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Effect of Treatments on Keeping Quality and Vase Life of Anthurium Cut Flowers

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ABSTRACT

The study was conducted to explore the effect of selected preservation treatments on the quality of Anthurium flowers. Hydration solutions make an important contribution to the postharvest quality. This research is an effort to investigate suitable hydration solution for restoring freshness of flowers and test its effect on keeping quality. Six preservatives commonly used for hydration for different flowers were selected for the study. Laboratory experiments were carried out for ten days to observe the changes in the quality of the flowers. The qualitative characteristics of flowers were evaluated by expert panel and these were qualitatively evaluated by three experts for change in colour, form, texture and appearance. Flowers treated with a chemical compound *i.e.* silverthiosulphate (STS) had significant influence on the keeping quality and vase life of anthuriums.

Key words*: Cut flowers, Hydration, Preservatives, Vase Life, STS, Up keep.*

Hydration of cut flowers after harvest is customary practice and it can restore the loss in flower turgidity that occurs during dry handling of stems in the greenhouse and help limit water deficit stress associated with subsequent dry shipment (Halevy and Mayak, 1981; Van Doorn, 1997). Since flowers are viable and actively metabolizing plant parts, they are subject to ageing processes. In this process, ethylene is found to be the main quality affecting factor on freshness of fruits and the vase-life of cut-flowers (Yun-Sang *et al.*, 1996 and Dutta *et al*., 1991). Halevy and Mavak (1979) defined "vase life" as the useful longevity of the floral product at the final consumer's home. They also stated that the criterion for termination of vase life needs to be determined for each flower.

Anthurium ranks ninth in the global flower trade and commands a respectable price both for its cut flower and whole plant. These flowers are highly perishable, prone to post-harvest losses and necessitate utmost care. The quality of cut flowers depends on stage of harvest, pre-harvest factors and post-harvest handling. Post harvest management involves the steps for the improvement in keeping quality of the flower to the consumer. The red, heart-shaped flower of Anthuriums is really a spathe or a waxy, modified leaf flaring out from the base of a fleshy spike (spadix) where the tiny real flowers grow. The anthurium flowers appear as rough on the spadix as compared to a smooth spadix. Most common colors of anthuriums are red and shades of red. Anthurium is becoming increasingly popular as an exquisite flower in India, and there is need to standardise post harvest practices to suit our conditions. The use of floral preservatives and sucrose with or without certain additives and also the use of some chemicals to the solutions could be of practical significance for prolonging the life of a anthuriums. Such preservatives to extend flower life might be used effectively at all levels of handling the crop that would irrlurn be beneficial both for producers and consumers. The present study was envisaged to ascertain the effect of different treatments to enhance the vase life and keeping quality of Anthuriums.

MATERIAL AND METHODS

Experimental research design was adopted for conducting the study. This experiment was designed to test the preservative treatments from commonly available solvents when compared to solutions prepared with commercial solvents. This research was taken up in the Floral Craft Production Unit of the Department of Resource Management and Consumer Sciences in the month of March 2012. Fresh Anthurium Flowers were procured for experiments from wholesale market, also stems

were trimmed and placed in the hydration solutions for about ten days at room temperature. A total of 3 trials were conducted with six preservatives. The Treatments identified for preservation of flowers were C: Control;T1 (STS); 5ml of Silver thiosulphate to a half liter of Water; T2 (SBW): Sprite 50ml, Bleach 1.5gms to a liter of warm water to a half liter ; T3(AW): Aspirin 1 gm to a half liter of warm water; T4 (LSBW): Lemon Soda 50ml,Bleach 0.7gms to a half liter of Water; T5 (SBLW): Sugar 2gm, Bleach 1.5gm , Listerine Mouth Wash 6ml to a half liter of Water; T6 (EBSW): Epsom Salt 2gm, chlorine bleach 2gm, Lemon Soda 50ml to a half a of liter water. Several different ways that may prolong and preserve the flowers.

A total of seven flowers were selected for each trial out of this one was used as control and another set of six were used for hydration treatments. Flowers were allowed to stand in the preservative treatments for maximum period of 10 days. These flowers were evaluated by three experts using a structured evaluation sheet. Good quality flowers suitable for hydration treatment were trimmed for desired length of 8". Flowers were transferred to pre-labelled containers for hydration. These were placed in the cool corner of the room, away from direct sunlight or artificial light. Care was taken to maintain good ventilation. A cut flower needs simple vase solutions which contain acid to improve water flow in flower stems, sugar to help buds open and last longer, and a preservative to reduce growth of bacteria. The physical observations were further supported by photos of the seven flowers until all the flowers had died or drooped.

Parameters to assess the quality of flower: Flowers were evaluated on four variables viz., change in colour, change in form, change in texture and change in appearance. Qualitative rating scale of 1-3 scores were used to measure the variables for each characteristic. The trails were conducted in triplicate for each treatment the nine sample observations were taken by identified expert panel of judges. The experiments were retained till they were not amenable for the study for a period of ten days. The scores obtained for each of these variables were subjected to F-Test Two-Sample for Variances and t-Test: Paired Two Sample for Means to study the effect of treatments on vase life of flower

RESULTS AND DISCUSSION

According to the analyzed data, as shown Plate 1 and Table 1, T_1 showed better performances compared to other treatments, having scored the highest marks upto 10 days for all parameters such as colour, form, texture and appearance. Silverthiosulfate (STS) positively affected the vase- life of anthurium and coincides with (Cameron and Reid, 1983; Joyce, 1992; Mor *et al.,* 1984; Premawardena *et al.,* 2000; Yapa *et al.,* 2000). The treatment with T_5 and T_6 held the flower fresh up to 8 days while T_2, T_3, T_4 resulted in changed colour in the tips of the petals and had slowly transformed into darker shade. The marked change in flowers in T_2, T_3, T_4 and C can be observed in Plate 1. The form of the flowers also showed remarkable changes after five days in T_2, T_3 was observed and the flowers became dull.

Nowak and Rudnicki (1990) inferred that fresh flower preservatives are chemicals added to water to make flowers last longer. They contain a germicide, a food source, a pH adjuster, water, and sometimes surfactants and hormones. Germicides are used to control bacteria, yeasts and moulds. These microorganisms harm flowers by producing ethylene, blocking the xylem, producing toxins and increasing sensitivity to low temperatures. Blooms should be kept away from direct sunlight and heat sources. They will last longer at cooler room temperatures, but will suffer from cool drafts. A cool draft is moving air that is cooler than the ambient temperature, such as air from an open window on a cool day**.**

There are various chemicals that can inhibit the effect of ethylene. The most common is the metal ion silver. It usually is applied to flowers in the form silver thiosulfate (STS). It acts on both ethylene receptors and production sites in the flower. This protects the flowers from ethylene in the environment and it stops the flower from producing ethylene itself. Floral longevity was measured by the number of days in which both the flower and foliage held ornamental characteristics. During this evaluation, qualitative measurements were taken for the state of the flower and foliage. For the flower, the characteristics observed were opening, size, colour and floral hydration status.

Table 1. Effect of Hydration Treatment on Physical Observation Score of Gerbera.

Control	Treatment 1	Treatment 2	Treatment 3	Treatment 4	Treatment 5	Treatment 6
12	12	12	12	12	12	12
12	12	12	12	12	12	12
9	12	10	10	10	12	12
9	12	9	9	8	12	12
8	12	9	8	7	12	12
4	12	8	7	4	10	10
4	10	4	6	4	10	9
4	10	4	6	4	9	9
4	10	0	0	0	9	9
4	10	0	0	0	9	9

Treatments: C: Control; T_1: STS ; T_2: SBW; T_3:AW; T_4:LSBW; T_5:SBLW; T_6:EBSW

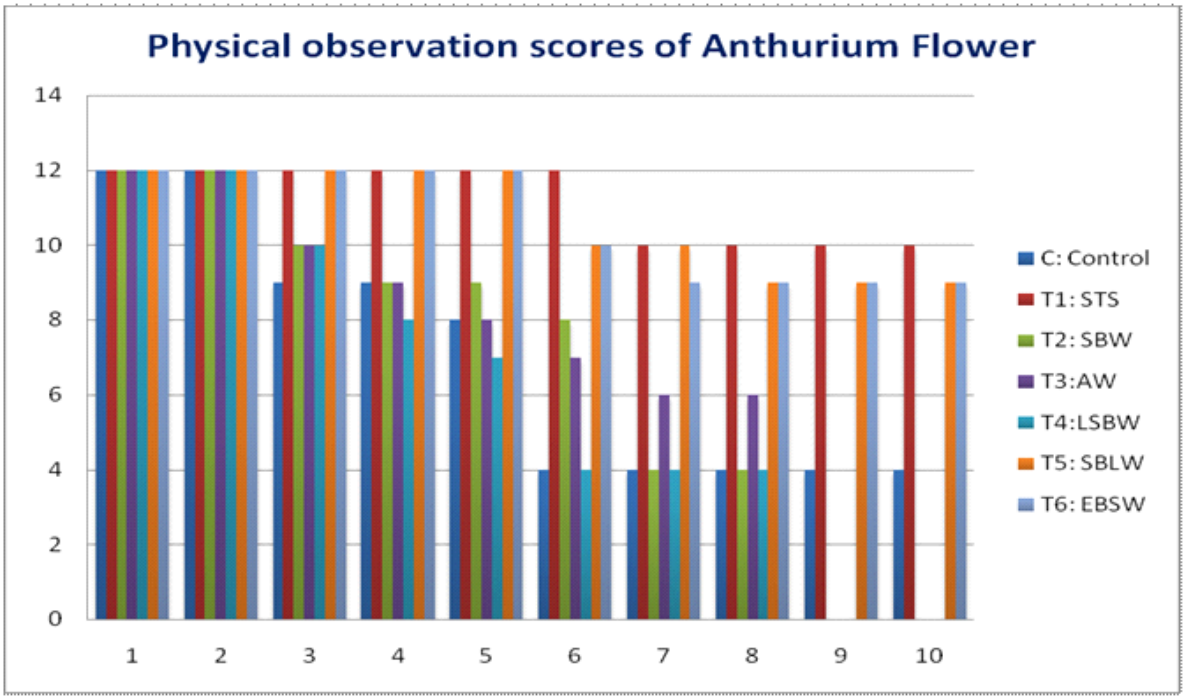

Plate 1. Effect of Hydration Treatments on the keeping quality of Gerbera.

Statistical analysis showed that the varieties and treatments responded positively for the enhancement of vase life. These Physical observation scores were statistically analyzed to establish the influence of treatments on number of days to retain the qualities of flowers and are presented in Table 2. The quality of the flowers deteriorated significantly from the fifth day onwards where as in T_1 it remained fresh up to10 days (F-Test Two-Sample for Variance). Among treatments, treatment T_1 (STS) was found to have significant difference over other treatments (t-Test: Paired Two Sample for Means) for period of 10 days, thus the null hypothesis is rejected.

CONCLUSION

The flower eco system is quite unique and it should be treated as bounty of nature. They should be scientifically protected from environmental hazards. Anthuriums are very sensitive to the stresses of storage and transportation, particularly at warm temperatures. For florists, it is important that the flowers be placed in a proper vase

Table 2. F test and t- Test of Physical Observation score of Anthurium.

F-Test Two-Sample for Variances			t-Test: Paired Two Sample for Means		
	Day 5	Day 6		CONTROL	T1
Mean	10	8.5	Mean	7	11.2
Variance	5.2	7.9	Variance	11.55555556	1.066666667
Observations	6	6	Observations	10	10
df	5	5	Pearson Correlation	0.759554525	
F	0.658227848		Hypothesized Mean Difference	0	
P(F<=f) one-tail	0.328743175		df	9	
F Critical one-tail	0.1980069		t Stat	-4.9194735	
			P(T<=t) one-tail	0.000412602	
			t Critical one-tail	1.833112923	
			P(T<=t) two-tail	0.000825205	
			t Critical two-tail	2.262157158	

preservative. Results emerged out from the study were T_1 (Silverthiosulphate) was found to be effectual formulation over the other formulations and it retained its freshness for ten days, while T_5 (Sugar 2gm, Bleach 1.5gm , Listerine Mouth Wash 6ml to a half liter of Water) and T_6 (Epsom Salt 2gm, chlorine bleach 2gm, Lemon Soda 50ml to a half a of liter water) retained freshness up to eight days.

Commercially formulated hydration solutions provide the necessary ingredients to overcome these factors and aid in quick flower hydration. They adjust the solution to a low pH for better liquid uptake, while at the same time cleaning the stem to flow freely. This simple hydration process prior to providing a flower food nutrient is extremely beneficial for flowers which are dry-shipped and will be subjected to dehydration.

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