

**Effect of some essential oils on postharvest quality and vase life of gerbera cut flowers  
(gerbera jamesonii cv. Sorbet )**

**Hossein DAREINI\*, Vahid ABDOS, Elham DANAEE**

*Islamic Azad university of Garmsar, Department of Horticultural science, Garmsar ,Iran.*

---

**ABSTRACT**

*Gerbera flower nowadays because of it's diverse colour high economic importance in the floriculture industry. The aim of this study Effect of different plant essence containing Thymus vulgaris, Cuminum cyminum, Eucalyptus Rosemarinus officinalis (50, 75 and 200 mg/L) with sucrose 3% as continuous treatment and distillate water as a control on Gerbera cut flower were studied. Vases containing cut flowers kept in room with environment condition include: average temperature 24° C , relative humidity 70% and photoperiod 14 hr light supplemented with light intensity about 15 to 20  $\mu\text{mol}/\text{m}^2/\text{sec}$  with fluorescent lamps. Treats such as longevity, solution uptake, stem bending, membrane stability index, anthocyanin content of petals and activity of superoxide dismutase enzymes in petal at certain days were evaluated and statistically analyzed. Results revealed that pulse treatment of Thymus vulgaris at 50 mg/l ,and cuminum cyminum 100 mg/l concentration along with sucrose 3% significantly increases solution uptake and quality of cut flowers. Also this treatment increases anthocyanin content of petals, membrane stability index and total soluble solid of stem flower. The rate activity of catalase and super oxide dismutase enzymes in all treatment contrast with control showed decrease at lower rate. Vase life of Gerbera cut flowers in all treatments regard to control significantly increases.*

**Keyword:** Plant essence, Gerbera, Longevity, Superoxide dismutase

---

**INTRODUCTION**

Gerbera flower belongs to chicory or compound (asteraceae family). And is one of ten important flowers in the world and iran from viewpoint of production and consumption. It's value is because of beautiful envelopes in it's borders and it's flowers that have diverse colours such as pink, yellow white, red and orange. This multi year grassy and herbal, plant is aboriginal of south and eastern Africa and south America and asia [3]. Gerbera flower nowadays because of it's diverse colour. has good location in global commerce, but it's production in the country because of it's neck curvafure, Falling of it's calycle short stem and rapid fade has been reduced.in fact it's life length reduced by bacterial congregation at stem cut location. many chemical antibacterial compounds are introduced to reduction of bacterial congregation and increaceing it,s life length, but this process can be poisonous for flowers. many studies were carried out for stem cut flowers life increace, but complete study about plant essence applications with different condensity for life and quality of gerbera flower has not been carried out studies has showm that use of plant essence of papermint can increace it's life span. rarious studies have shown that plant essences like etanol and GA3 are effective in life span of stem cut flower as result in this study some degradable. Safe and environment

friendly materials are introduced for longevity and quantity and quality characteristics of gerbera flower that are effective reduction of agricultural crop losses and agricultural sustainable development.

## MATERIALS AND METHODS

This study was carried out in gardening lab of Islamic azad university of garmsar on plant essence of thymus , eucalyptus , cuminum cyminum , rosemarinus in three concentration (50 , 75 , 100 mg/l) and distillate water and sucrose %3 as preservative solution on longevity after harvest and some quantity and quality characteristics of gerbera flower az factorial experiment in form of statistical plan of full 'sorbt' random blocks with three repeat five gerbera stems with end cut of 35cm long were put in 50m/l container containing essence with (50 , 75 , 100 mg/l) concentration. Distild water and sucrose are applied as witness experiment was conducted in a room and under control conditions with average 24c. relative moisture %70 and 14 h light with density 15-20 micromol m/s fluorescent lamp. data was analysed with spss software and characteristics such as: flower longevity , stem bending , membrane stability index , total soluble soild , relative fresh weight , solution uptake , anthocyanin content of petals and activity of catalase and superoxide dismutase enzymes in certain days were scaled and statistically evaluated.

### Longevity of flowers

When calyces loss their freshness completely their life is considered ended and results were recorded.

### Curvature constant index percent of cellular membrane of anthocyanin, water content

Curvature by conveyor and comparison of top of flower and it's stem was carried out. Ec1 and Ec2 by Ec meter was evaluated and was calculated by following.

(1) Formual : cellular membrane stability :{ 1- (Ec1/Ec2 )100

For water content evaluation at first fresh weight of flower and then after putting it on dry. dry weight evaluated by digital balance and water content was calculated by following.

Calyce extracts were extracted and calyce anthocyanin was evaluated by two wavelength 530 and 657 nanometer and was calculated with following.

(2) Formual : anthocyanin amount : A 530 – 1.4 A 657

Enzyme catalase and superoxide dismutase Were extracted and evaluated by spectrophotometer in wavelength of 530 and 657 nanometer.

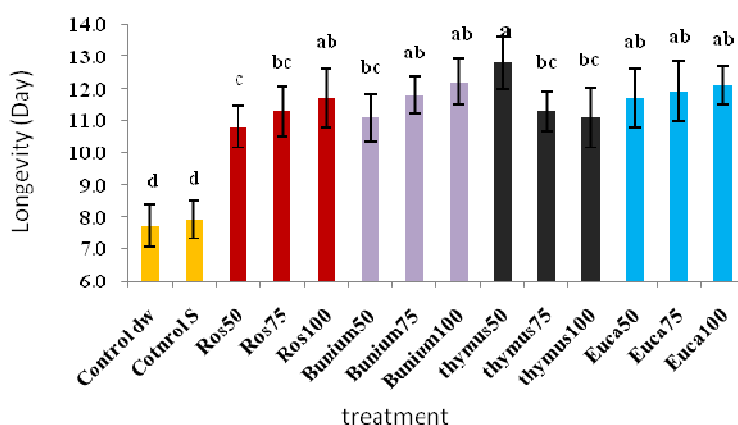
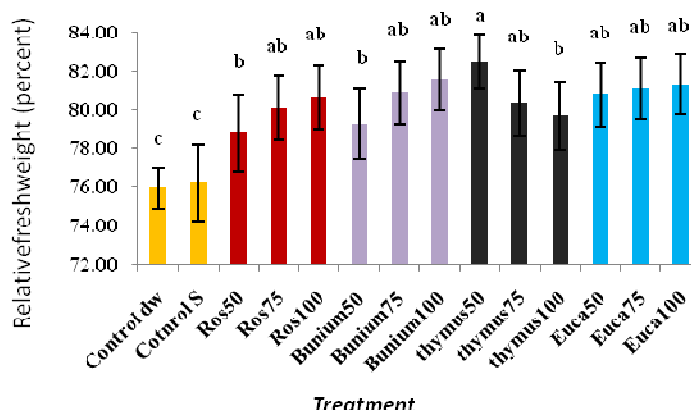


Figure (1) Gerbera flower longevity variations in different treatment of plant essence

## RESULTS AND DISCUSSION

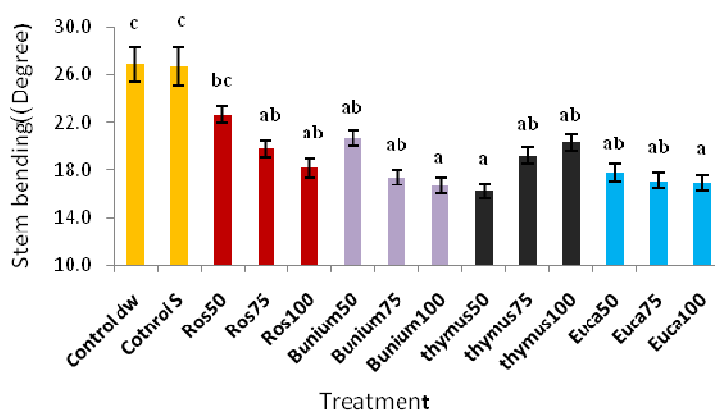
Longevity after harvesting of stem cut flowers for all concentrations of applied essences in solutions containing thymus 50 ppm and sucrose %3 increased significantly than witness flowers. That all applied treatment in this experiment had meaningful difference in %1 than treatment witness along with flowers longevity. Essence application of thymus with 50 mg/l and sucrose %3 had the most longevity than treatment control (figure 1).

From beginning of experiment. Wet weight of flowers for this reason that plant essences are prohibitors of vascular obstruction and solution absorption increase. In all treatment was increased and at the end was reduced (figure 2).



**Figure (2) Gerbera flower relative fresh weight variations in different treatment of plant essence**

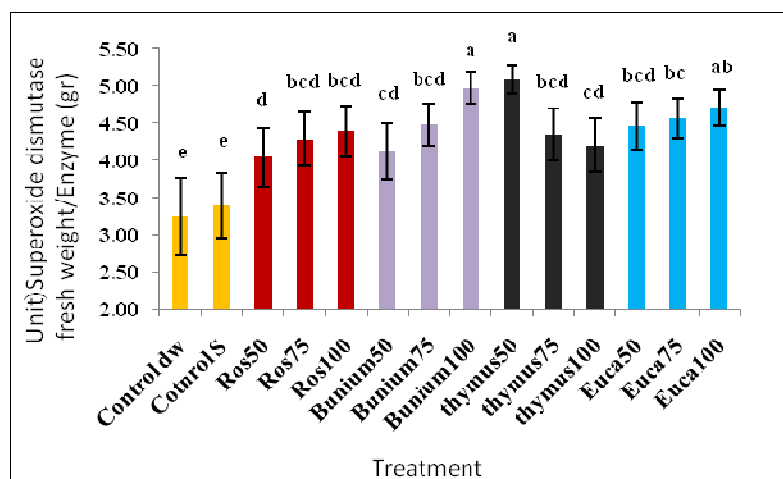
Of course this reduction in all treatment concentrations was significantly lower than control. Water absorption aueleration for all experimented solutions was increase and at the end was reduced. Solution absorption in treatment was reduced rapidly. Minimum solution absorption aueleration increase also observed in treatment thymus 50 mg/l and cuminum cyminum 100 mg/l in any way. from begining of treatment to flower fade in all treatment solutions meaningful difference at %1 level was observed than treatment flowers solved solid materials in flower's stems at all treatmeant concentrations along with sucrose %3 was increased. But this amount in treatment flowers was low from the beginning (figure3).



**Figure (3) Gerbera flower stem Bending variations in different treatment of plant essence**

Stem curvature in all treatment because of antibacterial property and cellular tvrzhsans of essences. fircreast showed decrease and then showed increase , but this increase in all treatment concentrations was significantly lower than

treatment. Calycle anthocyanin in all treatment concentrations was increased and then decreased. But in treatment flowers showed decrease from the beginning Cellular membrane stability index in treatment solutions was increased. Thymus 50 mg/l, Eucalyptus 75 and 100 mg/l and cuminum cyminum 100 mg/l. but increase in all treatment concentrations in statistical level %1 had meaning ful difference with treatment flowers. Activity of two enzyme superoxide dismutase in all treatment solution was increased but in treatment flowers showed decrease from beginning. Minimum increase of two enzymes in flowers was related to thymus treatments 50 mg/l. eucalyptus 100 mg/l and cuminum cyminum 100 mg/l (figure4).



**Figure (4) Gerbera flower Superoxide dismutase enzyme variations in different treatment of plant essence**

Results of table of variance analysis showed that using of thymus essence increased after harvest longevity of stem cut flowers gerbera (%1 level) meaningfully than treatment. In addition application of other plant essences in all applied concentrations could increase flower longevity (%1) and other characteristics except curvature (%5 level) meaningfully. Among treatment thymus essence with 50 ppm concentration had the most effect on gerbera longevity (table1).

**Table (1) variance analysis of different treatment of plant essences**

F.S	Squares Average	Freedom degree	Changes Resources	
2295/922**	15511/143	13	Treatment	Longevity
4/163**	0/487	13	Treatment	Solution uptake
3/634**	365/677	13	Treatment	Stem bending
5/689**	0/006	13	Treatment	Anthocyanin
11/997**	138/939	13	Treatment	membrane stability index
17/079**	3/692	13	Treatment	Superoxid dismutase

\*\* significant at level probability %1      \* significant at level Probability %5  
Ns Lacking probability significant

Many studies showed that presence of microorganisms in water can cause physical vascular obstruction of stem cut flowers, and data of this study show significance of antibacterial and antimicrobial materials application in water for improvement in water transportation without vascular obstruction. Gerbera stem cut flowers when being treatment with thymus 50 mg/l had more water containing than treatment flowers. One of the most important problems after the harvest of gerbera is stem curvature because of flower hardness and vascular obstruction by bacteriul aggregation results of this study showed that plant essences application can reduce curvature complexity significantly. This process is because of dry matter and water containing of stem (table 2). Also is determined that stem cut flowers of gerbera when are treatment with thymus 50 mg/l have negative effect in curvature. Flower curvature has negative affinity with all flower quantity characteristics. If stem weight increases flower curvature become less (table 2).

Table (2 ) affinity between quality characteristics after harvest of cut flower of gerbera

Superoxid dismutase	membrane stability index	Anthocyanin	Stem bending	Solutin uptake	Longevity	Resources
+0/960**	+0/983**	+0/994**	-0/969**	+0/808**	1	Longevity
+0/929**	+0/858**	+0/821**	-0/856**	1	---	Solution uptake
-0/964**	-0/994**	-0/981**	1	---	---	Stem bending
+0/964**	+0/994**	1	---	---	---	Anthocyanin
+0/974**	1	---	---	---	---	Membrane stability index
1	---	---	---	---	---	Superoxid dismutase

\*\* significant at level probability %1      \*significant at level Probability %5  
 ns Lacking probability significant

Results of this study had correspondence with other results of plant essences roll in longevity and curvature reduction of stem cut flower.

### Conclusion and suggestions

According to obtained results of this study plant essences as natural degradable .safe and environment friendly compounds are appropriate alternatives for chemicals in longevity increase after harvest of gerbera.as conclusion we can note that plant essences increase longevity of gerbera by antibacterial and antimicrobial activity and balance and pressure preservation of tvrzsans and improve quality and quantity characteristics of flower such as anthocyanin and superoxide dismutase and catalase enzymes because of solution absorption and water content except of treatment 50mg/l that had not meaningful difference with treatment control. Essence of thymus 50mg/l and cuminum cyminum 100mg/l had the highest solution absorption than treatment control .also thymus 50mg/l is cause to increase of stem solution solid materials. Relative fresh weight and wafer content that is cause of curvature reduction and longevity increase of gerbera cut flowers. Different kinds of gerbera show different reactions to plant essences of treatment, as results obtained results for one kind can not be basis for use of multi essences in other kinds or other flowers so more studies are needed for research and discovery of effect of these compounds with appropriate concentrations in other kind of gerbera. Fore future researches on after harvest longevity of cutten flowers can suggest that with regard to different reactions of species to different plant essences evaluate flowers longevity with different essences application thymus is one of effective compounds that causes to solution absorption flower freshness and longevity increase as result different concentrations of thymus and other plant essence are suggested for evaluation of cut flowers.

### REFERENCES

- [1] Mousavi et al, Mashhad University, **2008**, (14) 5 ,46-41.
- [2] Bayati et al, Mashhad University, **2011**, (4) 3 ,104-100.
- [3] Hejazi et al, University of Mashhad. **2009**, 19-24.
- [4] Dole JM and Wilkins FH, Prentice Hall Upper Saddle River New Jersey. **1999**, pp. 356-360.
- [5] Singh A, Kumar J and Kumar P. *Plant Growth Regul.* **2008**, 55: 221-229.
- [6] Meng X and Wang X. *Hort. Sci. Biotech.* **2004**, 79: 131-137.
- [7] Farokhzad A, Khalighi A, Mostofi Y and Naderi R. *Agri. Soc.Sci.* **2005**, 1: 309-312.
- [8] Heins RD, *Amer. Soc. Hort. Sci.* **1980**, 105: 141-144.
- [9] (Sheggen He , Zhaogizhang. *Biology and Technology*, **2009**, 54:59-62