

Improvement vase life and postharvest quality of cut *Alstroemeria hybrida* flowers via naphthalene acetic acid (NAA)

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ABSTRACT

The effects of different levels of naphthalene acetic acid were investigated on vase life and postharvest quality of cut Alstroemeria flowers in Islamic Azad University, Rasht Branch (Iran). Experiment carried out based on completely randomized design with naphthalene acetic acid (NAA) at 3 levels (0, 10 and 20 mg L⁻¹) in 3 replications. Analysis of variance showed that effect of NAA on the number of open florets, vase life, dry matter percentage and chlorophyll a (chl a) was significant ($p \leq 0.05$). Results demonstrated that maximum vase life, dry matter and number of open florets was achieved by 10 mg L⁻¹ NAA with 9.85 days, 17.07% and 4.67 respectively. Highest chlorophyll a content was obtained by 20 mg L⁻¹ NAA (3.02 µg /ml).

Key words: Alstroemeria, Naphthalene acetic acid, Vase life, Chlorophyll content.

INTRODUCTION

Alstroemeria (*Alstroemeria hybrida*) is belong to Alstroemeriaceae (Liliaceae) family and is one of the most important cut flowers in the world [13-15]. Alstroemeria such as other cut flowers, is sensitive to bacterial contamination, ethylene and petal abscission [8- 12- 13- 16]. These problems enhanced senescence and finally reduced vase life of cut flowers [7]. 1-Naphthalene acetic acid (NAA), is an plant growth regulator belong to auxin group that has some important roles in plants [6]. Shimizu-Yumoto and Ichimura [20] found that pulse treatment with NAA and aminoethoxyvinyl glycine (AVG) at 5 mM and 1 mM respectively, improved postharvest life of cut *Eustoma* flowers. Chang & Chen [5] reported that application of NAA is useful for reduce flower abscission in Bougainvillea cut flowers. The aim of this study is investigation on effect of NAA on vase life and postharvest quality of cut Alstroemeria flowers.

MATERIALS AND METHODS

Cut alstroemeria (*Alstremeria hybrida*) were purchased from commercial grower in Mahallat (Iran) and transported to postharvest laboratory, Department of Horticulture, Rasht Branch, Islamic Azad University (Iran) with 60-70% relative humidity, 12 µ mol s⁻¹m⁻² light intensity, 20±2°C temperature and 12h photoperiod from florescent lamps. This study was carried out based on completely randomized design with 3 levels of NAA(0, 10 and 20 mg L⁻¹), 3 replications, 9 plots and in each plot was 5 cut flowers. Vase life, number of open florets, dry matter percentage and chlorophyll a content were evaluated. End of vase life was when flower was wilted or leaf was discoloured [7]. Dry matter percentage was calculated by this formula [11]:

$$DM(\%) = \frac{\text{Dry weight in end of vase life}}{\text{Fresh weight in end of vase life}} \times 100$$

Chlorophyll a (chl a) content was measured in 3th day of experiment. All of leaves of cut flowers were sampled and chl a was evaluated according to Hashemabadi [11] method. Data were analyzed by using of SPSS software and mean comparison was performed by LSD test.

RESULTS AND DISCUSSION

Analysis of variance showed that effect of NAA on vase life, number of open florets, dry matter percentage and chlorophyll content was significant ($p \leq 0.05$). Results showed that maximum vase life, dry matter percentage and number of open florets were achieved in 15 mg L⁻¹ NAA with 9.85 days, 17.07% and 4.67 respectively (Table-1, Fig.- 1 and 2).

Fig: 1 Effect of NAA on dry matter of cut *Alstroemeria* flowers.

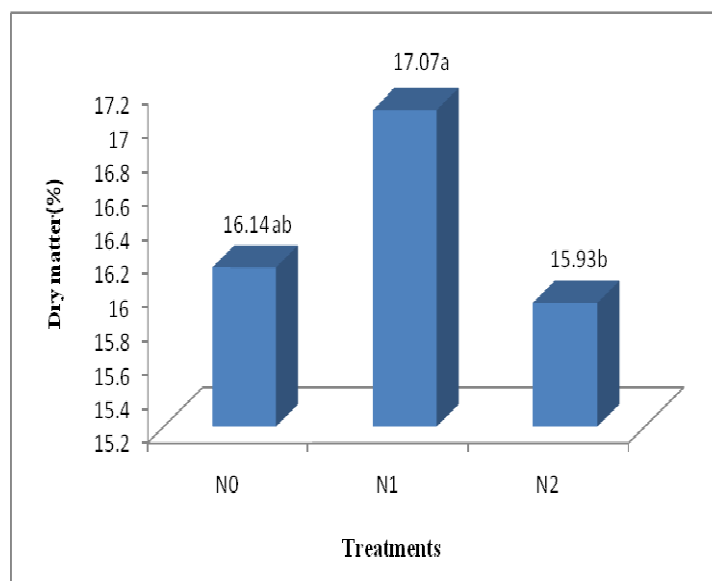
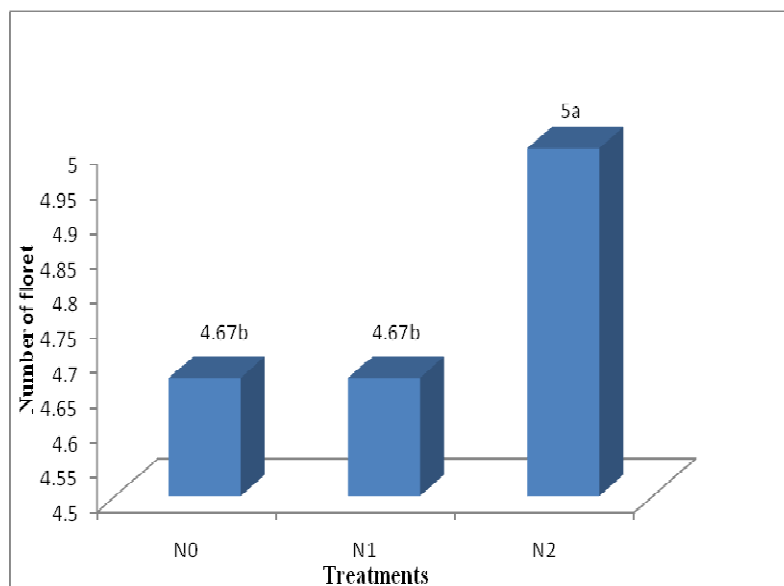


Fig: 2 Effect of NAA on number of floret of cut *Alstroemeria* flowers.



Positive effect of NAA is due to antimicrobial, antisencecence and antirespiratory properties that bacterial contamination and improve water relation and prevent vascular blockage that finally can extends vase life of cut flowers [2- 4-7]. Our results agreed by Saifuddin *et al.* [19], (Shimizu Yumoto & Ichimura [20], Sacalis & Nichols [18] and Philosoph-Hadas *et al.* [17]. Halevy & Kofranek [10] demonstrated that NAA decreased petal abscission and improved vase life of cut rose. Mean comparison showed that 20 mg L⁻¹ NAA with 3.02 chl a

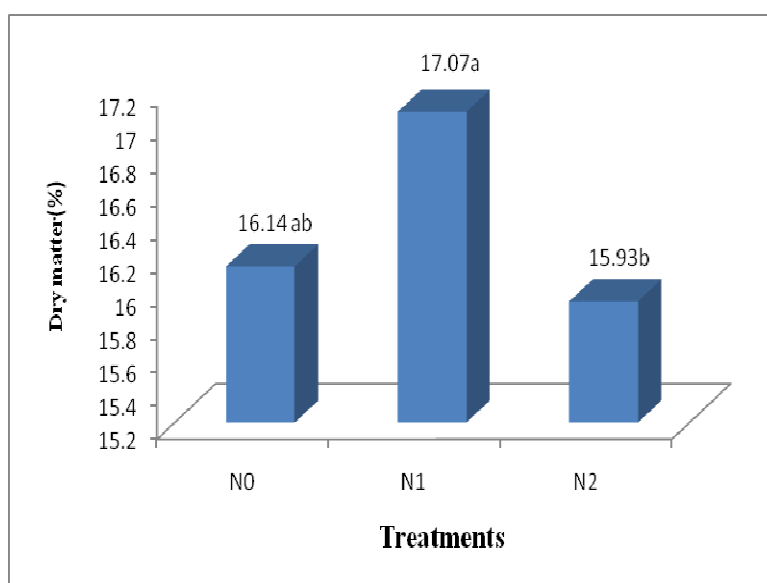
compared to control (2.12) (Table-1, Fig.-3), prevented chlorophyll degradation. NAA inactivated chlorophyllase [9]. Leaf yellowing is a visible symptom of senescence as leaves lose their chlorophyll content.

Table 1: Effect of NAA on measured traits.

Treatment	Vase life (Days)	Number of open floret	Dry matter(%)	Chlorophyll content (µg /ml)
N0 (Control)	8.62 b [*]	4.67 b	16.14 ab	2.12 ab
N1(10 mg L ⁻¹)	9.85 a	4.67 b	17.07 a	1.10 c
N ₂ (20 mg L ⁻¹)	8.62 b	5a	15.93 b	3.02 a

^{*}According to LSD test, in each column, means with the same letters are not significantly different

Fig: 3 Effect of NAA on chlorophyll a content of cut *Alstroemeria* flowers.



The loss of chlorophyll causes a shift in color from green to wide variety of yellow, red, brown and orange [14]. NAA as an antiethylene compound, enhanced chlorophyll content and reduced leaf yellowing in *Alstroemeria* that this results recognition results of Abdul Wasea [1] and Basiri et al. [3].

CONCLUSION

Results suggested that NAA can improves vase life and quality of cut *Alstroemeria* and decreased leaf yellowing and ethylene production in this cut flower.

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