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Storage and Vase Life of Cut Rose Flowers as Influenced by Various Packing Materials

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ABSTRACT

The influence of various packing materials, viz. cellophane paper, butter paper and aluminum lamination foil, on the storage and vase life of cut rose flowers (*Rosa hybrida* L. cvs. Kardinal, Gold Medal and Anjleeq) was studied. Flowers were harvested at two different stages, viz. tight bud stage and loose bud stage. Data regarding storage life (days) and vase life (days) of flowers of all the treatments were collected by following standard procedures. When flowers of *R. hybrida* L. cv. Kardinal were kept in aluminum lamination foil at tight bud stage, both storage and vase life were maximum followed by *R. hybrida* L. cv. Gold medal in the same packing material. Cultivar Anjleeq harvested at loose bud stage and placed in cellophane paper exhibited minimum storage and vase life. Flowers should be harvested at tight bud stage and packed in aluminum lamination foil for prolonging their shelf life.

Key Words: Packing materials; Cut rose flowers; Storage life; Vase life; *Rosa hybrida* L.

INTRODUCTION

Rose, a universally celebrated flower, has been used as a garden plant since the dawn of civilization. It belongs to family Rosaceae and Genus *Rosa* which contains more than 150 species and 1400 cultivars (Gault & Synge, 1971). Rose enjoys superiority over all other flowers being extensively used for decorative purposes and is prized for its delicate nature, beauty, charm and aroma. Rose plants produce an aquisite floral display consisting of many vibrant colors, shapes, sizes and perfumes.

In European countries, during winter season, snow and frost check the flower production and there is a dearness of fresh flowers in the market. Contrarily, Pakistan is fortunate to have all types of climates and can produce fresh flowers round the year with little efforts, mechanization and proper post harvest handling and can export the commodity to the international market. Ornamental cut flowers and potted flowering and foliage plants are showing great trade potential for export in Gulf and European countries.

With increasing demand in different parts of the country, there is a need to transport the flowers to long distances in an attractive condition which requires good transportation facilities and the use of suitable packing materials and preservative chemicals. This is indispensable to regulate the prolonged supply of flowers. Pre-cooling significantly increases the fresh and dry weight of cut roses. Ice cold water spray for 45 min gives maximum vase life (8.80 days), flower diameter (9.5 cm) and water uptake (9.0 mL) while cold storage at 4°C for 24 h significantly increases the fresh and dry weight, vase life (9.4 days), water uptake (9.5 mL) and flower diameter (10.0 cm) of cut roses (Palanikumar & Bhattacharjee, 2000); whereas, according to Nell *et al.* (2001), transportation of roses in boxes with gel packs reduced the temperature 3-4°C during transport and storage. Roses lasted longer and had better quality when shipped with gel packs.

Under ordinary conditions, the flowers could be a source of beautification and attraction for only two to three days. Since most of the people like to enjoy the beauty and scenery of flowers for a longer period of time, so keeping in view the socioeconomic value of flowers, there is a dire need to explore the possibilities of extending vase life by using different packing material like cellophane paper, butter paper, aluminum lamination foil, polyethylene sheet etc.

At room temperature pretreated flowers prove better than non-treated, polyethylene and paraffin stood at par while cellophane appeared worst. At 4°C, pre treated flowers significantly ousted non-treated and polyethylene attained the highest position against paraffin and cellophane (Ahmad, 1986). While, Faragher *et al.* (1986) observed that storage of cut rose flowers at 1-8°C for one or two weeks usually shortened vase life. Cut flowers of rose (cv. Mercedes) were stored without water for 10 days at 0, 3 or 8°C and 65 or 95% relative humidity. The increase in temperature from 3-8°C (95% R.H.) was accompanied by shortening of vase life. Sleeving of Astilbe hybrid flowers during the dry period (4-24 h at 20°C) results in better vase life than wrapping them in paper. Vase life was generally longer (12.2 days compared with 2.1) when the flowers were pretreated in water at 5°C, sleeved and kept in chrysal preservative solution (Kalkman, 1986). It was observed that a pulse treatment for 24-48 h to *Freesia hybrida* Bailey flowers cut in the tight bud stage with 20% sucrose resulted in prolonged vase life, whilst reduced sugar concentrations

or increased pulse durations were not effective. Pulse treatment of flowers with 20% sucrose for 24 h prior to three days of simulated shipping improved subsequent vase life (Woodson, 1987). Temperature during dry storage (5°C) reduces the reproduction rate of bacteria in the basal 5 cm of stems cut rose flowers (*Rosa hybrida* L. cv. Sonia). Using aluminum sulphate (0.8 g/L) during the hydration period before dry storage limited the number of bacteria and prevented their subsequent increase while in the simple deionized water bacteria multiplied very much and shortened the vase life (Doorn & Witte, 1991).

The main objective of this study was to ascertain a packing material for commercial use to extend the vase life of rose cut flowers and to find out the best packing material for improving utility of rose cut flowers for longer period.

MATERIALS AND METHODS

The study was carried out in post harvest laboratory, Institute of Horticultural Sciences, University of Agriculture, Faisalabad, during 2003. The flowers of three cultivars of *Rosa hybrida* L. viz. Kardinal (V_1), Gold Medal (V_2) and Anjleeq (V_3), were selected uniformly in terms of development and harvested in the morning at tight bud stage (S_1) and loose bud stage (S_2).

Flower stems were trimmed diagonally to a uniform length prior to treatment application. All the flowers were washed with distilled water before starting the experiment. Stems were dipped in 1000 ppm silver nitrate ($AgNO_3$) solution for 15 min and then were pulsed in a solution containing 10% sucrose + 150 ppm citric acid. After pulsing the flowers, stem ends were recut for convenience in packing, to limit sugar damage from the stems, and to inhibit the growth of microorganisms on the residual sugar. Packing materials were Cellophane paper (P_1), Butter paper (P_2) and Aluminum lamination foil (P_3). Flowers were packed individually in the unsealed but folded and punched packs. Punching holes help to maintain optimum concentrations of carbon dioxide and oxygen. All the flowers were stored at 3°C in medicool refrigerator and data were collected on the following parameters.

Storage life of flowers (days). Storage life of flowers stored at 3°C was recorded in days from the time flowers were packed to when about 10% flowers were wilted.

Vase life of flowers (days). After storage, the flowers were taken out from the packs. The stem ends were recut diagonally and their vase life was noted by daily evaluation of the appearance of the flowers. The flowers were placed individually in distilled water in test tubes. Each flower was tagged. Vase life was calculated from the end of the storage period to the time when about 50% of the flowers were wilted (Larsen & Scholes, 1966).

The experiment was laid out according to completely randomized design with factorial arrangements using three flowers in each treatment. The results were interpreted according to Duncan's Multiple Range test at 5% level of significance (Steel & Torrie, 1980).

RESULTS AND DISCUSSION

Storage life of flowers (days) As far as storage life of flowers (days) is concerned, significant differences among varieties, bud stages and packing materials were observed. Maximum storage life was observed in flowers of cv. Kardinal (13.67 days) harvested at tight bud stage and packed in aluminum lamination foil. Whereas, minimum vase life was observed in flowers of cv. Anjleeq harvested at loose bud stage and packed in cellophane paper (3.67 days) as presented in Table I. The interactive effects of varieties and bud stages, varieties, bud stages and packing materials and bud stages and packing materials were non-significant. However, interactive effects of varieties and packing materials were significant. Interaction between varieties and packing materials revealed that the storage life of the flowers of Kardinal (V_1) in aluminum lamination foil (P_3) was maximum (12.83 days) followed by Gold Medal (V_2) in the same packing material (10.17 days). The flowers of Anjleeq (V_3) in cellophane paper (P_1) exhibited minimum storage life (4.17 days).

Table I. Influence of various packing materials on storage and vase life of cut rose flowers

Treatments	StorageLife	VaseLife
$V_1S_1P_1$	8.67bc	3.33c
$V_1S_1P_2$	10.33b	4.67bc
$V_1S_1P_3$	13.67a	7.33a
$V_1S_2P_1$	7.67c	2.67d
$V_1S_2P_2$	8.67bc	3.33c
$V_1S_2P_3$	12.00a	5.67ab
$V_2S_1P_1$	6.33cd	1.67e
$V_2S_1P_2$	7.67c	2.67d
$V_2S_1P_3$	10.33b	4.67bc
$V_2S_2P_1$	5.00d	1.33ef
$V_2S_2P_2$	6.33cd	2.67d
$V_2S_2P_3$	10.00b	5.00b
$V_3S_1P_1$	4.67d	1.33ef
$V_3S_1P_2$	6.00cd	3.33c
$V_3S_1P_3$	7.67c	4.33bc
$V_3S_2P_1$	3.67e	1.00f
$V_3S_2P_2$	4.33de	2.33de
$V_3S_2P_3$	6.33cd	3.33c

Means with same letters are statistically non-significant at P<0.05

Vase life of flowers (days). Data pertaining to this factor of study revealed significant differences among varieties, bud stages and packing materials. Maximum vase life was observed in flowers of cv. Kardinal (7.33 days) harvested at tight bud stage and packed in aluminum lamination foil. Whereas, minimum vase life was observed in flowers of cv. Anjleeq harvested at loose bud stage and packed in cellophane paper (1.00 days) as presented in Table I. The interactive effects of varieties and bud stages and varieties and packing materials were significant. However, the

interactive effects of bud stages, packing materials and varieties and bud stages and packing materials were non-significant. Interaction between varieties and packing materials revealed that vase life of the flowers of Kardinal (V_1) in aluminum lamination foil (P_3) was maximum (6.50 days) followed by Gold Medal (V_2) in the same packing material (4.83 days). The flowers of Anjleeq (V_3) in cellophane paper (P_1) exhibited minimum vase life (1.17 days). Interaction between varieties and bud stages indicated that the vase life of Kardinal (V_1) flowers at tight bud stage (S_1) was maximum (5.11 days) followed by Kardinal (V_1) at loose bud stage (S_2; 3.89 days). Flowers of Anjleeq (V_3) at loose bud stage (S_2) exhibited minimum vase life (2.22 days).

CONCLUSION

Storage and vase life of cut rose flowers can be improved by harvesting them at tight bud stage (S_1), packing in aluminum lamination foil (P_3) and stored at 3˚C. Moreover, Kardinal (V_1) has more storage and vase life as compared to Gold Medal (V_2) and Anjleeq (V_3). By proper post harvest handling, the aesthetic benefits of cut flowers can be extended reasonably.

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