



Tender Nut Water: A Natural Floral Preservative

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Introduction

Cut flower trade has of late increased greatly in the domestic as well as international markets. In cut flowers, some post-harvest physiological changes take place which influences its vase-life. The stored food reserves are expended by the detached flowers to continue the physiological processes. The longevity of any cut flower depends on genetic factors, cultural and environmental factors, stage of harvest, water relation, stem plugging and so on. The vase-life can be extended to a certain extent by the use of floral preservatives. These are available commercially in the form of tablets or solutions. It can also be prepared using prescribed quantity of chemicals, the main ingredients of any such solution being sugars, acidifying agents and germicides. Sometimes growth regulators and anti ethylene compounds are also added.

Coconut water at the tender nut stage is a very popular refreshing drink. It is also utilised in preserved form as packed tender coconut water and coconut water based vinegar. At tender nut stage (7-8 months), coconut water was reported to contain on an average, 2.2 to 3.7 mg/100 ml of ascorbic acid, vitamin B, 105mg/100ml of sodium, 312. mg/ 100ml of potassium, 0.04mg/ 100ml of copper, 24 mg/100ml of sulphur, 183.0 mg/100 ml of chlorine and was acidic in reaction with a pH of 4.8 to 5.3 (Thampan, 1981). The total variation in glucose content of tender coconut water ranges from 2.0 to 6.9% (Nair and Sadanandan, 1976). The sugars, minerals and some elements are the essential constituents for preservation and further coconut water being acidic in pH, adds to its suitability as a floral preservative. In

places where coconut palms are available in plenty, coconut water offers plenty of scope for use as holding solution in flower arrangements. Coconut water is a promising eco-friendly alternative to chemicals such as silver thiosulphate (STS), which was widely used but now has been banned, as it is hazardous to the environment. In order to explore the possibility of using coconut water as the holding solution, a trial was conducted at the Central Agricultural Research Institute, Port Blair, Andamans. Coconut water at different dilutions was compared with that of tap and distilled water for testing its efficacy as a floral preservative solution.

Materials and Methods

Cut flowers like gladiolus, gerbera and tuberose were harvested at the optimum harvestable stage and were precooled in tap water for half an hour to remove the field heat. Then the flowers were placed in coconut water at different dilutions with tap water (10 to 100%) to study their vase-life. Distilled water was used as control. The vase-life of flowers (in days) and the amount of holding solution absorbed were recorded and the results are presented below.

Results and Discussion

The gladiolus spikes had a vase-life of 9.41 days in the holding solution containing 100 percent coconut water (Table. 1). The treatment recorded 36.10 per cent increase in the vase-life over control. It was observed, to be at par with solutions containing 70, 80 and 90 percent coconut water. Tap water recorded the lowest vase-life (5.08 days) in gladiolus. The amount of holding solution absorbed was maximum in control (65.44ml).

In gerbera, 50 per cent coconut water + 50 per cent tap water recorded the maximum vase-life of 14.16 days followed by 60 per cent coconut water (12.00 days). The shortest vase-life was recorded by the control (5.08 days). An increase of 64.12 percent in vase-life was recorded over control when 50% coconut water was used as holding solution. The amount of holding solution absorbed varied between 10.08 ml in case of pure coconut water to 16.83 ml in distilled water (Table 1).

In the preliminary trials conducted using double tuberose flower spikes, it was observed that 25 percent coconut water + 75 percent tap water recorded 53.84 percent increase in vase-life over control (Table 2).

In general, the prolonged vase-life of all the flowers may be attributed to the presence of sugars in higher quantities, which lends rigidity and





mechanical stability to the cut flowers by replacing the energy spent to carry out its post harvest metabolism. Sugars are translocated and accumulated in the flowers, increasing their osmotic concentration and improving their ability to absorb more and more water to maintain turgidity. Salts like potassium chloride delay the gradual decline in turgidity. Further, presence of calcium in the form of calcium chloride may contribute to increase in the turgidity of flowers, thereby increasing their vase-life. Acidic pH facilitates greater uptake of preservative solutions (Bhattacharjee, 1995) and hence coconut water is an

ideal holding solution allowing greater movement of nutrients. The chlorine present in coconut water, kills bacteria and prolongs vase-life. Copper prevents stem plugging by inhibiting microbial growth. The sulphur present in the form of sulphites (SO_3) and sulphates (SO_4) acts as an anti-fungal agent in acidic medium.

Conclusion

Coconut water can be effectively used as a natural floral preservative as it does not involve any chemicals hazardous and besides being available in abundance, especially in the coconut growing tracts it is an eco-friendly and low cost alternative.

References

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Table 1. Vase-life studies of cut flowers using coconut water as holding solution

Treatments	Gladiolus		Gerbera	
	Vase-life (days)	Amount of Solution absorbed (ml)	Vase-life (days)	Amount of solution absorbed (ml)
10% Coconut water	5.90	60.25	7.16	15.58
20% Coconut water	6.08	54.03	7.20	15.41
30% Coconut water	6.83	49.08	7.25	15.40
40% Coconutwater	6.91	45.31	11.83	13.67
50% Coconut water	7.75	41.25	14.16	13.08
60% Coconut water	7.91	38.25	12.00	11.91
70% Coconut water	8.16	36.37	7.25	12.08
80% Coconut water	8.33	34.25	7.41	11.08
90% Coconut water	9.25	32.21	6.16	10.83
100% Coconut water	9.41	30.41	8.41	10.08
Tap water	5.08	21.33	6.08	13.00
Distilled water	5.91	65.44	5.08	16.83
C.D. (p=0.05)	1.356	1.751	1.078	1.535

Table 2. Vase-life studies of tuberose flowers using coconut water as holding solution

Treatments	Vase-life (days)
Coconut water only	7
50% coconut water	12
25% coconut water	13
Distilled water	6