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EFFECT OF GIBBERELLIC ACID TREATMENTS ON GROWTH AND SOME METABOLIC PRODUCTS OF ROSELIE PLANT

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Abstract

This present investigation was conducted in the experimental Farm of Medicinal and Aromatic Research Section, during two successive seasons 1988 and 1989. Four GA_3 concentrations 0.100 , 200 and 300 ppm were used in this study. The obtained results showed that GA_3 treatments caused a significant increase in height of plants, number of fruits per plant, weight of dry sepales per plant, weight of dry sepales per plot, anthocianin content in dry sepals and total organic acid in sepals.

INTRODUCTION

Roselle (*Hibiscus sabdariffa* L.) belongs to the family Malvaceae.

It is cultivated for the fleshy calyx from which Jelly, jam and kind of tea named, "kerkeded", etc., are prepared (Kirby 1963).

The young leaves and shoots are eaten as salad or as pot herb in some countries (Brouk 1975). The calyeces decoction or infusion may be used as an hybotensive agent, since it lowers blood pressure without producing side effect (Sharaf, 1962).

Nowadays, there is tendency of expansion the cultivation of new crops all over the Nile valley. Roselle fruits ripe in November this date is unsuitable in the midle and north of Nile valley in Egypt because of the high humidity and rains which reduce the value of flower sepals and caused waiste in sepals.

This work aimed however, to study the effect of gibberellic acid treatments on the growth, flower, fruits and chemical contents of sepals.

MATERIALS AND METHODS

The present study was carried out during seasons of 1988 and 1989 at the experimental Farm of Medicinal and Aromatic Research section, Ministry of Agriculture, Dokki, Egypt.

The expirments were designed as completely randomized Blocks in 3 replicates. Expermintal plots were 2 x 3=6 M2, included 4 ridges spaced 50 cm apart and 50 cm distance between plants. The date of sowing was April 5th in a nursery, then after 35 days plants were transplanted.

A guard row between every two treatments was left. Seeds were obtained from the Medicinal and Aromatic plants in Seds.

Gibberelic acid was used in this experiments at concentrations of 0, 100, 200, and 300 ppm.

The GA_3 concentrations were sprayed on June.9 th. The Plants were observed for the first flower.

Ten plants from each treatments were collected in complete form on November 10th (the end of plant life) and following data were recorded. Plant height, fruit number per plant, dry weight of sepals per plant, dry weight of sepals per plot, percentage of organic acid in dry sepals and anthocyanen content in dry sepals was determined according to the procedure described by Fuleki and Francis 1968.

All obtained data subjected to the statistical analysis recommended by Snedecor (1967).

RESULTS AND DISCUSSION

Effect of GA_3 on height of plants:

Data presented in Table 1 show that there were significant increases in height of plants due to the effect of GA_3 on cells ellongation of the stem.

These results are in harmony with those obtained by Hard-h (1958) on *Chrysanthemum* spp, Poole, and Ying (1984) on *Ghrysanthemum morifolium*, L. Salem (1984) on *Chrysanthemum frutescens* L, and AL-Mulla (1985) on *Tagetes arecta* L *and Zinnia elegans* Jacq, they reported that application of GA_3 increased stem length. The effect of GA_3 on increasing plant height may be due to the effect of GA_3 on promoting the internodal length, cell enlargement and the number of stem nodes. This may explain also the basis of the increase in the membrane permeability as mentioned by Wood and Paley (1972). It also may be due to the effect of GA_3 on stimulating auxin action as described by Kuraishi and Muir (1963). In addition, this effect may be due to the direct possible effect of GA_3 on both cell division and cell enlargement as mentioned by Sachs *et al.* (1959). Sachs and Lanf (1957), on *Hyscyamus niger* L., plants showed that, the stem elongation caused by GA_3 application is a result of a great increase in the number of cell divisions in the subapical region of the stem.

Effect of GA_3 on the number of day to first flower and number of flower:

It is clear from data listed in Table 1 that there was a significant decrease in the number of days to the first flower by using GA_3 treatments. These results may be due to the effect of GA_3 on reduce juvonile phase.

Data listed in Table 1 show that there was a significant increase in the number of fruits per plant due to GA_3 application this result may be due to the effect of GA_3 on reduce juvonile phase in plant and faces suitable condition for fertility. These results are in harmony with those obtained by. Baz (1970) on Gerbera Jamesonii and Agina (1980) on Tagetes spp. They reported that spraying plants with GA_3 increased the number of flower per plant.

Table 1. Effect of GA_3 treatments on height of plants and fruits number per plant in 1988 and 1989.

GA_3 Conc.	Plant height		Number of days for first flower		Fiurt number	
ppm	1988	1989	1988	1989	1988	1989
0	145.7	190.3	160	158	10.0	18.3
100	166.7	191.0	146	146	22.7	32.3
200	196.7	223.0	147	145	43.3	31.0
300	219.3	227.7	147	146	15.7	44.0
L.S.D. at 0.05	8.4	22.1	1.4	2.4	1.4	2.3

Effect of GA_3 on yield of dry sepals per plant and per plot:

Data listed in Table 2 show that there was a significant increase in yield of dry sepals per plant. This result may be due to the increase of the number of fruits per plant.

Data presented in Table 2 clear that there was a significant increase in yield of dry sepals per plot. This results may be due to the increase of yield of dry sepals per plant which gave the same trend.

Effect of GA_3 on organic acid and anthocyanin content in dry sepals:

Data illustrated in Table 3 show that there was a signifecant increase in percentage of organic acid in sepals by using GA_3 treatments this results may be due to the effect of GA_3 on early flowering which faces a suitable condition for increase organic acid in sepals.

Data listed in Table 3 clearr that there was a significant increase in anthocyanin content in sepals. This result may be due to the effect of GA_3 on early flowering which was suitable condition for anthocyanin content.

Table 2. Effect of GA_3 treatments on yield on dry sepals per plant and per plot in 1988 and 1989.

GA_3 Conc.	Yield of dry sepals per plant (g)		Yield of dry sepals per plot (g)	
ppm	1988	1989	1988	1989
0	09.57	07.50	180.8	229.6
100	12.03	19.90	477.6	288.8
200	12.50	25.50	621.6	300.0
300	16.74	21.90	526.4	401.6
L.S.D. at 0.05	00.14	0.66	52.7	12.8

Table 3. Effect of GA_3 treatments on roselle content of anthocyanineand organic acid content.

GA_3 Conc.	Percentage of organic acids		Anthocyanine content mg/100g	
ppm	1988	1989	1988	1989
0	8.30	8.53	447.200	472.60
100	9.70	9.42	894.700	909.40
200	9.87	8.87	2175.70	2345.0
300	10.50	8.73	2061.00	2060.2
L.S.D. at 0.05	0.84	1.12	0.41	35.32

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تأثير المعاملة بالجبريلين على النمو وبعض منتجات التمثيل لنبات الكركديه

مرتضى رضا خاطر

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أستخدمت GA_3 رشا على المجموع الخضرى بمعدل ٠ ، ١٠٠ ، ٢٠٠ ، ٣٠٠ جزء فى المليون وكانت النتائج كالآتى : –

أدت المعاملة بالجبرلين الى زيادة معوية فى إرتفاعات النباتات وعدد الثمار فى الوزن الجاف للسبلات للنبات الواحد وللقطعة التجريبية .

وكذلك زياده فى الأنثوسيالنين والأحماض العضوية الكلية للسبلات.