attained (41.19, 46.20, 46.69, 30.60, 41.42 and 40.16 as. an. av. the two studied seasons) due to (T1 to T6) compared to (T7), respectively.

No significant differences were found as a result of increasing NAA concentrations from 40 to 80 ppm or GA_3 from 50 to 100 ppm. Therefore, from an economic standpoint spraying with 40 ppm NAA or 50 ppm GA_3 is preferable.

Table 2. Effect of spraying NAA and GA_3 on Yield components of mango cv. Naomi during 2023 and 2024 seasons

Treatments	Fruit set %			Fruit retention %			Yield/tree(kg)		
	2023	2024	Mean	2023	2024	Mean	2023	2024	Mean
T1	1.73B	1.67B	**1.70B**	22.76A	22.81A	**22.79A**	13.11B	13.95B	**13.53B**
T2	1.91A	1.93A	**1.92A**	22.82A	23.45A	**23.14A**	14.61A	15.38A	**15.00A**
T3	1.95A	1.98A	**1.97A**	23.61A	23.89A	**23.75A**	14.56A	15.53A	**15.05A**
T4	1.28C	1.30C	**1.29C**	18.12B	18.20B	**18.16B**	12.99B	13.81B	**13.40B**
T5	1.28C	1.32C	**1.30C**	18.15B	18.21B	**18.18B**	14.06AB	14.96AB	**14.51A**
T6	1.27C	1.29C	**1.28C**	18.09B	18.23B	**18.16B**	13.88AB	14.88AB	**14.38A**
T7	1.26C	1.30C	**1.28C**	16.28C	16.31C	**16.30C**	9.97C	10.55C	**10.26C**
NEW LSD 5%	**0.09**	**0.08**	**0.06**	**1.68**	**1.55**	**1.16**	**1.10**	**1.16**	**0.82**

T1: spraying NAA at 20 ppm, T2: spraying NAA at 40 ppm, T3: spraying NAA at 80 ppm, T4: spraying GA_3 at 25 ppm, T5: spraying GA_3 at 50 ppm, T6: spraying GA_3 at 100 ppm and T7 (control): spraying water.

Fruit physical quality

It is evident from Tables (3 and 4) that spraying with NAA and GA_3 significantly improved the fruit quality in terms of increasing the fruit weight, fruit dimensions as well as pulp % and decreasing peel % compared to spray with water (control). The highest values of fruit traits were recorded on the trees that were sprayed with GA_3 at 100 ppm (T6) and GA_3 at 50 ppm (T5), respectively. Therefor the corresponding increment of fruit weight over control was (34.30 and 36.00%), fruit length was (29.03 and 30.13%), fruit diameter was (29.13 and 30.53%), pulp percentage was (6.04 and 6.30%), during the two seasons studied, respectively.

Table 3. Effect of spraying NAA and GA_3 on Fruit weight (g) and fruit dimension of mango cv. Naomi during 2023 and 2024 seasons

Treatments	Fruit weight (g)			Fruit length (cm)			Fruit diameter (cm)		
	2023	2024	Mean	2023	2024	Mean	2023	2024	Mean
T1	368.36C	416.80C	**392.58C**	13.94C	15.11C	**14.53C**	7.82C	8.41C	**8.12C**
T2	354.42C	401.70C	**378.06CD**	13.52C	14.68C	**14.10C**	7.61C	8.18C	**7.90C**
T3	351.26C	398.60C	**374.93D**	13.41C	14.52C	**13.97C**	7.54C	8.13C	**7.84C**
T4	391.83B	446.30B	**419.07B**	14.87B	16.10B	**15.49B**	8.41B	9.05B	**8.73B**
T5	419.95A	468.60A	**444.28A**	15.83A	16.96A	**16.40A**	8.88A	9.56A	**9.22A**
T6	423.25A	476.50A	**449.88A**	15.98A	17.10A	**16.54A**	8.96A	9.67A	**9.32A**
T7	322.10D	339.50D	**330.80E**	12.23D	13.18D	**12.71D**	6.87D	7.41D	**7.14D**
NEW LSD 5%	**19.32**	**21.38**	**14.82**	**0.93**	**0.98**	**0.71**	**0.48**	**0.53**	**0.37**

T1: spraying NAA at 20 ppm, T2: spraying NAA at 40 ppm, T3: spraying NAA at 80 ppm, T4: spraying GA_3 at 25 ppm, T5: spraying GA_3 at 50 ppm, T6: spraying GA_3 at 100 ppm and T7 (control): spraying water.

Table 4. Effect of spraying NAA and GA_3 on pulp and peel percentage of mango cv. Naomi during 2023 and 2024 seasons

Treatments	Pulp %			Peel %		
	2023	2024	Mean	2023	2024	Mean
T1	82.63A	83.65A	**83.14A**	13.46C	13.33C	**13.40C**
T2	81.87A	82.91A	**82.39A**	14.10B	13.94B	**14.02B**
T3	81.53A	82.96A	**82.25A**	14.22B	14.05B	**14.14B**
T4	83.11A	84.18A	**83.65A**	13.29C	13.16C	**13.23E**
T5	83.62A	84.56A	**84.09A**	12.86D	12.71D	**12.79D**
T6	83.85A	84.75A	**84.30A**	12.81D	12.67D	**12.74D**
T7	78.91B	79.68B	**79.30B**	14.68A	14.56A	**14.62A**
NEW LSD 5%	**2.83**	**3.11**	**2.16**	**0.38**	**0.41**	**0.28**

T1: spraying NAA at 20 ppm, T2: spraying NAA at 40 ppm, T3: spraying NAA at 80 ppm, T4: spraying GA_3 at 25 ppm, T5: spraying GA_3 at 50 ppm, T6: spraying GA_3 at 100 ppm and T7 (control): spraying water.

The recorded fruit weight were (392.58, 378.06, 374.93, 419.07, 444.28, 449.88and 330.80 g) and pulp percentage were (83.14, 82.39, 82.25, 83.65, 84.09, 84.30 and 79.30 %), and Peel percentage were (13.40, 14.02, 14.14, 13.23, 12.79, 12.74 and 14.62 % as an average of two studied season) for the trees that sprayed with NAA at 20 ppm, NAA at 40 ppm, NAA at 80 ppm, GA_3 at 25 ppm, GA_3 at 50 ppm, GA_3 at 100 ppm and water (control), respectively. Hence, the increment of fruit weight above the control was attained (18.68, 14.29, 13.34, 26.68, 34.30 and 36.00% as an average of two studied season) due to (T1 to T6), respectively.

No significant differences due to increasing the NAA concentrations from 40 to 80 ppm or GA_3 from 50 to 100 ppm. So, from an economic standpoint spraying is preferable was 40 ppm NAA or 50 ppm GA_3.

Fruit chemical quality

Table 5 and 6 shows the chemical components of fruit juice and their impact on the spraying NAA and GA_3 during the 2023 and 2024 seasons. The data showed that all treatments led to a significant improvement in the chemical ingredients of fruit juice in terms of high values, total soluble solids, total sugar, reducing Sugar**,** Vitamin C and a significant decrease in total acidity compared to the control. The highest percentage of total soluble solids, total sugar, reducing Sugar**,** Vitamin C as well as the lowest total acidity were obtained in trees that sprayed with NAA at 80 ppm (T3). Therefore, the corresponding increment of TSS over control was (7.95%), total sugar was (6.89%), reducing sugar was (7.76%), Vitamin C was (25.35%) and total acidity was (22.22%) during the two seasons studied, respectively.

Table 5. Effect of spraying NAA and GA_3 on percentage of TSS, total sugars and reducing sugars of mango cv. Naomi during 2023 and 2024 seasons

Treatments	TSS%			Total Sugars %			Reducing Sugars %		
	2023	2024	Mean	2023	2024	Mean	2023	2024	Mean
T1	12.98A	13.22A	**13.10A**	10.51A	10.88A	**10.70A**	4.87A	5.10A	**4.99A**
T2	13.06A	13.11A	**13.09A**	10.63A	10.77A	**10.70A**	4.91A	5.08A	**5.00A**
T3	12.93A	13.45A	**13.19A**	10.48A	10.69A	**10.59A**	4.87A	5.10A	**4.99A**
T4	13.73A	12.89A	**13.31A**	10.35A	10.56A	**10.46A**	4.79A	4.93A	**4.86A**
T5	12.69A	12.91A	**12.80B**	10.41A	10.51A	**10.46A**	4.83A	4.90A	**4.87A**
T6	12.81A	12.95A	**12.88B**	10.44A	10.52A	**10.48A**	4.83A	4.95A	**4.89A**
T7	12.25B	12.41B	**12.33C**	9.92B	10.10B	**10.01B**	4.60B	4.68B	**4.64B**
NEW LSD 5%	**0.43**	**0.39**	**0.30**	**0.33**	**0.39**	**0.26**	**0.18**	**0.21**	**0.14**

T1: spraying NAA at 20 ppm, T2: spraying NAA at 40 ppm, T3: spraying NAA at 80 ppm, T4: spraying GA_3 at 25 ppm, T5: spraying GA_3 at 50 ppm, T6: spraying GA_3 at 100 ppm and T7 (control): spraying water.

The recorded TSS were (13.10, 13.09, 13.19, 13.31, 12.80, 12.88 and 12.33%), Vitamin C were (38.23, 38.75, 40.20, 38.25, 38.48, 39.20 and 32.07%) and total acidity were (0.220, 0.220, 0.210, 0.230, 0.230, 0.220 and 0.270% as an average of two studied season) for the trees fruits that's sprayed with NAA at 20 ppm (T1), NAA at 40 ppm (T2), NAA at 80 ppm (T3), GA_3 at 25 ppm (T4), GA_3 at 50 ppm (T5), GA_3 at 100 ppm (T6) and water (control, T7), respectively. No significant differences due to increasing the NAA concentrations from 40 to 80 ppm or GA_3 from 50 to 100 ppm. So, from an economic standpoint spraying with 40 ppm NAA or 50 ppm GA_3 is preferable.

Table 6. Effect of spraying NAA and GA_3 on Vitamin C content and percentage of Acidity of mango cv. Naomi during 2023 and 2024 seasons

Treatments	Vitamin C (mg/ 100 ml Juice)			Acidity %		
	2023	2024	Mean	2023	2024	Mean
T1	37.90B	38.55B	**38.23B**	0.220BC	0.216C	**0.220C**
T2	38.40A	39.10AB	**38.75B**	0.219BC	0.220C	**0.220C**
T3	39.80A	40.60A	**40.20A**	0.214C	0.210C	**0.210D**
T4	37.83B	38.66AB	**38.25B**	0.231B	0.228BC	**0.230B**
T5	38.10AB	38.85AB	**38.48B**	0.228B	0.225BC	**0.230B**
T6	38.81AB	39.58AB	**39.20AB**	0.225B	0.223BC	**0.220C**
T7	31.72C	32.41C	**32.07C**	0.274A	0.270A	**0.270A**
NEW LSD 5%	**1.84**	**1.96**	**1.37**	**0.025**	**0.021**	**0.017C**

T1: spraying NAA at 20 ppm, T2: spraying NAA at 40 ppm, T3: spraying NAA at 80 ppm, T4: spraying GA_3 at 25 ppm, T5: spraying GA_3 at 50 ppm, T6: spraying GA_3 at 100 ppm and T7 (control): spraying water.

Hence in general view, spraying NAA at 40 ppm and GA_3 at 50 ppm proves to be more effective in improving mangoes quality.

Discussion

Spraying plant growth regulators was a key factor in increasing mango productivity. Mango foliar spraying of plant growth regulators has been shown in previous research to significantly improve flowering and production characteristics. (Parauha and Pandey (2019).

Higher plants naturally produce organic compounds known as phytohormones or plant growth regulators (PGRs), which regulate growth or other physiological processes at a location distant from their place of production and are active in trace amounts when applied in modest concentrations. In order to increase the production of high-quality fruits, contemporary crop husbandry has made the use of plant growth regulators an essential component. Cell division, cell expansion, and cell differentiation are all regulated by it. In this way, they regulate dormancy, senescence, and organogenesis from the germination stage until fruiting. Additionally, they are crucial in controlling physiological processes like sugar metabolism, stomata aperture control, and plant stress responses Lopez-Lauri (2016) and Suman *et al.* (2017).

Gibberellins are plant hormones that control a number of developmental processes, including stem elongation, flowering, germination, fruit and leaf senescence, etc. Mango trees may produce more fruit with improved fruit set, quality, and yield if gibberellins are applied at the flower bud differentiation stage or full bloom Sarker and Ghosh (2005) and Singh *et al.* (2018)

One of these horticulture techniques that lowers fruit drop and improves mango output and quality is the application of NAA and GA_3 spraying (Anila and Radha, 2003). Additionally, foliar spraying mango trees with NAA and GA_3 increased fruit quality and yield while decreasing fruit drop (Vejendla *et al.*, 2008 and Nkansah *et al.,* 2012).

According to our findings, foliar spraying with CA_3 or NAA improves fruit retention by approximately 11.53 to 41.96%, yield per tree by approximately 41.42 to 46.20%, fruit weight by 14.29 to 34.30%, and total soluble solid by approximately 3.81 to 6.16 percent compared to control. Additionally, the current study's findings concur with those of Anila and Radha (2003), Kassem and Marzouk (2004), Nkansah *et al.*

(2012), El Gammal *et al.* (2015), Osama *et al.* (2015), Abd El-Rhman *et al.* (2017), Kundu *et al.,* 2023, and Hussein *et al.* (2023). Their research revealed that spraying GA_3 or NAA was beneficial for increasing mongo tree fruiting.

Conclusion

These studies showed that all of the examined features significantly increased and improved as a result of the different spraying treatments compared to the control. The highest yield and best fruit quality were obtained from twice spraying with NAA at 40 ppm and GA_3 at 50 ppm on Naomi mango trees.

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تحسين خصائص إثمار المانجو الناعومي باستخدام بعض منظمات النمو

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الملخص

تم إجراء هذه الدراسة خلال موسمي 2023، 2024 بهدف دراسة تأثير رش بعض منظمات النمو على إنتاجية وخصائص ثمار المانجو الناعومي المنزرعة في مزرعة آفاق بمنطقة بلاط، محافظة الوادي الجديد، مصر. اشتملت الدراسة على رش حمض النفثالين أسيتيك (NAA) بتركيزات 20 جزء في المليون، 40 جزء في المليون، 80 جزء في المليون، بالإضافة إلى رش حمض الجبريلين (GA_3) بتركيزات 25 جزء في المليون، 50 جزء في المليون، 100 جزء في المليون، مقارنة بمعاملة رش بالماء (المقارنة) وقد صممت التجربة بنظام القطاعات كاملة العشوائية.

ويمكن تلخيص النتائج كالتالي:

- أدي رش حمض النفثالين أسيتيك (NAA) إلي زيادة معنوية في نسبة العقد الابتدائي والنهائي للأشجار وبالتالي زيادة وزن المحصول لكل شجرة مقارنة برش الماء (معاملة الكنترول) .

- سبب الرش بحمض الجبريلين (GA_3) زيادة نسبة العقد النهائي ووزن وأبعاد الثمار وأيضاً زيادة نسبة اللحم وتقليل نسبة القشرة للثمرة مقارنة برش المياه (معاملة الكنترول) .

- أدي الرش بحمض النفثالين أسيتيك (NAA) وحمض الجبريلين (GA_3) إلي زيادة مؤكدة في المواد الصلبة الذائبة الكلية ومحتوي الثمار من السكريات ونقص مؤكد في نسبة الحموضة في العصير مقارنة برش الماء (معاملة الكنترول) .

- من نتائج هذه الدراسة يمكن التوصية بأهمية رش أشجار المانجو الناعومي بحمض النفثالين أسيتيك (NAA) بتركيز 40 ppm أو حمض الجبريلين (GA_3) بتركيز 50 ppm مرتين وذلك لتحسين الإنتاجية وانتاج محصول ذو خصائص ثمرية جيدة.

الكلمات المفتاحية: *المحصول، المانجو الناعومي، حمض النفثالين أسيتيك، حمض الجبريلين، جودة الثمار*