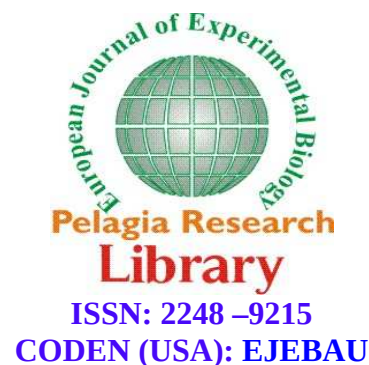




Pelagia Research Library

European Journal of Experimental Biology, 2013, 3(2):448-451



Effects of 1-MCP (1- methylecyclopropene) on the vase life of *Primula sinensis* L.

Seyyedeh Elmira Ghassemzade*, Davood Hashemabadi and Mahmoud Ghassemnejhad

Department of Horticultural Science, Rasht Branch, Islamic Azad University, Rasht, Iran

ABSTRACT

Primula is one of the flowering flowers in the world that to be released market in pots. The flower are very sensitive to ethylene and this makes the marketing process is damaged. In order to improve the effect of 1-MCP on the vase life of primula, a study in a completely randomized design with one concentration factor using of 1-MCP at five levels (0, 50, 100, 150 and 200 nl l^{-1}) in three replications and 18 experimental plots with 5 plants were performed. The results of data analysis indicate that the effect of 1-MCP concentration on the measured traits of chlorophyll a were statistically significant at level of 1. But on the traits of vase life at 5% and petals Brix degree at 1% was not significant. Comparison of treatment means indicated that treatment with 150 nl l^{-1} 1-MCP compared with the control increase vase life by 1/2 day and had the greatest impact.

Keywords: 1-MCP, *Primula* and vase life.

INTRODUCTION

Primula with the scientific name of *Primula sinensis* L. from the family of Primulaceae is a dicotyledon, herbaceous and perennial plant that grow in the forest and prairie grove wildly and it is native in cold and wet region [12]. Senescence and abscission are events that take place after the flowers exposed to ethylene that this gas stimulates both the process [1, 5, 15, 14]. Therefore, to prevent ethylene action in plants treated with the inhibitor is recommended which among them we can refer to STS, TDZ and NO [3, 11]. 1-MCP is a gaseous substance and is inhibitors of ethylene action that is used to control or delay the ethylene-based postharvest effects in a range of gardening products. This substance due to the lack of toxicity and the lack of heavy elements such as silver as an inhibitor compound has been welcomed [7]. Researchers have stated that concentrations of 250 to 300 nl l^{-1} of substance 1-MCP in 5 minutes in grenadine flowers is effective than at a concentration of 0/5 nl l^{-1} in 24 hours that has been remains within 24 hours at 5° C in the vessel [20, 8]. In some cases, 1- MCP is prevented some damage from ethylene when the two compounds are used in combination but completely prevent damage from Ethylene when the 1- MCP is used before Ethylene [19]. 1- MCP also prevented the increase in ethylene production from pollen and prevents the progression of senescence in *Phalaenopsis* plant cv. 'Herbert Hager' [17]. And prevents from the accumulation of mRNA associated with ethylene biosynthesis enzymes including synthase ACC and oxidase ACC [4, 13, 16, 21]. The purpose of this study was to achieve the best time to treat 1-MCP to improve vase life and quality maintenance of the primrose flowers.

MATERIALS AND METHODS

In March 2012, primrose flowers in marketable stage which were half-open buds prepared from a greenhouse located in Amol and transferred into the Postharvest Laboratory of Agriculture Faculty of Azad University, Rasht. Five bushes were put into a disposable container by volume of 450 cc and were laid into each plot. To prevent the 1-

MCP gas injected into the flowers, a plastic cover of the volume 18,480 cm³ is laid on the plots. After performing treatments (0, 50, 100, 150 and 200 nll/l) the cover is torn and flowers were place outdoor in Postharvest to the end of vase life. Postharvest laboratory conditions was including 12 hours of light and 12 hours dark that was provided by fluorescent white light. Light intensity was 12 mol m/ s, room temperature, 20° C and relative humidity was between 60 to 70 percent. Criterion for determining the vase life was apparent wilting of petals and leaves and loss of marketable appearance and their market friendly. Brix degree of petal in the first day and end of day vase life measured by refractometer and numbers were subtracted from each other. Data analysis was performed using MSTATC software and data mean comparison was performed according to LSD test.

RESULTS AND DISCUSSION

Analysis of variance in the treatment showed that the effect of different levels of 1- MCP on chlorophyll a was significant at 1% and C₅ concentration (150 ng per liter) has shown the highest rate of chlorophyll 'a' (Table 1). Prevent from the degradation of chlorophyll 'a' in above treatments may be because that Chlorophyllase enzymes failed to properly decomposed chlorophyll. Chlorophyllase is the first enzymes in the path of breakdown Chlorophyll that its value in old leaves is more than young leaves [6]. 1-MCP prevents or delays in chlorophyll degradation and different types of color changes in many products [18]. This in turn leads to a longer vase life in treated varieties. 1- MCP delays chlorophyll in Croton[10] in the presence of ethylene. The effect of 1- MCP substance concentration on the petals Brix degree shows that concentrations of 1- MCP have no effect on this index. The reason can be attributed to the strong effects of 1- MCP that by receptor occupation is prevented them from blockade by ethylene. Most days of vase life was related to C₂ treatment by 5 days and C₅ in 6 days. Blankenship *et al.*, [2] believe that 1- MCP in *Petunia* by preventing the effects of induced external ethylene increases in electrolyte leakage and prevents to reducing the amount of membrane proteins lipid fluidity. 1- MCP by disrupting the operation of SAM synthase prevents the degradation of proteins and increase plant life. Jiang *et al.*, [10] during their studies concluded that 1- MCP prevents the degradation of proteins in aging leaves of Croton.

Table 1 - Effect of different concentrations of 1- MCP on measured traits of primrose

treatments	chlorophyll a (mg l ⁻¹)	petal Brix degree (% sucrose)	vase life (day)
C ₀ :0 nll ⁻¹	0.081c	4.2b	4.953ab
C ₁ : 50 nll ⁻¹	0.273b	4.4b	5.340ab
C ₂ : 75 nll ⁻¹	0.134c	4.3b	5.203ab
C ₃ : 10 nll ⁻¹	0.081c	5.1b	5.066b
C ₄ : 150 nll ⁻¹	0.158a	5.2b	5.196ab
C ₅ :200 nll ⁻¹	0.521c	6a	6a

*In each column, means with a common letter are not significantly different based on the LCD test.

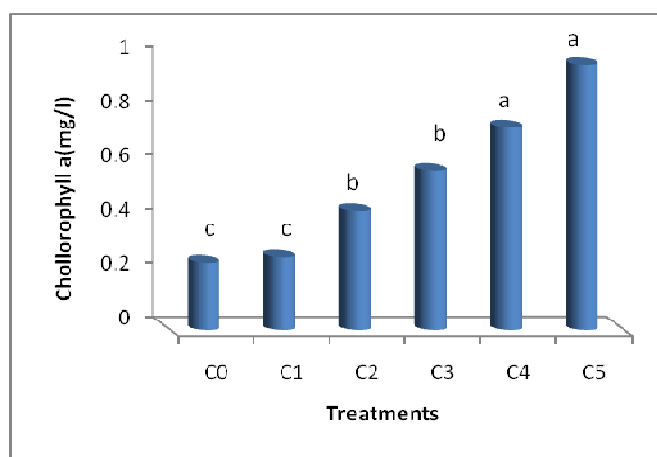


Figure 1 - Effect of 1- MCP concentration treatments on chlorophyll a

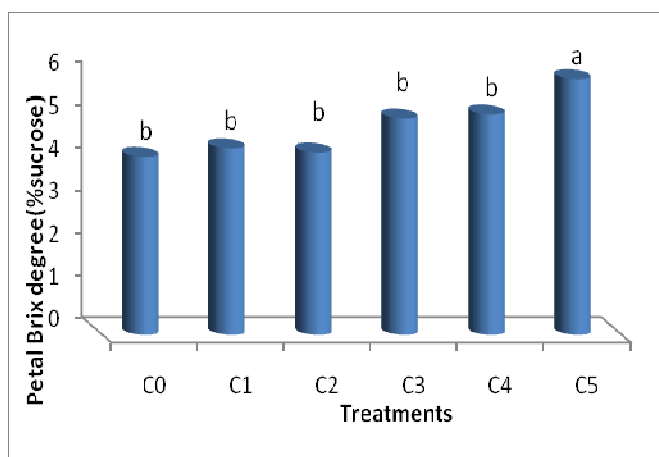


Figure 2- Effect of 1- MCP concentration treatments on petal Brix degree

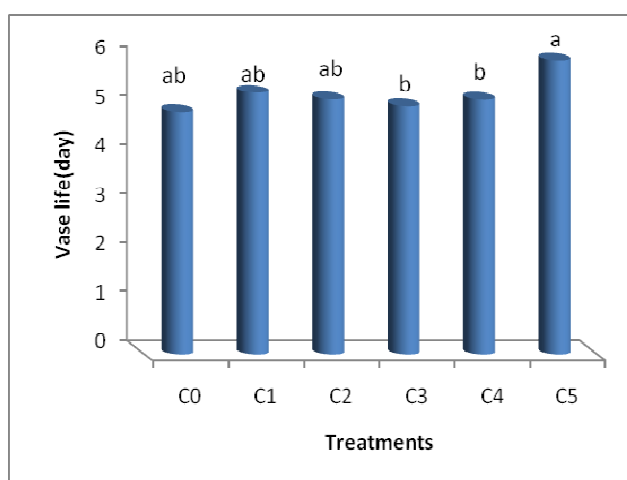


Figure 3- Effect of 1- MCP concentration treatments on vase life

REFERENCES

- [1] P. Azadi, B. Edrisi, S.M. Banijamali, H. Bayat, M.R. Shafie, A. Mirzakhani, and D. Hashemabadi, *Research Station of flowers and ornamental plants in Mahallat.*, **2001**. Carnation.
- [2] S.M. Blankenship, and J.M. Dole, *Postharvest Biol Tecnol*, **2003**. 28, 1 – 25.
- [3] A. Chamani, *PhD thesis of Tehran University*, **2005**.
- [4] L. Dong, H. Zhou, L. Sonogo, A. Lers, and S. Lurie, *Postharvest Biol Tecnol*, **2001a**. 23, 105-115.
- [5] Gh. Fathi, B. Ismaelpour, *Publications of Mashhad Jihad University*. **2000**.
- [6] A. Ferrante, D.A. Hunter, W.P. Hackett, and M. Reid, *Postharvest Biotechnology and Tecnology*. **2002**. 25, 333-338.
- [7] D. Hashemabadi, *Science and Research Branch of Tehran*. **2006**. P 105.
- [8] D. Hashemabadi, B. Kaviani, Sh. Sedaghatpour, A. MohammadiTorkashvand, and R. Zarei, *African journal of biotechnology*. **2009**. 8(20), 5351-5357.
- [9] Y. Jiang, and D.C. Joyce, *J. Hort. Sci. Biotech*. **2002**. 77, 19 – 21.
- [10] W. Jiang, Q. Sheng, , X.J. Zhou, M.J. Zhang, and X.J. Liu, *Postharvest Biol Tecnol*, **2002b**. 26, 339 – 345.
- [11] M. Karimi, M. Hasanpour Asil, H. Samizadeh Lahiji, And S. Talesh Sasani, *Science and Technology Journal*. **2007**. No.43, PP 1-9.
- [12] A. Khalighi, *Rouzbehan publication*. **2008**. P392.
- [13] F.M. Mathoko, Y. Tsunashima, W.Z.O. Owine, Y. Kubo, and A. Inaba, *Postharvest Biol. Tecnol* **2001**. 21, 265 – 281.
- [14] Y. Mostofi, and R. Shafie. *National Research Station Publications flowers and ornamental plants in Mahallat*. **2003**.
- [15] T. Nell, and M. Reid, *nellreid 02.htm*. **2002**.
- [16] W.O. Ownio, R. Nakano, Y. Kubo, and A. Inaba, *J. Am. Soc. Hort. Sci* **2002**. 127, 520 – 527.
- [17] R. Porat, A.H. Halevy, M. Serek, and A. Borochoy, *Physiol – Plant*. **1995a**. 93, 778 – 784.

- [18] R. Porat, B. Weiss, L. Cohen, A. Daus, R. Goren, and S. Dorby, *Postharvest Biol. Technol.* **1999**, 15, 155 – 163.
- [19] M. Serek, E.C. Sisler, T. Tirosh, and S. Mayak, *Hort Science*. **1995c**, 30, 1310.
- [20] E.C. Sisler, E. Dupille, and M. Serek, *Plant Growth Regual.* **1996a**, 18, 79 – 86.
- [21] S. Shiomi, M. Yamamoto, R. Nakamure and A. Inaba, *J. Jpn. Soc. Hart. Sci.* **1999**, 68, 10 – 17.