International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2019; 7(2): 857-860
© 2019 IJCS
Received: 14-01-2019
Accepted: 18-02-2019

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Effect of packing materials on storage and vase life of cut rose flowers

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Abstract
The influence of various packing materials, viz. butter, *kraft* and polythene paper, on the storage and vase life of cut rose flowers (*Rosa hybrida* L) was studied. A rose is a perennial plant of the genus *Rosa*, within the family *Rosaceae*. There are over 100 species of rose. In this paper the ambient storage and refrigerated storage of rose (red and white variety) were compared with effect of wrapping by using butter, *kraft* and polythene paper for 3, 5 and 7 days respectively. The roses with butter paper wrap showed minimum weight loss followed by polythene and *kraft* paper in ambient and refrigerated condition respectively. Butter paper was found to be best wrap paper material by overall acceptability using hedonic scale rating. The refrigerated storage had preserved best appearance, aroma, color and less stem spoilage as compared to ambient condition according to panel called for evaluation by using hedonic scale rating. Among all three wrapped papers the butter paper gives best results upto 3 and 5 days in ambient and refrigerated condition respectively. The white rose preserved good appearance and color than red rose in both storage conditions.

Keywords: packing materials, cut rose flowers, storage life, vase life

Introduction
Flowers, the crowning glory of God's creation are an inseparable part of human life. They are part of age old tradition and culture of Indian society symbolizing purity, peace, passion, love and beauty. Due to their aesthetic, economic and social value their demand in the globe is increasing tremendously. Growing flowers commercially is a recent trend. Flowers have an increasing demand in the local as well as in the international markets. The total area under floriculture in India is 16,7,000 ha with production of 98,7,000 MT of flowers and India exports floriculture product about Rs. 11,999.09 lack (Anonymus 2009) [1]. The major flower growing states are Tamilnadu, Andhra Pradesh, Karnataka, Maharashtra, West Bengal, Uttar Pradesh, Haryana and Delhi in which Karnataka is the leading state having total area under floriculture 26,000 ha with loose flower production 203.9 MT and cut flower production 5867 MT. Important flowers those having more demand are Roses, Gerberas, Carnations, Gladiolus, Chrysanthemums, Marigolds, Asters, Orchids etc. A rose is a perennial plant of the genus *Rosa*, within the family *Rosaceae*. They form a group of erect shrubs, and climbing or trailing plants, with stems that are often armed with sharp prickles. Roses are best known as ornamental plants grown for their flowers in the garden and sometimes indoors. They have been also used for commercial perfumery and commercial cut flower crops. The majority of these ornamental roses are selected hybrids. From the above aforesaid information of higher production and industrial growth, their scope and importance, the under protected cultivated flower like Rose was included under the part of storage stability study.

Methodology
Freshly harvested red and white rose flower samples were obtained from local cultivars of Nashik. Following three wrapping materials were used under the study for keeping the quality of the flowers.

1. Butter paper
2. Polythene paper
3. *Kraft* paper

The wrapped samples were stored at two different conditions i.e. refrigerated storage and ambient storage (Jain *et al*. 2006) [3]. The Refrigerated storage condition was done at 5° C temperature and 80-90 % RH (Palani kumar, 2001) [4].

Hedonic relates to the psychology of pleasurable and non pleasant states of consciousness. In hedonic method, psychological states of like and dislike are measured on a rating scale. Normally rating scale has been categories into five forms, viz. numerical, graphic, standard, cumulated points and forced choice forms. The nine points numerical scale as given below had been most extensively used for new product development and consumer studies.

Table 1: Hedonic Rating scale

S. No.	Rating	Numerical Code
1.	Like extremely	9
2.	Like very much	8
3.	Like moderately	7
4.	Like slightly	6
5.	Neither like nor Dislike	5
6.	Dislike slightly	4
7.	Dislike moderately	3
8.	Dislike very much	2
9.	Dislike extremely	1

Result and Discussion

Storage life of Rose flower

Data presented in table 2 illustrated that

1. At Refrigerated storage the minimum weight loss in butter paper was observed.
2. At Ambient storage the maximum weight loss in *kraft* paper was observed.

Table 2: Loss of weight for rose after 3 days (Red and White)

S. No.	Wrapping Material (papers)	Storage Conditions							
		Ambient Condition				Refrigerated Condition (5°C)			
		Red		White		Red		White	
		Initial weight	Final weight	Initial weight	Final weight	Initial weight	Final weight	Initial weight	Final weight
1.	Butter	7.101	4.052	12.950	10.655	7.971	6.718	11.054	10.679
2.	*Kraft*	10.114	4.388	11.920	7.730	8.990	5.831	11.885	9.787
3.	Polythene	12.403	8.523	13.230	7.710	9.411	6.504	13.840	12.740

Data presented in table 3 illustrated that

1. At the Refrigerated storage the minimum weight loss was observed in butter paper.
2. At Ambient storage the maximum weight loss was observed in *kraft* paper.

Table 3: Loss of weight for rose after 5 days (Red and White)

S. No.	Wrapping Material (Papers)	Storage Condition							
		Ambient Condition				Refrigerated Condition (5° C)			
		Red		White		Red		White	
		Initial weight	Final weight	Initial weight	Final weight	Initial weight	Final weight	Initial weight	Final weight
1	Butter	10.807	8.264	12.772	12.471	10.350	**9.656**	11.435	10.816
2	*Kraft*	10.921	7.438	25.591	24.075	9.388	8.945	11.886	11.102
3	Polythene	11.515	9.475	10.934	9.816	8.730	7.491	11.435	10.742

Plate 1: Effect of ambient storage condition after 3, 5 and 7 days (from left to right), respectively

Plate 2: Effect of refrigerated storage condition after 3, 5 and 7 days (from left to right) respectively.

Table 4: Loss of weight for rose after 7 days (Red and White)

S. No.	Wrapping Material (papers)	Storage Conditions							
		Ambient Condition				Refrigerated Condition(5˚C)			
		Red		White		Red		White	
		Initial weight	Final weight	Initial weight	Final weight	Initial weight	Final weight	Initial weight	Final weight
1.	Butter	10.366	4.864	14.120	7.187	7.308	4.090	10.886	7.204
2.	*Kraft*	12.560	5.312	9.115	4.801	8.201	7.220	11.483	8.917
3.	Polythene	10.446	4.927	15.760	8.595	10.936	5.585	9.960	7.717

Data presented in above table showed that at seven days test all papers showed overall same weight loss.

Vase life of Red rose

The vase life was noted by daily evaluation of the appearance of the flowers.

Data presented in table 5 illustrated that,

1. The ambient storage (3 days) of polythene wrapped red rose was most acceptable with hedonic rating 7 (Like moderately).
2. The refrigerated storage (3 days) of all three wrapped paper red rose was acceptable with hedonic rating 6 (Like slightly).
3. The ambient storage (7 days) of all three wrapped papers was not acceptable with hedonic rating 3 (Dislike moderately).

Table 5: Hedonic scale rating for Red rose

S. No.	Wrapping Materials	Storage Condition					
		Ambient			Refrigerated		
		3 days	5 days	7 days	3 days	5 days	7 days
1.	Butter Paper	6	4	3	6	6	6
2.	*Kraft* Paper	5	3	3	6	5	4
3.	Polythene Paper	7	4	3	6	5	6

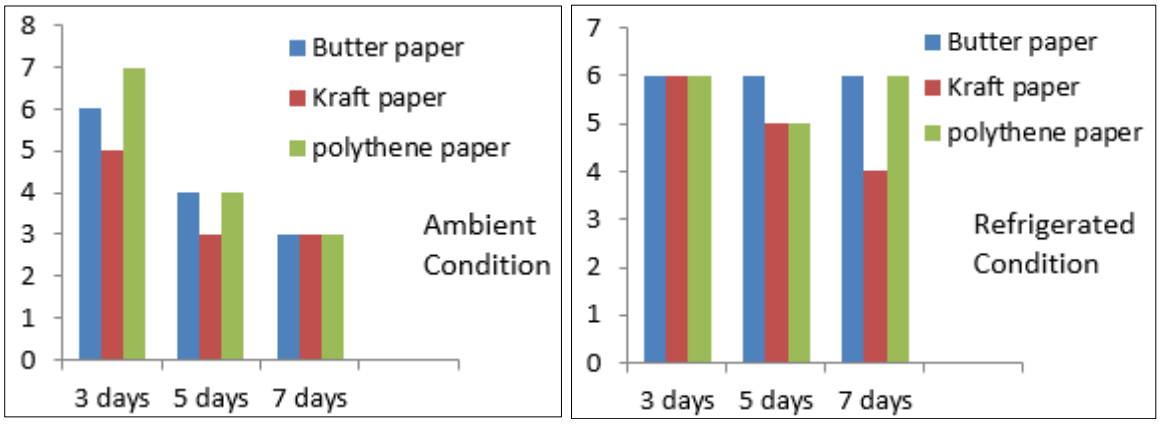

Fig 1: Sensory evaluation for red rose in ambient & refrigerated condition

Fig. 1 shows the graphical representation of sensory evaluation of rose flower in ambient and refrigerated storage condition with respect to time in days. It was observed that the butter paper wrapped rose flowers get the good scale of hedonic rating.

Vase life of White rose

Table 6: Hedonic scale rating for White rose

S. No.	Wrapping Materials	Storage Conditions					
		Ambient (Days)			Refrigerated (Days)		
		3	5	7	3	5	7
1.	Butter Paper	7	7	5	5	6	4
2.	*Kraft* Paper	6	5	3	5	6	5
3.	Polythene Paper	5	4	3	6	6	6

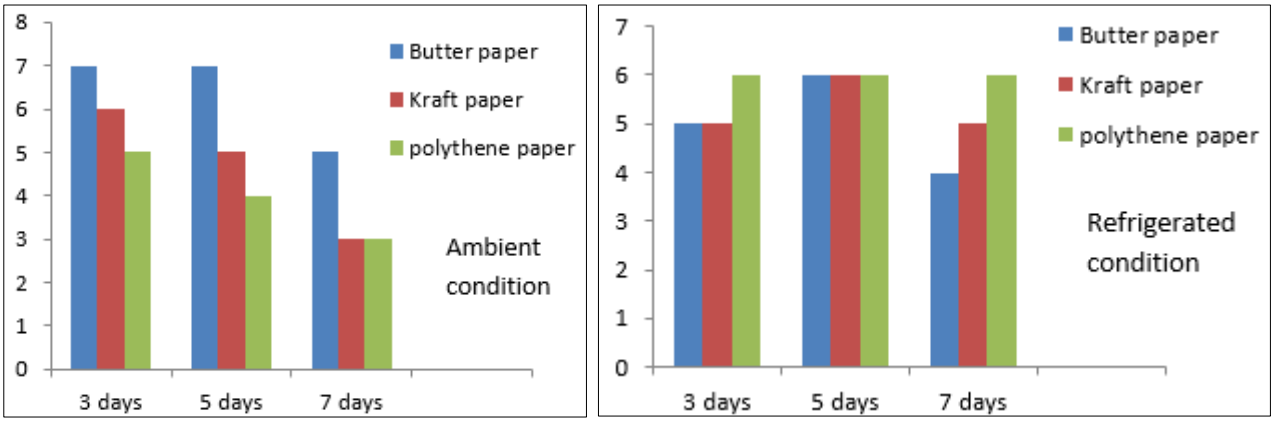

Fig 2: Sensory evaluation for white rose in ambient & refrigerated condition

Data presented in table 8 illustrated that,

1. The ambient storage (5 days) of butter paper wrapped white rose is most acceptable with hedonic rating 7 (Like moderately).
2. The refrigerated storage (5 days) of all three wrapped paper white rose was acceptable with hedonic rating 6 (Like slightly).
3. The ambient storage (7 days) with *kraft* and polythene wrapped papers to white rose badly affect its acceptability with hedonic rating 3 (Dislike moderately).

Conclusion

Storage and vase life of cut rose flowers can be improved by harvesting them at tight bud stage as suggested by different researchers (M. Usman Farooq *et. al*. 2004) [5]. The different wrap papers were applied in ambient and refrigerated condition showed the different effect on weight loss and overall acceptability. The butter paper was found to be best wrap material among the two viz., *kraft* and polythene in both storage conditions. The roses retained acceptability up to 5 days in refrigerated storage while they spoil after 3 days in ambient condition. By proper post harvest handling, the aesthetic benefits of cut flowers can be extended reasonably.

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