IMPROVEMENT ON EXTENDING THE POSTHARVEST LIFE AND QUALITY OF ANTHURIUM (*Anthurium andreanum*) CUT FLOWERS BY THE ADDITION OF SUCROSE.

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ABSTRACT

The majority of the Anthurium species are perennial herbaceous plants, cultivated for ornamental purposes due to their attractive inflorescences**.** Anthurium is the largest genus of the Araceae family and very popular with flower arrangers. Wilting is the main cause in the termination of the vase life of cut flowers. Flowers are attracted by the customers due to their appearance, quality and freshness. Sugars play a vital role in keeping the quality of cut flowers, by adding sugars such as sucrose to the vase water is effective in improving the post-harvest life of cut flowers. Sugar provides a respiratory substrate and among all the different types of sugars, sucrose has been found to be the most commonly used sugar in prolonging vase life of cut flowers. The present experiment was conducted to find out the appropriate percent of sucrose for extending the vase life of anthurium cut flowers. Eight preservative solutions were used for extending the vase life and the experiment was conducted in Completely Randomized Design with three replications. Maximum days taken for spadix necrosis, Days taken for spathe blueing, Physiological loss in weight, Solution uptake and Vase life were recorded. The treatment T_5 (sucrose 6%) recorded maximum results in extending the vase life and flower quality.

Keywords: Anthurium, vase life, sucrose.

INTRODUCTION

Anthuriums are tropical plants grown for their showy cut flowers and attractive foliage. Highly organic, well aerated medium with good water retention capacity and drainage is needed for its growth and development. The plant produces blooms throughout the year, one bloom emerging from the axil of every leaf. Vase life of cut flowers can be prolonged by the addition of chemical preservatives (Nowak and Rudnicki, 1990). Different factors affect the vase life of cut flowers are chemical and physiological factors such as the content of stored foods of flower, humidity, light, and temperature of the place where

vase is kept. Cut flowers are forced to continue living with reserved carbohydrates, proteins and fat for their longevity. Factors affecting water uptake such as air embolism and duration of vascular occlusion contribute to cut flower senescence in Anthurium flowers. The major reasons for less vase life may be due to nutrient deficiency, bacterial and fungal infection, water stress induced wilting and vascular blockage and the action of ethylene in plant cells. Ethylene serves as a hormone in plants by stimulating and regulating the opening of flowers and the shedding of flowers. By applying various chemicals the post-harvest life of cut flowers can be extended. Wilting is the main cause in the termination of the vase life of cut flowers. Flowers are attracted by the customers due to their appearance, quality and freshness (Abdussmed, 1999). The longevity of cut flowers is also an essential factor that makes sure that the customers will be attracted and satisfied to purchase more flowers (Kumar and Deen. 2017). But the flowers remain fresh for a certain period of time. Senescence is the terminal stage of plant development that follows the physiological maturity consequently leading to the death of cells, organ or the whole plant (Sudaria *et al*., 2017). Floral senescence is the most serious problem regarding the post-harvest management of cut flowers.

Cut flowers will decay if they are not able to draw water from the vase solution. Also clogging of vascular tissues of the stem by a material produced by phloem will block the absorption of water. Another important factor which helps the vase life is its content of stored foods. Sucrose act as a source of energy required for the continuation of the vase life of the cut flowers and also helped for the improvement in the keeping quality value of Anthurium cut flowers. Among all the different types of sugars, sucrose has been found to be the most commonly used sugar in prolonging vase life of cut flowers. Sugar has an important role in the longevity of flowers, especially cut flowers, because after harvest they receive no nutritional and hormonal support from the mother plant (Van Staden, 1995). Therefore, the present experiment was conducted to find out the sucrose concentration for extending the vase life, quality and postharvest behaviour of flowers.

MATERIAL AND METHODS

The experiment was conducted at Flora-tech floriculture unit at Kottarakara, kollam Dist, kerala state, India during June 2014 to find out the best chemical preservative solution for extending the vase life of anthurium cut flowers, the variety used for the study is Acropolis. Eight treatments were used and the treatments are T_1 – sucrose 2%, T_2 - sucrose 3%, T_3 - sucrose 4%, T_4 - sucrose 5%, T_5 - sucrose 6%, T_6 - sucrose 7%, T_7 - sucrose 8%, T_8 – Distilled water (control) without sucrose and experiment was conducted in Completely Randomized Design with three replications. Each treatment have three flowers with each flower as one replication. Observations on various parameters of postharvest life were recorded on Days taken for spadix necrosis, Days taken for spathe blueing, Physiological loss in weight, Solution uptake and Vase life on 8 th day of the experiment.

RESULTS AND DISCUSSION

Sucrose concentrations significantly influenced all the treatments on prolonging the vase life and quality of cut Anthurium flowers. Among the different sucrose comcentrations (T_5) sucrose 6% recorded the maximum results and enhanced the postharvest life of Anthurium cut flowers (Table 1). Sucrose 6% delayed flower senescence compared to flowers held in other concentrations and vase life was significantly increased (Fig 1). Sucrose act as a source of energy required for the continuation of the vase life of the cut flowers (Halevy and mayak, 1981) and may also act as osmotically active molecule, thereby lead to the promoting of subsequent water relations and lengthening the vase life. It is well known that sucrose supply increases the longevity of many cut flowers, since sucrose can act as a source of nutrition for tissues approaching carbohydrate starvation, flower opening and subsequent water relations (Kuiper *et al*., 1995), similar finding were obtained by Lalonde *et al*., (1999), Nichols (1973) and Ichimura, 1998). (Rogers, 1973), (Halevy and Mayak, 1981), (Paulin *et al*., 1986) concluded that this could be due to exogenous application of sucrose which might have increased the ability of cut flowers to absorb water by influencing the water potential and osmotic potential.

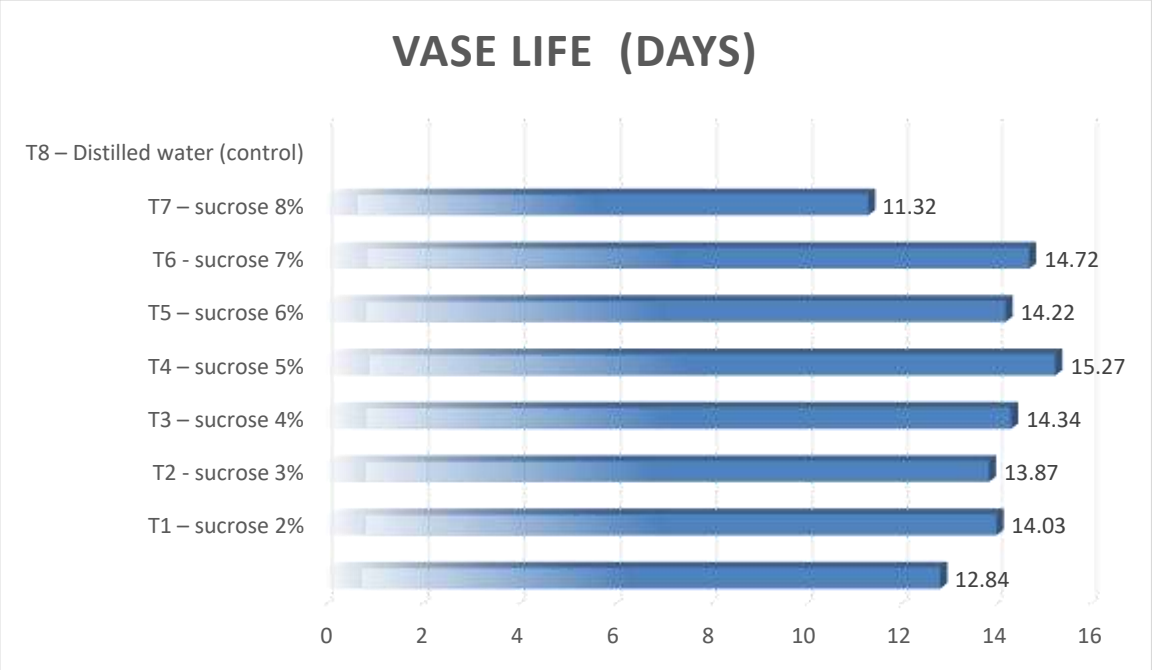
Sucrose used in the vase solution influenced the water uptake, transpiration loss of water, and also maintained better water relation of cut flowers (Bhattacharjee, 1998). The use of sugars in the pulsing solution effectively influences the water balance results in high degree of freshness of cut flowers for long period. Observations in the Table 1 showed that flowers treated with 6% sucrose recorded the highest relative fresh weight among all treatments. Beginning of the senescence phase in cut flowers is characterized by decrease in fresh weight (Ichimura and Goto, 2002). Sucrose decreases water loss in petals and increases the uptake of water, by inducing the closure of stomata and increasing the osmotic concentration of the flowers respectively. The present results in anthurium cv. Acropolis was similar with the findings of (Pathak *et al*., 1979) in tuberose, Shobha and Gowda (1994) in cut calendula flowers, Kiamohammadi and Hashemaabadi (2011) in cut lisianthus, (Seyf *et al* ., 2012) in cut roses.

Considering the experimental results it can be concluded that the results in the treatment with sucrose 6% recorded significant improvement in vase life of anthurium cut flowers which attained the best result compared to other concentrations. This may be due to the role of sucrose in improving water balance of cut flowers by affecting the osmotic potential of cut flowers and the water holding capacity of the tissues allowing less water to be transpired. Days taken for spadix necrosis, Days taken for gloss loss as well as Days taken for spathe blueing has been increased during the postharvest life. Sucrose decreased ethylene production and also highly efficient as a source of energy required for the continuation of the vase life of the cut flowers.

Table. 1 Effect of sucrose concentrations on extending the quality of anthurium cut flowers

Treatments	Days taken for gloss loss	Days taken for spadix necrosis	Days taken for spathe blueing	Solution uptake (ml)	Water loss (ml)	Fresh weight of cut flower (g)
T_1 – sucrose 2%	20.49	19.67	24.67	3.11	20.46	7.24
T_2 - sucrose 3%	20.51	20.12	23.98	3.23	20.81	8.52
T_3 – sucrose 4%	20.42	19.34	24.34	3.19	21.83	7.66
T_4 – sucrose 5%	21.12	19.93	23.57	3.23	20.04	8.92
T_5 – sucrose 6%	22.45	20.10	24.67	3.45	21.82	9.24
T_6 - sucrose 7%	22.15	21.45	25.12	3.16	20.18	8.60
T_7 – sucrose 8%	21.67	20.54	25.34	3.56	21.11	8.66
T_8 – Distilled water (control)	13.14	12.03	16.47	1.58	13.29	4.12
SE (d)	1.12	0.74	1.15	0.10	1.19	0.15
CD (p=0.05)	2.23	1.51	2.21	0.21	2.29	0.31

Fig. 1 Effect of sucrose concentrations on the Vase life of Anthurium cut flowers



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