



Research Paper

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Effect of pulsing and holding solutions on vase life of *Dendrobium* cv. SONIA 17

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ABSTRACT : Effect of different pulsing treatments and holding solutions on the vase life of cut spikes of the orchid, *Dendrobium* cv. Sonia-17 was studied. Among the pulsing treatments, pre-cooling treatment done at 15°C for 12 h recorded maximum spike longevity of 32 days, maximum number of days for wilting of first floret (26 days), maximum number of days for wilting of all florets (38 days) and maximum water uptake (10 ml). In the trial using different holding solutions, AgNO₃ (25 ppm) + sucrose (5%) gave maximum vase life of 35 days, maximum number of days for wilting of first flower (17.3 days) and maximum number of days for wilting of all flowers (53.7 days). Pre-cooling treatment done at 15°C for 12 h and holding solutions containing AgNO₃ (25 ppm) + sucrose (5%) was found to be the best treatments to enhance the vase life of cut spikes of the orchid, *Dendrobium* cv. SONIA-17.

KEY WORDS : Flower spike, Vase life, Pulsing, Holding

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Cut flowers, being highly perishable commodities, have gained importance in floriculture industry. Orchids are commercially grown worldwide as cut flowers and have much demand both in domestic and international markets. *Dendrobium*, one of the largest genera of the family Orchidaceae, is a popular tropical orchid, grown commercially as a cut flower.

Cut flowers are living, actively metabolizing heterogeneous organs, composed of floral parts which may be at different physiologically developing stages. About 20-30 per cent of the flowers are lost due to faulty harvest, handling, package, storage, transport and marketing. Appropriate post harvest management of any cut flower is of utmost importance to ensure the long-lasting quality. In cut flower production, increasing the vase life, duration of storage and minimizing the loss after harvest are the factors to be considered very important.

The use of preservative solutions to enhance the quality and prolong the life of cut flowers is in use for several years. Floral preservatives are chemical formulations used to improve vase-life, size and colour of flowers. Important biocides used for treating cut flowers are 8-hydroxyquinoline

citrate (200-600 ppm), silver nitrate (25-50 ppm), aluminium sulphate (100-300 ppm), citric acid (50-1000 ppm), slow release chlorine compounds and quarternary ammonium compounds (50-200 ppm) (Arora and Singh, 2002). The four main uses of these preservative solutions are conditioning, pulsing, bud opening and holding.

Pulsing is a pre-shipment short term treatment by the growers, the effect of which should last throughout the shelf life of flower. Pulsing of flowers before storage helps to improve post-storage opening of buds (Somani, 2009). Pulsing is of great value in prolonging life, promoting opening and improving colour and size of petals of cut flowers. The treatment is especially beneficial for flowers destined for long periods of storage or for long distance transportation. Pre-cooling is a practice to remove the field heat and to preserve the quality of flowers. Holding solutions containing low concentrations of sugar (0.5 to 20%) are used to improve vase life of flowers.

The objective of the present study was to enhance the vase life of cut spikes of the orchid, *Dendrobium* var. Sonia-17 using different pulsing treatments and holding solutions.

RESEARCH METHODS

The trial was conducted under the All India Coordinated Floriculture Improvement Project at College of Horticulture, Vellanikkara, Thrissur. *Dendrobium* variety Sonia 17 was used for the experiment. Spikes were harvested when two- third of the flowers in a spike were open, *i.e.* 3 to 4 days after opening, because flowers cut prematurely will fail to develop normally off the plant. Standard spikes having 4-5 open florets and 1-2 buds were used for the study. Ketsa and Wongs-Aree (1995) reported that the number of open florets in each individual inflorescence of *Dendrobium* orchid must be adequate before harvest because they will ensure the maximum water supply even in the presence of preservatives in order to maximize bud opening with less defects (twisting and half opening). A slanting cut was given to expose more surface area to the pulsing and holding treatments. The spikes were given different pulsing and holding treatments.

The spikes were given different pulsing treatments using chemicals, cold treatment and hot water treatment. There were six treatments, *viz.* pre-cooling at 15°C (12 h, 24 h), immersing in hot water at 50°C (10, 20 seconds) as well as keeping in HQ 500 ppm (6 h, 12 h) along with control and with three replications. After pulsing the spikes were kept in tap water and observations were recorded till all the florets wilted.

There were six holding solutions with three

replications, *viz.*,

H1 - HQ (200ppm) + sucrose (5%)

H2 - HQ (400ppm) +sucrose (5%)

H3 - Ag NO₃ (25ppm) + sucrose (5%)

H4 - BA (25 ppm)

H5 - BA (25ppm + sucrose (5%)

H6 - AgNO₃ (25ppm) + HQ (400ppm) + sucrose (5%).

The spikes were kept in the prepared solution. Each treatment was tried on two spikes which was replicated thrice. Every alternate day, a fresh cut of about 0.5 cm was given at the base of the stalk to remove dead tissues so as to facilitate easy absorption of chemicals and free respiration. The pulsing or holding solution was taken in a bottle containing 200 ml solution.

Observations such as vase life (days for 50% flowers to wilt), days for fading of first floret, days for fading of last floret and water uptake were recorded for both pulsing and holding treatments.

RESEARCH FINDINGS AND DISCUSSION

Maximum spike longevity of 32 days was recorded when pre-cooling treatment was done at 15°C for 12 h (Table 1). Minimum vase life was recorded in P4- hot water pulsing (50°C) for 20 seconds (15 days). Maximum number of days for wilting of first floret was also observed in the treatment P1- Precooling done at 15°C for 12 h (26 days), which was at par with the treatment P2- Precooling done at 15°C for

Table 1 : Vase life of *Dendrobium* cv. Sonia 17 as influenced by different pulsing treatments

Treatments	Vase life (days for 50% flowers to wilt)	Days for fading of first flower	Days for fading of last flower	Water uptake (ml)
P ₀ – Control	25.0	20.0	29.0	5.0
P ₁ – Pre-cooling at 15°C (12 h)	32.0	26.0	38.0	10.0
P ₂ - Pre-cooling at 15°C (24 h)	27.0	22.0	30.0	7.5
P ₃ – Immersing in hot water (50°C) for 10 seconds	19.0	17.0	24.0	5.0
P ₄ - Immersing in hot water (50°C) for 20 seconds	15.0	12.0	19.0	5.0
P ₅ – HQ 500 ppm + sucrose (5%) for 6 h	25.0	20.0	30.0	7.5
P ₆ - HQ 500 ppm + sucrose (5%) for 12 h	24.0	19.0	26.0	7.5
C.D. (P=0.05)	4.08	4.29	5.25	2.19

Table 2 : Vase life of *Dendrobium* cv. Sonia 17 as influenced by different holding solutions

Treatments	Vase life (days for 50% flowers to wilt)	Days for fading of first flower	Days for fading of last flower	Water uptake (ml)
H ₀ – Control	24.7	14.0	36.7	7.5
H ₁ - HQ (200 ppm) + sucrose (5%)	23.0	10.3	39.3	7.5
H ₂ - HQ (400 ppm) +sucrose (5%)	26.7	10.0	44.0	7.5
H ₃ - Ag NO ₃ (25 ppm) + sucrose (5%)	35.0	17.3	53.7	5.0
H ₄ - BA (25 ppm)	27.0	15.3	41.7	7.5
H ₅ - BA (25 ppm + sucrose (5%)	25.7	11.3	44.0	5.0
H ₆ - AgNO ₃ (25 ppm) + HQ (400 ppm) + sucrose (5%)	27.0	15.3	46.7	7.5
CD (P=0.05)	NS	4.17	7.54	3.02

NS=Non-significant

24 h (22 days). Maximum number of days for wilting of all florets and maximum water uptake was also observed in the treatment P1- Precooling done at 15°C for 12 h (38 days and 10 ml, respectively).

Jomy (1998) reported that the use of a combination of 4% sucrose and 400 ppm 8-HQ for six hours enhanced the vase life of *Dendrobium* flowers upto 21 days. Swapna (2000) also observed that spikes remained fresh for a period of 19.92 days when given a pulsing of HQ500 ppm +sucrose 5% for 12 h.

There was no significant difference between the treatments for vase life as influenced by the different holding solutions (Table 2). The treatment H3- AgNO₃ (25ppm) + sucrose (5%) gave maximum vase life (35 days for 50% flowers to wilt) followed by H6 (AgNO₃ (25 ppm) + HQ (400ppm) + sucrose (5%) and H4 (BA 25ppm) with a vase life of 27 days. Maximum number of days for wilting of first flower was also observed in H3 - Ag NO₃ (25ppm) + sucrose (5%) (17.3 days), which was at par with H4 - BA (25 ppm) and H6 - AgNO₃ (25ppm) + HQ (400ppm) + sucrose (5%) (15.3 days). Maximum number of days for wilting of all flowers was also observed in H3 - Ag NO₃ (25ppm) + sucrose (5%) (53.7 days), which was at par with H6 - AgNO₃ (25ppm) + HQ (400ppm) + sucrose (5%) (46.7 days). Water uptake was at par among all the treatments.

According to Ketsa *et al.* (1995), inflorescence of *Dendrobium* held in vase solution containing 225 ppm HQS+ 30 ppm AgNO₃+ 4% glucose recorded the longest vase life of 51.5 days, while in distilled water it was only 7.25 days. When used at 50 to 100 µLL-1, 8-hydroxyquinoline sulfate (8-HQS) extended shelf-life of *Dendrobium* Pompadour cut

flowers (Kesta and Amutiratana, 1986).

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