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Research Note :

EFFECT OF NATURAL AND CHEMICAL FLORAL PRESERVATIVES ON THE VASE LIFE OF *DENDROBIUM* HYBRID SONIA-17

Prathamesh Vaidya* and John P. Collis

Department of Horticulture, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad-211007(U.P.)

**E-mail: pratham1828746@gmail.com*

ABSTRACT: Observations on vase life and bud opening of cut flowers of *Dendrobium* cv. Sonia-17 as influenced by floral preservatives revealed that maximum vase life (37.33 days), flower diameter (8.14 cm), number of florets open at a time (7.30) and longest blooming period were recorded with 75 ppm HQC + 75 ppm $AgNO_3$ + 2% sucrose.

Keywords : *Orchid flower, preservatives, water uptake, vase life.*

Orchids, belonging to the family Orchidaceae, are the most fascinating and beautiful flowers. They constitute an order of royalty in the world of ornamental plants and they are of immense horticultural importance and play a very useful role to balance the forest ecosystem because of richness of the orchid's flora. In the production of cut flower one of the most important aspects is to deliver the flower in garden fresh condition to the market, but this is rather a delicate job. Flowers are not adapted to long term survival. The cut flower differs from other horticultural products in many ways. Floral preservative are commonly used to retard the senescence processes in the vase life of cut flowers. Preservatives can often at least double the longevity of cut flowers. Keeping this in view, the present investigation was carried out.

The study was conducted in the laboratory of the Department of Horticulture, SHIATS, Allahabad in completely randomized design (CRD) using different concentrations and combination of chemicals with nine treatments and one control replicated thrice with ten flowers per treatment, viz. T_1 (control), T_2 (25% coconut water), T_3 (50% coconut water) T_4 (150 ppm 8-HQC + 2% sucrose), T_5 (25 ppm $AgNO_3$ + 2% sucrose), T_6 (50 ppm $AgNO_3$ + 2% sucrose), T_7 (150 ppm STS + 2% sucrose), T8 (75 ppm 8-HQC + 150 ppm $Al_2(SO_4)_3$ + 2% sucrose), T_9 (10 ppm $KMNO_4$) and T_{10} (75 ppm 8-HQC + 75 ppm $AgNO_3$ + 2% sucrose).

The flowers of *Dendrobium* cv. Sonia-17 were cut in the early morning, wrapped in Craft paper in groups and translocated vertically under dry conditions to the laboratory within two hours. Then the flowers were rapidly precooled by placing them in cool water for 3 hours. The flowers were placed in glass bottles containing 250 ml of previously mentioned chemical preservative solutions as well as distilled water as control treatment and kept in the laboratory at room temperature (25 ± 2°C) for 10 days; 30 – 35 % RH and continuous lighting with fluorescent lamps 1000 lux. The observations on days to bud opening, vase life (days), flower fresh weight (g) and freshness (days), flower diameter (cm), no. of maximum open floret at a time, solution uptake (ml), pigmentation extend (days), bud opening (%), days to opening of first bud and total blooming period (days) were recorded.

The results expressed in Table 1 revealed that maximum vase life of cut flower (37.33 days) was recorded in the treatment T_{10} (75 ppm 8-HQC + 75 ppm $AgNO_3$ + 2% sucrose) and the minimum vase life (17.66 days) was recorded with T_1 (control). High vase life was accompanied by low ion leakage percentage. Apart from being a broad spectrum bacterium and fungicides, 8-HQC compound have

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been reported to reduce the physiological stem blockage in sterile tissue. Data on flower water content (Table 1) with low ion leakage percentage had high water content. Meeteren (5) reported that water content can cause decrease in water retaining capacity of the petals. The onset of the decline in water content was depended on the cultivar and associated with increase of ion leakage. It is necessary to mention that high water content and also high ion leakage probably occurs due to different physiological behaviour from one cultivar to another. So in the present study, physiological behaviour in this manner may be observing.

The flower diameters were significantly influenced by 8-HQC, sucrose and its concentrations. Maximum flower diameter (8.14 cm) was recorded with T_{10} (75 ppm 8-HQC + 75 ppm $AgNO_3$ + 2% sucrose) and minimum flower diameter (6.40 cm) was recorded with control T_0. The flower diameter is a suitable index to flower opening and the stem diameter is important factor of flower quality and play important role in flower marketing. The results indicated that the effect of treatments on water uptake was significant. . Pre-harvest factors have direct effect on fresh weight of cut flowers. Evaporation and transpiration are two important factors that cause to reduce fresh weight and reducing of fresh weight play important role to determine vase life. Wilting of petals reduces their ornamental value as it supported in the experiment results (Amariulei and Burgo, 1 and Nowak and Rudnicki, 6).

Data (Table 1) indicated that maximum vase solution uptake (7.30 ml) was observed in treatment T_{10} (75 ppm 8-HQC + 75 ppm $AgNO_3$ + 2% sucrose) followed by 75 ppm 8-HQC + 150 ppm $Al_2(SO_4)_3$ + 2% sucrose (6.99 ml) and significantly increased water uptake in most cases as compared to flowers placing in other solutions or distilled water (control). Also, it is clear from data that with the extension of shelf life period, a gradual decrease in the amount of water uptake was observed after that day in most treatments. The results are in agreement with those of Farahat and Gaber (3) on *Monestera deliciosa.* Sucrose helps in maintaining the water balance and turgidity. Hence, addition of sucrose to holding solution might have lead to increased uptake of the holding solution. In our study, the declining of water uptake by flowers when they placed in water may be due to vascular blockage particularly at the stem base and using 8-HQS at various concentrations acted as a biocide inhibiting microbial population that might have

Table1: Effect of natural and chemical floral preservatives on the quantative characters of dendrobium orchids.

Treatment details	Vase life (days)	Floral diameter (cm)	Vase solution uptake (cm)	Pigmentation extend (days)	Percentage of bud opening (%)	Days to opening of the first bud
T_1	17.66	6.40	4.45	17.66	54.00	7.33
T_2	23.55	6.73	4.99	23.55	63.44	6.44
T_3	25.33	6.77	4.88	25.33	67.54	6.44
T_4	32.33	7.18	5.99	30.33	73.42	4.55
T_5	29.22	7.18	5.22	27.33	65.00	5.99
T_6	30.55	7.35	5.11	28.55	62.46	5.66
T_7	31.44	7.00	5.21	29.22	66.00	4.66
T_8	34.88	7.94	6.99	23.85	74.28	4.33
T_9	2.15	6.65	4.88	19.15	65.40	6.99
T_{10}	37.33	8.14	7.30	32.33	70.27	4.33
Mean	28.24	7.13	34.47	26.71	66.18	5.67
CD (P=0.05)	1.58	0.12	1.11	1.08	2.32	0.27

resulted in blockage of the vascular tissues, and subsequently caused stem break.

Pigmentation extent of flower including *Dendrobium* cv. Sonia-17 significantly depends on the quality of vase water, moisture retention capacity of flower and wind velocity. The data (Table 1) showed maximum pigmentation extent (32.33 days) was recorded in treatment T_{10} (75 ppm 8-HQC + 75 ppm $AgNO_3$ + 2% sucrose) followed by treatment 150 ppm 8-HQC + 2% sucrose (30.33 days) and minimum was (17.33 days) recorded in control.

It is evident from the data (Table 1) that the percentages of bud opening were significantly affected by all floral preservatives as compared with control. Among all the treatments, the maximum percentage of bud opening was recorded with treatment T_8 (74.28%) followed by T_4 (73.42%), T_{10} (70.27%) and minimum (54.00%) recorded in control. HQC was more effective in increasing bud opening and vase life than $AgNO_3$. This was similar to the results (Ketsa and Boonrote, 4) for *Dendrobium* 'Youppadeewan' flowers. The superiority of HQC over $AgNO_3$ may have been due to the relative immobility of $AgNO_3$ in the stem (Veen and Van de Geijin, 7). However, when $AgNO_3$ was replaced by STS in the holding solution, bud opening and vase life were not increased confirming to reports of Chand *et al.* (2). In fact, STS reduced vase life (Table 1) and water uptake of orchid flowers, particularly the whole inflorescence and halved inflorescence bearing only open florets. The combination of HQC and $AgNO_3$ was more effective in maintaining water uptake and prolonging vase life than when either HQC or $AgNO_3$ was used alone in combination with glucose. This suggests that the synergistic effect of HQC and $AgNO_3$ on increasing vase life and increased water uptake. Both HQC and $AgNO_3$ may have specific antimicrobial activities which is why they cannot be substituted for each other.

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