

# Effect of IBA on rooting cuttings of carnation flowers (*Caryophyllium aromaticus*) in three environments Various acidic

Maryam ghofrani<sup>1\*</sup>, Abdolkarim ejraei<sup>2</sup> and Abdolhossein abotalebi<sup>2</sup>

1. M.Sc Horticulture Student of Jahrom Islamic Azad University

2. Jahrom Islamic Azad University

**Corresponding author:** Maryam ghofrani

**ABSTRACT:** Carnation is the scientific name *Caryophyllium aromaticus* the family Caryophyllaceae. It is native to the islands of Indonesia and the Pacific and because there's a certain beauty in most parts of the world are grown as ornamental trees. In this study, the effect of the hormone concentrations of indole butyric acid (IBA) on the rooting of cuttings of carnation flowers in chemical environment with pH=6, were evaluated. Therefore, concentrations of zero (control), 200, 400, 600 and 800 ppm of IBA in the three media types with pH=6 of organic acid called citric acid, sulfuric acid and acetic acid were used. Cuttings for 8 h in medium containing various concentrations of auxin were then cultured mixture of sand and peat moss that had been transferred. Seventy-five days after planting cuttings include root traits and shoot dry weight, root number and root number of rooted cuttings were measured. Statistical design applied in this study was a completely randomized design with 15 treatments and three replications. Based on the results of the sulfuric acid concentration of 400 ppm IBA rooting cuttings in the best of grenadine.

**Keywords:** Carnation, IBA, pH soils.

## INTRODUCTION

Caryophyllaceae *Dianthus* dark green grass and shrub branches and twigs are sometimes compact plants with padding or cushion-shaped form. The leaves are simple, sans serif, thin, elongated or are awl-like (Khaliq, 1379). The scientific name of the family Caryophyllaceae with *Caryophyllium aromaticus* clove is native to Indonesia and the Pacific Islands, and because there's a certain beauty in most parts of the world are grown as ornamental trees. However, in cold regions, the plant is kept in the greenhouse and hot house. Clove is a small conical tree that never leaves yellow and not green all year round. The tree reaches a height of 10 meters (Ghasemi, 1390). One of the most common and yet most simple methods of plant propagation using cuttings which may be similar to that of hardwood cuttings, semi-woody cuttings, green cuttings, root cuttings, leaf cuttings, buds, leaves and cuttings, to (light, 1389). Part of the stem or leaf cuttings are separated from the mother plant and is suitable for rooting. The most common types of cuttings, stem cuttings in that part of the stem, which has several lateral or terminal bud is separated from the mother plant and the environment have been rooting for the root to grow in an environment independent (Khaliq, 1379). Plant hormones refers to certain substances made in the organism and the transfer of tangible physiological effects on the densities of other parts of the plant leave is very low, active (teacher and Chehrazai, 1382). Auxin, a plant hormone that a wide range of developmental responses in plants are due. One of the most common and the most common auxin indole acetic acid (IAA) and indole Bvtryk acid (IBA) pointed out. The main effects that have been attributed to auxin are: cell division and cell enlargement herbal plant stem elongation, root production, timber production, nutrient, apical bud growth, prevent the growth of lateral buds, fruit formation, fruit enlarging, prevent leaf loss, protein biosynthesis and other effects (teacher and Chehrazai, 1382). (Rahemi et al., 1386) used two types of synthetic auxin indole Bvtryk acid (NAA) on rooting hard wood cuttings of peach and almond hybrids in terms of space and found that indole Bvtryk acid significantly increased the rooting percentage than any other has been treated. In another study by (Gupta et al., 2005) paper on rooting cuttings, flowers and figures Pahary Mahara Mist by auxin and a shift took place, it was concluded that the treatment with the highest concentration of

4000 ppm of IBA rooting and propagation of the variety of Palawan. (Blazich ,1988) reported The solution is to increase the use of plant growth regulators IBA rooting cuttings and quality of rooted plants and IBA concentration on rooting cuttings of plants in different ways depending on the ppm use between 20,000 to 10 are. (Blythe ,2004) Effect of different concentrations of IBA and NAA on rooting cuttings of *Camellia japonica* examined and observed that the concentration of 3000 ppm IBA and (IBA 2500 + NAA 1250 ppm) increased rooting percentage the cuttings were substantial. (Teacher and Chehrazi ,1382) The effect of hormone auxin on rooting cuttings of leafy and non-leafy rosette (*Bougainvillea spectabilis*) in plastic tunnels Their leafy cuttings with IBA at 1000 ppm were treated with 90 had the highest percentage of rooting. The main objective of this study was to investigate the effects of pH 6 medium on rooting of cuttings of carnation flowers so that the plant rooting response to three types of organic acid called citric acid, sulfuric acid and acetic acid with pH 6 conditions evaluated and should be investigated.

### MATERIALS AND METHODS

In this study, the effect of concentrations of indole butyric acid (IBA) on the rooting of cuttings of carnation flowers in medium with a pH of 6 was evaluated. Therefore, concentrations of zero (control), 200, 400, 600 and 800 ppm of IBA hormone was prepared. Medium with a pH of 6 to produce three types of organic acid called citric acid, malic acid and acetic acid were used. After preparation of the samples, prepared cuttings in 30 seconds Benomyl 5/2 per thousand, followed by the cuttings were disinfected for 8 hours Drzymarhay made of a mixture of medium and the Cuttings moved out of the sand and peat moss. Seventy-five days after planting cuttings include root traits and shoot dry weight, root number and root number of rooted cuttings were measured. As mentioned above, in this research, five treated and five levels of pH levels IBA will have a total of 15 treatments. Statistical design applied in this study was a completely randomized design with 15 treatments and three replications and 10 cuttings were placed in each iteration. Statistical analysis using SPSS software and Duncan mean comparison test was performed at ( $P \leq 0.05$ ).

### RESULTS AND DISCUSSION

#### Results

##### Roots number

Average data using Duncan test at 5% level showed that levels of hormones, IBA and three organic acid with a pH of 6 has a significant effect on the number of roots. The highest value obtained from roots among treatments (IBA hormone levels of sulfuric acid and 400 mg l) is the minimum number of root treatment (IBA hormone levels of citric acid and 800 mg L ) is a hormone treatment given to most surfaces and various acids has been shown to significantly decrease. (Table 1).

Table 1 . Comparison of different levels of hormones, IBA and 6 of pH in the acidic environment of the roots

(IBA) mg / lit	acetic acid	sulfuric acid	citric acid
zero	13/33ab	7/66cd	13ab
200	10bc	10bc	12ab
400	3/66de	15/6a	7/33cd
600	5de	5/4de	5de
800	6cde	4/55de	2/5e

†Means in each column having the same letter, have not significant difference ( $P \leq 0.05$ ) according to DMRT

##### Root fresh weight

Average data using Duncan test at 5% level showed that levels of hormones, IBA and three organic acid with a pH of 6 to have significant effects on the fresh weight of roots. The highest value obtained among treatments in root fresh weight (IBA hormone levels of sulfuric acid and 400 mg l) is obtained from the lowest root fresh weight (IBA hormone levels of acetic acid and 800 mg l) is the treatment given to the most significant decrease in hormone levels and various acids is shown. (Table 2).

Table 2 . Comparison of different levels of hormones, IBA and 6 of pH in the acidic environment of the fresh weight of roots

(IBA) mg / lit	acetic acid	sulfuric acid	citric acid
zero	2/41i	5/2g	2/5i
200	16/5c	16c	3/48h
400	2/6i	41a	7f
600	/50j	13d	8e
800	/40j	17/9b	/81j

†Means in each column having the same letter, have not significant difference ( $P \leq 0.05$ ) according to DMRT

**Root dry weight**

Average data using Duncan test at 5% level showed that levels of hormones, IBA and three organic acid with a pH of 6 has a significant effect on root dry weight. The highest value obtained root dry weight between treatments (IBA hormone levels of sulfuric acid and 400 mg l) is the minimum number of root treatment (IBA hormone levels of acetic acid and 800 mg l) is the treatment given to the most significant decrease in hormone levels and various acids is shown. (Table 3).

Table 3 . Comparison of different levels of hormones, IBA and 6 of pH in the acidic environment of the dry weight of roots

(IBA) mg / lit	acetic acid	sulfuric acid	citric acid
zero	/54f	1/33d	/55f
200	2b	2b	/87e
400	/40f	6a	2b
600	/12g	1/5cd	1e
800	/08g	1/6c	/13g

†Means in each column having the same letter, have not significant difference (P ≤ 0.05) according to DMRT

**Branch length**

Average data using Duncan test at 5% level showed that levels of hormones, IBA and three organic acid with a pH of 6 has a significant effect on shoot length. The highest value obtained during field among treatments (IBA hormone levels of citric acid and 200 mg) and minimum branch length of treatment (IBA hormone levels of acetic acid and 400 mg ) is a hormone treatment given to most surfaces and various acids has been shown to significantly decrease. (Table 4).

Table 4 . Comparison of different levels of hormones, IBA and 6 of pH in the acidic environment of the three branches

(IBA) mg / lit	acetic acid	sulfuric acid	citric acid
zero	29a	20/66b	29a
200	18/33bc	18/33bc	33a
400	14c	20bc	20/66b
600	20bc	21b	19bc
800	23b	17/66bc	20/66b

†Means in each column having the same letter, have not significant difference (P ≤ 0.05) according to DMRT

**Shoot fresh weight**

Average data using Duncan test at 5% level showed that levels of hormones, IBA and three organic acid with a pH of 6 to have significant effects on fresh weight of branches. So that the maximum weight among treatments in the treatment arm (IBA hormone levels of citric acid and 200 mg l) is obtained from the lowest weight category (IBA hormone levels of acetic acid and 800 mg l) is a hormone treatment given to most surfaces and various acids has been shown to decrease significantly (table 5).

Table 5 . Comparison of different levels of hormones, IBA and 6 of pH in the acidic environment of the fresh weight of shoots (g)

(IBA) mg / lit	acetic acid	sulfuric acid	citric acid
zero	45ef	42f	46e
200	72c	72c	71/2c
400	19/6g	122b	147a
600	9/33h	6/5hi	6i
800	5/6i	58d	19g

†Means in each column having the same letter, have not significant difference (P ≤ 0.05) according to DMRT

**Root length**

Average data using Duncan test at 5% level showed that levels of hormones, IBA and three organic acid with a pH of 6 has no significant effect on root length. In this regard, the maximum length of treatment among treatments (IBA hormone levels of acetic acid and 600 mg l) is the minimum length of treatment (IBA hormone levels of citric acid and 400 mg L ) is a treatment given to most acids and various hormone levels did not show a significant decrease. (Table 6).

Table 6 . Comparison of different levels of hormones, IBA and 6 of pH in the acidic environment of the root

(IBA) mg / lit	acetic acid	sulfuric acid	citric acid
zero	10ab	12ab	10ab
200	9/66ab	9/33ab	11/66ab
400	13ab	12ab	8b
600	14a	11ab	11ab
800	13ab	9/74ab	13/66a

†Means in each column having the same letter, have not significant difference (P ≤ 0.05) according to DMRT

### The number of rooted cuttings

Average data using Duncan test at 5% level showed that levels of hormones, IBA and three organic acid with a pH of 6 to have significant effects on the number of cuttings rooted. The highest number of rooted cuttings obtained among treatments (IBA hormone levels of sulfuric acid and 400 mg l) is the minimum number of rooted cuttings obtained (acetic acid and hormone IBA level of 800 mg) is a hormonal treatment given to most surfaces and various acids have been shown to have significantly decreased. (Table 7).

Table 7 . Comparison of different levels of hormones, IBA and 6 of pH in acidic medium

(IBA) mg / lit	The number of rooted cuttings		
	acetic acid	sulfuric acid	citric acid
zero	1/66gh	1/33gh	3f
200	12c	12c	3f
400	3f	15a	13b
600	2g	9d	5e
800	1h	9d	2g

†Means in each column having the same letter, have not significant difference ( $P \leq 0.05$ ) according to DMRT

### Discussion

#### Roots number

Analysis of variance revealed a significant difference between treatments in terms of eliminating the 5% level (see Table 1). Average data at the 5% level using Duncan's test showed that the highest number of roots per treatment (IBA hormone levels of sulfuric acid and 400 mg) with a mean of 6/15 and the lowest number (citric acid and hormone IBA 800 ppm level) with the average 5/2 value was found. IBA concentration increases from zero to 800 mg every organic acids, ultimately leading to a reduction in the number of roots (Table 1). The results obtained by (Meyghan ,1388) is consisten.

#### Root fresh weight

Analysis of variance revealed significant differences between treatments at the 5% level, together with the wet roots (Table 2). Average data using Duncan test at 5% level showed the highest fresh weight of root treatment (IBA hormone levels of sulfuric acid and 400 mg) with the mean of the lowest on the warm, 41 acid (stick levels IBA level of 800 ppm) with an average of 40/0 was hot. PH 6 in the acetic acid concentration from zero to 200 ppm IBA increased root fresh weight, but the level of 200 to 800 mg fresh weight of root IBA is reduced. The citric acid in the environment at levels up to 600 ppm of IBA, root fresh weight increased, but at a level of 800 mg fresh weight of roots is reduced. Also in the sulfuric acid applied at all levels of IBA hormone levels, increased root fresh weight. The results obtained by (Angeles et al., 2010) is consistent.

#### Root dry weight

Analysis of variance revealed a significant difference between treatments at 5% level of root dry weight with time (see Table 3) . Average data using Duncan test at 5% level showed the greatest root dry weight in treatments ( IBA hormone levels of sulfuric acid and 400 mg ) with average 6/16 g and the lowest ( the acid and acetic IBA hormone level of 800 ppm ) with an average of 08 / 0 was hot . The citric acid in the environment at levels up to 600 ppm of IBA, root dry weight increased, but at a level of 800 ppm, root dry weight decreased. Also in the sulfuric acid applied at all levels of IBA hormone levels, increased root dry weight (Table 3). The problem with the results obtained by (Angeles et al., 2010) is consistent.

#### Branch length

Analysis of variance revealed a significant difference between treatments at 5% level of branch lengths are the same ( Table 4 ) . Average data at the 5% level using Duncan's test showed that the maximum length of the treatment arm ( IBA hormone levels of citric acid and 200 mg ) with the mean of the lowest on the treatment and 33 cm acid ( citric levels IBA 400 ppm level ) , there was a mean of 14 cm . IBA concentration increases from zero to 800 mg every organic acids , ultimately leading to reduced branch length (Table 4 ) . The results obtained by (Sanei *et al* .,1368 ) is consistent .

#### Shoot fresh weight

Analysis of variance revealed a significant difference between treatments at 5% level of branches with their weight (Table 5). Average data using Duncan test at 5% level showed the greatest weight in the treatment arm (IBA hormone levels of citric acid and 400 mg) with a mean 147 mg, and the lowest treatments (hormone acid Asnyk IBA

800 ppm level), with a mean of 6/5 hot there. IBA concentration increases from zero to 400 mg every organic acids, leading to a significant increase in shoot fresh weight and IBA concentration from 400 to 800 mg every organic acids, shoot fresh weight was significantly decreased (Table 5). The problem with the results obtained by (Blazich, 1988) is consistent.

### **Root length**

Analysis of variance revealed a significant difference between treatments at 5% level with no regard root length (Table 6).level of 400 mg), there was a mean of 8 cm. The relationship between the two treatments mentioned only the highest and lowest root length was found to be significant (Table 6).

### **The number of rooted cuttings**

Analysis of variance revealed significant differences between treatments at the 5% level, the number of rooted cuttings together (see Table 7). Average data at the 5% level using Duncan's test showed that the highest number of rooted cuttings Treatment (IBA hormone levels of sulfuric acid and 400 mg) and the lowest with an average of 15 treatments (IBA hormone levels of acetic acid and 800 mg) with mean 1 rooted cuttings, there found. In relation to the environmental pH 6 with acetic acid increased from 200 to 800 ppm of IBA rooted cuttings was significantly lower and the 12 rooted cuttings to root cuttings 1 has been significant .is shown .There has been significant . The problem with the results obtained by (Blythe, 2004) and (Regasdekar and Sharma, 1986) correspond.

## **CONCLUSION**

It is concluded that in most of the traits, the concentration of sulfuric acid and 400 mg IBA was the best treatment. The use of hormones for better IBA rooting cuttings, rooting cuttings will be very effective and will improve and enhance the effects of different levels of hormone are different. But it should be noted that high levels have detrimental effects on rooting cuttings. In general it can be stated that these rooted cuttings to auxin down gardening is one of the important applications of this material.

## **REFERENCES**

- Blazich FO. 1988. Chemicals and formulations used to promote adventitious rooting. *Journal of Environmental Horticulture* .1:132-147.
- Blythe EK, Sibley JL, Tilt KM and Ruter JM. 2004. Auxin application to stem cutting of selected woody landscape plant by incorporation into a stabilized organic rooting substrate., *Department of Horticulture Auburn university., Environ.Hort.,22* : 63-70.
- Gupta VNBK, Banerjee Sk.Datta.2005. studies on regeneration of *Bougainvillea glabra* by stem cutting with the aid of Auxins under intermittent mist., *Journal of Ornamental Horticulture., New series., 8(1)*: 65 – 69.
- Ghasemi M, Coffee CE. 1390. scientific and practical potting. Published Razavi, Jldavl.
- Khalighi a. 1379. floriculture (ornamentals grown in Iran), publisher Rouzbahan. teacher also., And Chehrazai, M., 1382, hormone auxin effect on rooting cuttings without leaves, leafy rosette (*Bougainvillea spectabilis*), *Proceedings of the Third Congress of Horticultural Sciences, Tehran, Iran.*
- Nori a, And nori s. 1389. Handbook presents the most important ornamental plants ornamental plants of green space, Jihad, Mashhad University Press., First Edition.