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Jeevitha KM

Ph.D., Student, Department of Family Resource Management, College of Community Science, University of Agricultural Sciences, Dharwad, Dharwad District, Karnataka, India

Veena S Jadhav

Professor, Department of Family Resource Management, College of Community Science, University of Agricultural Sciences, Dharwad, Dharwad District, Karnataka, India

Corresponding Author:

Jeevitha KM

Ph.D., Student, Department of Family Resource Management, College of Community Science, University of Agricultural Sciences, Dharwad, Dharwad District, Karnataka, India

Standardization of silica-gel drying technique of *Rosa Damascena*

Jeevitha KM and Veena S Jadhav

Abstract

Rose is symbol of affection and honor. Preserving roses received from loved ones add ethical and moral value. Hence this study aims to standardize effect of the Silica-gel drying technique on *Rosa damascena*. Red roses were collected from local growers. Moisture loss, time taken for drying, effect on qualitative parameters were statistically analyzed. Dried roses were added value through application of color. Dried roses were used in development of products such as frames and potpourris. The cost of each product was estimated and 30 consumers assessed the products for consumer acceptability. The results reveal that Red Rose took 10 days to dry completely. The maximum moisture loss was 86 per cent. Color of red rose turned darker and its appearance became lusterless after drying. Hence value addition of color was required. The most suitable value addition was Oil and Spray paints. The consumer acceptability of value-added products was extremely acceptable.

Keywords: *Rosa damascena*, silica-gel drying technique, moisture loss, quality parameters, consumer acceptability

1. Introduction

Dry flowers are vital export articles correspondingly in Indian and Global markets and Indian export is composed of 71 per cent dry flowers which are shipped to chiefly USA, Japan, Australia, Russia and Europe. The demand for dry flowers is growing at an inspiring rate of 8-10 per cent yearly thus contributing a lot of prospects for the Indian entrepreneurs to arrive in the worldwide floricultural trade (Singh, 2009) ^[1]. This commerce exports dried flowers and plants from India is about Rs. 100 crores. Potpourri is a major product of dry flower industry valued at Rs. 55 crores in India alone. This business provides direct employment to nearly 15,000 persons and secondary occupation to around 60,000 persons. In India, nearly 60% of the resources are obtained from forests and plains, only 40% of the flowers are cultivated for drying and coloring (Singh and Thapa, 2017) ^[12].

Roses are the first largest families of flowering plants and are distributed throughout the world. Roses are eye-catching elegant flowers that come in variety of colours and have huge emotional and cultural significance. Every rose has a flower head that is round in shape and symmetrical face and at downwards having vertical axis. Rose petals are ranges in shape like pointed cone with a rounded tear shape and some layer flat and the edges of others curl up or under. Roses has five or more than 60 petals which overlapping in layers on each flower head (D.C. Winston, 2017) ^[3].

The purity, beauty and quality of Rose flowers can be retained only for few days or few weeks. But, beauty and quality of dried Rose flowers can be retained from few months to several years by applying suitable drying technique. In order to reduce the major problem of short life of roses, drying techniques play an important role. The simplified drying technique such as Silica-gel drying technique is standardized in this study by which roses retain their fresh look for several months to several years. Hence, dried roses can be made highly suitable reserves for interior decoration and value added products. The dried flowers marketing has grown rapidly as consumers have become "Eco conscious" and choose dried flowers as the biodegradable and environmental friendly alternative over other products (Joshi and Jadhav, 2017). Based on the above rationale, the study on 'Standardization of Silica-gel drying technique of *Rosa damascena*' was undertaken with the following objectives:

1. To standardize the silica-gel drying technique of *Rosa damascena* flowers.
2. To develop value added products and evaluate the consumer acceptability of the developed value added products from dried *Rosa damascena* flowers.

2. Material and Methods

The present research was conducted in the year 2017-20 in the Department of Family Resource Management, College of Community Science, University of Agricultural Sciences, Dharwad, Karnataka. Cut *Rosa damascena* flowers were harvested in the early morning or late evening hours because the water necessity is comparatively less and have higher vase life. The flowers were cut at their stem in an angle using sharp pruning shears. The cut flowers were placed in water. They were placed in shade to avoid heat stress and unusual drying of petals. Red rose flowers were chosen for this research study. They were collected from the local flower growers and nurseries for the experimentation purpose. In this research study selected flowers dried in silica gel. It is a biochemical embedding media with high moisture absorbing capacity. Silica gel must be used in an airtight container. If it becomes moisture logged, it will not have the capacity to dry flowers. Hence it must be dried again by placing it in a microwave oven. Spread silica-gel in a shallow pan, place it in a warm oven (250°–275°), stirring occasionally until it loses moisture completely. Store silica gel in an airtight container until it is used again. Long and shallow plastic containers were chosen to dry *Rosa damascena*. They were wiped thoroughly to check moisture. The base was filled with an inch or two of silica-gel to create a bed for flowers. The roses were placed facing upwards. Gently flowers were covered with half an inch of silica-gel around them. Then the flower head was fully buried. Silica-gel was poured in between the petals so it reaches all corners of the bloom. Then the container was sealed. Further, it was placed out of direct sunlight and disturbances. The flowers were left for drying for at least a week in the container. Each day flowers were removed to check drying and record the dry weight. Once they were dried, roses were carefully removed from the box. With help of a paintbrush silica-gel stuck on the petals was wiped off and dried roses were preserved in a air-tight container. The observation noted were time taken for drying, fresh weight, dry weight and

moisture loss (%). The qualitative parameters such as colour, texture, shape and appearance were assessed by scoring on a five point scale given by (Oulakh, 2012) [8]. The point distribution patterns were Excellent (5.00), Very good (4.00), Good (3.00), Bad (2.00) and Very bad (1.00). The dried and dyed flowers were subjected to value addition by applying color manually. The dyed flowers were used in designing and development of beautiful value added products such as frames and potpourris. The cost of manufacturing of these products was assessed by guidelines given by University of Agricultural Sciences Dharwad (UASD), Karnataka. The Electricity cost was calculated as 10 per cent of Cost of production. The cost of labour was calculated as 15 per cent of cost of production. The miscellaneous cost was calculated as 20 per cent of cost of production. The profit was calculated as 30 per cent of the cost of production. Totaling all the components the selling price was devised. The consumer acceptability was judged by 30 consumers who were randomly selected based on their interest in volunteering for this research study. It was interpreted in terms of mean score. A scale was developed to assess the acceptability in point distribution pattern based on the factors such as Visual appearance, Size of the product, Weight of the product, Ease of maintenance, Durability and Cost of the product each rated as Extremely acceptable (5.00-4.00), Moderately acceptable (4.00-3.00), Slightly acceptable (3.00-2.00), Moderately defied (2.00-1.00) and Extremely defied (less than 1.00).

3. Results and Discussion

Roses were procured from local vendors and nurseries located in Dharwad and Hubballi cities, Karnataka state. Roses were available only during the monsoon, autumn and spring seasons (Table 1). They were available at cent per cent of the local vendor shops and nurseries. They were sold in bunches for Rs. 20 to Rs. 30 depending upon the demand in the market.

Table 1: Availability of *Rosa Indica L* flowers in Dharwad and Hubballi cities

Vernacular Name	Scientific Name	Available Season	Cost (Rs.)	Local Vendors (n ₂ =30)	Nurseries (n ₃ =10)
Rose	<i>Rosa damascena</i>	Monsoon, Autumn & Spring	20-30 per bunch	30(100.00)	10(100.00)

3.1 Time taken for drying of *Rosa damascena*

The time taken for drying in silica-gel drying technique is represented in Table 2. rose flowers irrespective of the colour of flower consumed 144 hours (6 days) for drying. According to Singh *et al.*, (2004) [10] reported that drying in silica gel is faster without any deterioration in quality.

Table 2: Time taken for drying by red roses in silica gel drying technique

Flowers	Colour	Time taken	
		Days	Hours
Rose	Red	240	10

3.2 Moisture Loss in *Rosa damascena*

As interpreted in Table 3 the fresh weight of Red rose was 12.50 g, with 86.00 per cent of moisture loss the dry weight recorded was 1.75 g. Dahiya (2003) [2] has found that the weight and moisture content of dried flowers were decreased significantly with an increase in the temperature and duration of drying.

Table 3: Moisture loss (%) in Red roses as effect of silica gel drying technique

Type of flower	Fresh Weight (g)	Dry Weight (g)	Moisture Loss (%)
Rose	12.50	1.75	86.00

3.3 Qualitative parameters of *Rosa damascena*

The qualitative parameters of Red rose were physically examined and depicted in Table 4. The colour turned darker as an effect of Silica-gel drying technique. The texture became rough and brittle, shape was retained and stiff with petals being wrinkled. The overall appearance became lustreless. According to Singh *et al.*, (2004) [10] has reported that drying in silica gel is faster without any deterioration in quality, however there is slight roughness in petal texture which was aesthetically accepted. Dhatt *et al.*, (2007) [4] studied that the method of drying rose buds and embedding of rose buds in silica gel has the best quality with shape and color. According to Raval, Jayswal and Maitrey (2020) [5] in silica gel dried flower quality was very well maintained. They concluded that for rose flower, embedded drying technique is best in which shape, size, colour are maintained.

Table 4: Qualitative parameters of dried Orchid flowers

Flowers	Colour	Colour change	Texture	Shape	Overall Appearance
Rose	Red	Turned Darker	Rough & Brittle	Stiff, Wrinkled petals & Retained shape	Lusterless

3.4 Development of value added products from *Rosa damascena*

Silica-gel dried rose flowers were used for preparation of diversified value added products. Dry flowers with original colour and shape, developed through embedding, were utilized for preparation of three dimensional arrangements. This research was intended to develop value added products like: Frame and Potpourri (Fig. 1). According to Katagi *et al* (2014) [7] dehydrated flowers and foliage can be used for designing distinctive, fascinating and artistic decorative items e.g. greeting cards, wall plates, calendar, landscapes, etc. Floral Craft means skilful and artistic use of floral materials for making saleable items for decoration purpose. These dried items may be used with fresh flowers or alone as: Floral arrangements, bouquets, gift pack, festive decorations, collages, flower pitchers, floral balls, pomanders, wall

sceneries, greeting cards, wedding cards, sweet smelling potpourris. The following items are required for preparation of greeting cards, floral designs, pictures, landscapes, calendars etc. Saima *et al* (2019) [9] opined that the drying techniques results in the preservation of flowers and foliage and the material can be can be successfully used in preparation of various floral decorations and different craft items *viz* greetings cards, wall hangings, photo frames, bouquets, decorative pots, book coverings, potpourris, flower baskets and various other economically useful creations. According to Raval, Jayswal and Maitrey (2020) [5] using these techniques we can dry flowers appropriately and use these dried flowers to make so many products like dry flower arrangement, floral jewelry, potpourri, candle making, press dried flower products, petal embedded handmade paper.



Fig 1: Value added products developed from dried red roses.

3.5 Cost estimation of value added products

The cost estimation of designed and developed value added products is interpreted in Table 5 was calculated on the guidelines given by University of Agricultural Sciences, Dharwad [2]. The Market Retail Price (MRP) was calculated on the basis of components such as cost of flowers and foliage, cost of raw materials, cost of moulds/frames. Containers, Cost of electricity (10%), Labour cost (15%), miscellaneous cost (20%) and Profit (30%). The Cost of production of 30X60 cm frame was Rs. 522.00/- which comprised Rs. 150.00/- as Cost of flowers and foliage, Rs. 60.00/- as Cost of raw materials, Rs. 150.00/- as Cost of

frames, Rs. 36.00/- as Electricity cost, Rs. 54.00/- as Labour cost, Rs. 72.00/- as Miscellaneous cost. Calculated 30 per cent of profit was Rs. 156.60/-, which made Selling price of Bookmarks was Rs.678.66/-. The Cost of production of Potpourris was Rs. 64.25/- which comprised Rs. 15.00/- as Cost of flowers and foliage, Rs. 15.00/- as Cost of raw materials, Rs. 15.00/- as Cost of glass containers, Rs. 4.50/- as Electricity cost, Rs. 6.75/- as Labour cost, Rs. 8.00/- as Miscellaneous cost. Calculated 30 per cent of profit was Rs. 19.27/-, which made Selling price of Potpourris was Rs. 83.52/-.

Table 6: Cost estimation of value added products developed from dried Orchid flowers

P. D	C. F (Rs.)	C. R (Rs.)	C. C (Rs.)	E. C @ 10% (Rs.)	L. C @ 15% (Rs.)	M. C @ 20% (Rs.)	C. P (Rs.)	Profit @ 30% (Rs.)	S. P (Rs.)
Frames (30x60)	150	60	150	36	54	72	522	156.60	678.66
Potpourris (small)	15	15	15	4.50	6.75	8.00	64.25	19.27	83.52

Note: P.D: Product Description; C. F: Cost of flowers; C. R: Cost of raw materials; C.C: Cost of containers E. C: Electricity Cost; L. C: Labour Cost; M. C: Miscellaneous Cost; C. P: Cost of Production; S. P: Selling Price

3.6 Consumer acceptability for the developed floral crafts

The designed and developed products were observed to be 'Extremely acceptable to Moderately acceptable'. Acceptability mean score was 4.33 given to Potpourris [Table 7]. Potpourris secured 5.00 for Visual appearance, Size,

Weight and 4.00 for Cost, Ease of maintenance and Durability each. Potpourris were Extremely accepted by the consumers. Acceptability mean score 3.67 was given to Frames with 5 for Visual appearance, 4 for Durability, Cost and 3 for Size, Weight and Ease of maintenance. It was Moderately accepted

by the consumers. Crepeau (2016) [1] has concluded that drying roses is great way to preserve their beauty long after

the season had ended for beautiful looking blooms and for the weddings specially and for varieties of beautiful craft items.

Table 7: Consumer acceptability of value added products developed

P. D	V. A	S. P	W. P	E. M	D. P	C. P	O. A	Observations
Frames	5.00	3.00	3.00	3.00	4.00	4.00	3.67	Moderately acceptable
Potpourris	5.00	4.00	5.00	4.00	4.00	4.00	4.33	Extremely acceptable

Note: P.D: Product Description; V. A: Visual appearance; S. P: Size of Product; W. P: Weight of Product; E. M: Ease of Maintenance; D. P: Durability of Product; C. P: Cost of Product; O. A: Overall Acceptability

4. Conclusion

Our country has a Mother Nature's boon of abundant sunshine, water, different agro-climatic conditions and good international networks. India has huge skilled human resource base. Fundamentally limitless talents for innovative designs are existing in the folk artisans. Dry rose flowers have many advantages such as they are inexpensive, slightest up keep, not easily perishable, eco-friendly & recyclable, year round accessibility & not dependable on weather or season, hence they can be replaced costly and perishable fresh flowers. The results of this study reveal that there was no significant difference found in dried rose flowers w.r.t qualitative parameters such as colour, texture, shape and overall appearance within flowers. Consumers disclosed keenness in learning about developed value added products such as bookmarks, coasters, key chains, floral jewelry, potpourris & paper weights. The existing technology has the potential to employ thousands of people especially to unemployed youths, Schools and College drop-outs, housewives and rural women's as boundless artistic and embellished products can be designed using dry flowers. There is a necessity to generate adequate consciousness about the potential of this technology by workshops, exhibitions and seminars etc.

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