

RESEARCH ARTICLE

Preservation of *Exacum ritigalensis* (Binara / Ginihiriya) Flower Using Glycerin

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ABSTRACT

Fresh flowers of *Exacum ritigalensis* are soft and they last for a few hours after removing the flower bunch. So, it is important to find some effective way to keep their colour and freshness. Glycerin is one such agent that can extend the life of cut flowers and keep their appearance fresh and appealing. *Exacum* flowers pedicels were cut in to one centimetre of length. Glycerin(ml) was used as preserving agent and diluted with water (ml) in different dilution ratios (2:1, 1:1, 1:2, 1:0 and 0:1 respectively). They were kept in shade place and colour changes and vase-live with appearance (neutral, good, bad and not useful) were observed in flowers after 24 hours, 48 hours, three day and seven days. Their colour intensities were ranked using five scales (No colour change, less colour change, moderately colour change and drastically colour change). According to the RGB colour chart in blue range, treatments were observed from 20 raters in separate interval times. Experiment was comprised five treatments and each treatment with three replicates. Statistical analysis was performed by Wilcoxon sign rank test using SPSS statics package (version 20). Results showed that less colour change and good flower appearance from glycerin: water (1:1), within seven days.

Keywords: *Exacum ritigalensis*, glycerin, preservation, vase-life

INTRODUCTION

Preserved flowers have a long shelf life compared with cut fresh flowers, and can be more suited to flower arrangements, wedding bouquets, or store window decorations. In spite of their high processing costs, these flowers are in high demand. Preserved flowers were first developed in 1991, and are prepared from fresh flowers by replacing their internal moisture with polyethylene glycol (de Winter-Scailteur, 1991; Ito *et al.*, 2010). These processed flowers can retain their fresh texture and flexibility for several years. However, preserved flowers do not retain their natural colour. Flowers are artificially stained by soaking in polyethylene glycol with synthetic dyes. It is difficult to stain sepals, stems, and leaves separately from petals, thus multicolour flowers are usually stained monotone. If the internal moisture of fresh flowers can be replaced with solvents that allow petals to retain their original colour, the processed flowers would look more natural than the currently available preserved flowers. There is a need to reconsider

the soaking solvents to address the challenge of retaining petal colour (Ito *et al.*, 2010).

Even under the best postharvest handling practices, the vase life of fresh flowers is relatively short and many of the flowers are lost during the marketing chain (Nowak and Rudnicki, 1990; Ito *et al.*, 2010). Preserved flowers can retain their fresh texture and flexibility for several years but cannot retain their natural color. However, there are few reports on the effects of solvent treatment on petal tissues. It has been reported that processed flowers can be prepared by replacing internal moisture with 2-propyl alcohol or t-butyl alcohol (Romero-Sierra and Webb, 1982). However, these solvents volatilized from the petals, resulting in losing fresh texture (Ito *et al.*, 2010).

Plant material preserved using glycerin has rich colour and texture. Glycerine treatment is usually used for foliage, and also it has good potential to preserve baby's breath (*Gypsophila muralis*) and the flower heads on grasses. The transformation is amazing to watch as deep green leaves take on

shades of orange, yellow, red and bronze at different rates, resulting in a multicolor display. The end result is attractive plant material, sometimes with several colours on a single plant and durable stems and flowers that last for years. This study was conducted to evaluate the possibility to extend of vase-life of *E. ritigalensis* using different concentration of glycerin treatments.

METHODOLOGY

Fresh flowers of *E. ritigalensis* open on the same day were selected. The flowers pedicels were cut in to one centimetre of length. Glycerin (ml) was used as preserving agent and diluted with water (ml) in different dilution ratios (2:1, 1:1, 1:2, 1:0 and 0:1 respectively). Cut flowers pedicel was dipped in glycerin solutions separately, which consists with different ratios. They were kept in shade place and colour changes and vase-lives with appearance were observed in flowers after 24 hours, 48 hours, three day and seven days. Their colour intensities were ranked using five scales (Table 1) according to the RGB colour chart in blue range and got observation from 20 raters in separate interval times. The mean values were taken of given marks in all kind of tested specimens. Experiment was comprised five treatments and each treatment was having three replicates. Statistical analysis was performed by Wilcoxon sign rank test using SPSS statics package (version 20).

Table 1: Ranking method to assess the colour of cut flower.

Observations of Colour	Appearance of the flower	Scale
No colour changed	Neutral	0
Less colour changed	Good	1
Moderately colour changed	Bad	2
Drastically colour changed	Not useful	3

RESULTS AND DISCUSSION

As glycerin replaces the moisture in the plant's veins, the flowers and leaves are become fleshy and supple rather than brittle like traditionally dried plants. The most striking change is the colour. Since glycerin is highly hydroscopic (Pioneer Thinking, 2017) which absorbs and replaces the moisture present inside the plant parts. The ultimate result of this is presence of water inside the plant tissue even after a long period. So they become bright, fleshy and supple rather than brittle like traditionally dried plants (Garden, Decor and Decor, 2017).

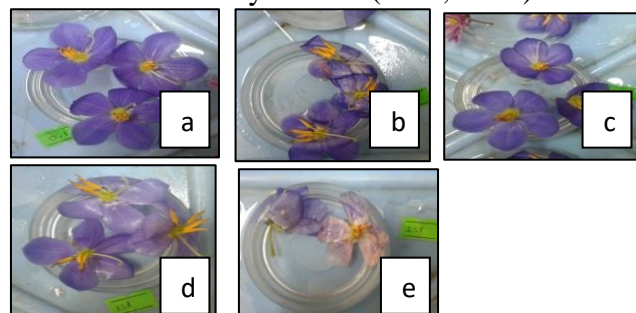
Table 2: Vase-life of flowers, appearance after seven days and scales given by the raters according to the vase-life.

Glycerin : Water ratio (ml)	Vase-life	Appearance of flower given by raters after seven days	Scale given by raters according to the vase-life
0:1	04 days	Not useful	Moderately colour changed
1:0	24 hours	Not useful	Drastically colour changed
1:2	06 days	Neutral	Less colour changed
1:1	07 days	Good	Less colour changed
2:1	24 hours	Not useful	Drastically colour changed

In this experiment, glycerin and water 1:1ratio was most successful to maintain the fresh appearance of the flowers. Glycerin treatment is usually used for foliage, but it can be applicable for some selected flowers too (Homeguides.sfgate.com, 2017). Glycerin and water 1: 2 ratio also can keep *Exacum* flowers for six days with minimum colour change and appearance (Figure 1, c). High glycerin ratio sows that flower petals were heavy, sticky and attached to the floor (Figure 1, e). Late summer is the best time to cut flowers for glycerin treatment (Ito *et al.*, 2010). Fresh flowers of *Exacum* in normal environment condition were observed that it was fade and last in after 30 minutes.

According to Staff, (2017) environmental conditions such as temperature, humidity, and light and air circulation are effect on the success of keeping quality of flowers. The favorable environmental conditions for this experiment are air temperature of 15.5°C - 24°C, neither excessively low nor high relative humidity, good lighting—but not direct sunlight—and good air circulation.

In this experiment the colour of flowers was not changed, but some other flowers can be subjected to lose their color during the process. To avoid this situation a dye can be add to the glycerin solution (Staff, 2017). To preserve flowers with this method it is suitable to use fresh and perfect flowers without any defects (Staff, 2017).



(Figure 1: Glycerin (ml) diluted with water (ml) in different dilution ratios respectively; a, 0:1; b, 1:0; c, 1:2; d, 1:1 and e, 2:1 after 3 days.

Cutting at an angle provides more surface area for absorbing the solution. When glycerin ready to use as floral preservative, it needs to heat it before use. If using plain glycerin, mix 1 part glycerin with 2 parts water was given the best results for Staff's experiments (2017) but this experiment showed 1:1 ratio is the best for Exacum flower.

CONCLUSION

Exacum flower which was kept 1:1 ratio glycerin and water was showed good floral appearance with less colour change while increasing vase-life within seven days.

REFERENCES

1. de Winter-Scailteur, N. 1991. Long-life cut flowers and method of treatment for obtaining same. WO91/03160. European Patent Office, Munich, Germany.
2. Garden, H., Decor, H. and Decor, A. (2017). *How to Preserve Flowers*. [online] HowStuffWorks. Available at: <http://home.howstuffworks.com/home-decor/accessories/how-to-preserve-flowers.htm> [Accessed 26 May 2017].
3. Homeguides.sfgate.com. (2017). *Glycerin for Drying Flowers*. [online] Available at: <http://homeguides.sfgate.com/glycerin-drying-flowers-64307.html> [Accessed on 26 May 2017].
4. Ito, H., Takahiro, H., Masaki, H., Katsuro, M., Saori, N., Youichi, M., and Susumu, Y. 2010. A protocol for preparing preserved flowers with natural color and texture. *HorTechnology* 20(2): 245-248.
5. Nowak, J. and Rudnicki, R.M. 1990. *Postharvest handling and storage of cut flowers, florist greens, and potted plants*. Timber Press, Portland.
6. Pioneer Thinking. (2017). *What Is Glycerin? | Glycerol*. [online] Available at: <http://pioneerthinking.com/what-is-glycerin> [Accessed on 26 May 2017].
7. Romero-Sierra, C. and Webb, J.C. 1982. Flower preservation. United States Patent 4,349,459. U.S. Patent and Trademark Office, Washington, DC.
8. Smith, K. (2011). *Drying and Preserving Flowers and Plant Materials for Decorative Use*. 1st ed. [ebook] Al AbAmAA&m And Auburn universities. Available at: <http://www.aces.edu/pubs/docs/A/ANR-1115/ANR-1115.pdf> [Accessed on 26 May 2017].
9. Staff, M. (2017). *Glycerine for Flowers – Modern Mom*. [online] Modernmom.com. Available at: <https://www.modernmom.com/2d53e906-051f-11e2-9d62-404062497d7e.html> [Accessed on 26 May 2017].