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Effect of different drying techniques on Dutch rose

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Abstract

Demand of dry flowers is increasing day by day both in domestic and international market, because dried flowers have a great potential as substitute of fresh flowers. The study aims to know the effect of different drying techniques on the quality of Dutch rose. The study was conducted in Dharwad city during 2017-18 in the department of Family Resource Management. Flowers of three different colours of Dutch rose were selected and collected from local growers. The flowers were subjected to drying techniques in air drying, silica gel, borax and microwave drying techniques. Data were statistically analyzed. The result shows that in different drying techniques Dutch rose has taken less time to dry completely in microwave drying technique. Maximum moisture loss was observed when the flowers were dried in silica gel drying. Yellow colour Dutch rose had retained good colour as well as appearance.

Keywords: dutch rose, drying techniques, moisture loss, quality parameters

Introduction

Flowers are one of the pure and beautiful creations of nature. Flowers have a special place in everywhere, due to their purity and beauty. The fragrance of flowers makes the surrounding air pleasant to breathe. Flowers look like world ornaments with their most valuable elegant and artistic properties. Their sight is a joy forever with expression of pure love and respect. Flowers are our companions in life as well as in death. They are symbol of love, respect, sacrifice, friendship, beauty and regard. Flowers are a most integral part of Indian culture. Flowers are being used for offering and decorative purposes all over the country since ancient times.

Rose is one of the nature's most beautiful flowers and it is universally accepted as "Queen of flowers". Rose belongs to the family Rosacea and Genus Rosa. Rose is symbol of love, adoration and innocence and it occupies a prominent position in the tradition, religious and social culture of every country in the world. Rose is one of the top ranking cut flower in the international flower trade and dry cut flower of roses are the most expensive in all dried flowers traded in the international market (Renuka *et al.*, 2017) [7].

The purity, beauty and quality of fresh flowers can be retained only for few days or few weeks. But, beauty and quality of dried flowers can be retained from few months to several years together by applying suitable drying techniques. In order to reduce the major problem of short life of fresh cut flowers, and other plant materials, drying techniques play an important role. The simplified drying techniques have been cultivated by which flowers, and other plant materials retain their fresh look for several months to several years. Hence, these dried flowers can be made highly suitable raw materials for interior decoration of much type of occasions.

The most common methods of drying of flowers and foliages include press drying, air drying, desiccant (silica gel, borax and sand) drying, microwave drying and hot air oven drying. Not all the drying techniques suitable for all type of flowers it is due to characteristics of flowers vary with crop to crop. Demand of dry flowers is increasing day by day both in domestic and international market. The dried flowers marketing has grown rapidly as consumers become "Eco conscious" and choose dried flowers as the biodegradable and environmental friendly.

Material and Methods

The present investigation was carried out in the year 2017-18 in the Department of Family Resource Management, College of Community Science. The three different colors of Dutch rose (red, yellow and white) were selected and collected from the local flower growers for the experiment purpose. The flowers were dried in different drying techniques such as air drying, desiccant (Silica gel, borax and sand) drying and microwave drying (after embedding them in

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silica gel) techniques. The flowers were dried in these drying techniques and observation was noted with respect to fresh weight, dry weight, moisture loss in per cent and time taken for drying of flowers in different drying techniques. The quality parameters viz., color, shape and appearance was assessed by scoring on a five point scale given by Dinesh 2000. The point distribution patterns are Excellent (5.00), Very good (4.00), Good (3.00), Bad (2.00) and Very bad (1.00). The data was recorded and subjected to statistical analysis using suitable statistical tools.

Result and Discussion

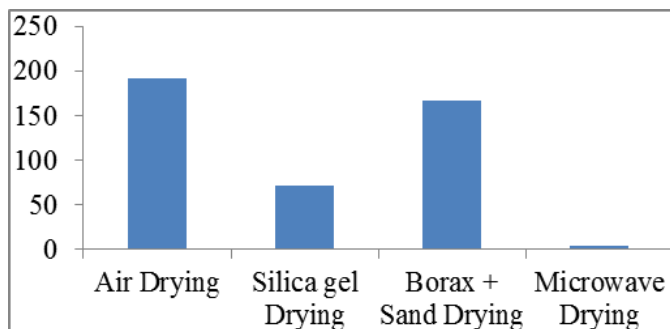


Fig 1: Time (minutes) taken for drying of Dutch rose by different drying techniques

The data presented in Fig. 1 indicates the time taken (minutes) for drying of Dutch rose by different drying techniques. Dutch rose taken more time i.e., 192 minutes in air drying, followed by in silica gel drying (72 minutes), mixture of borax and sand drying (168 minutes) and in microwave drying Dutch rose taken only 0.05 minutes. It can be revealed that time taken for drying of Dutch rose was more in air drying and less in microwave drying among different drying techniques. Radha Rani and Reddy (2015) [5] revealed that in microwave drying carnation and gerbera have taken 4 minutes and other flowers took only 2 minutes to dry.

Table 1: Effect of different drying techniques on moisture loss of selected Dutch rose

Drying techniques	Dutch rose colours						Mean Value	
	Red		Yellow		White		F.W	D.W
	F.W	D.W	F.W	D.W	F.W	D.W		
Air drying	13.88	0.86	13.68	0.62	11.82	0.82	13.12	1.46
Silica gel drying	10.12	0.96	11.08	2.70	11.42	0.60	10.87	0.72
Borax drying	12.92	1.13	12.90	1.00	12.00	1.16	12.60	1.10
Microwave drying	10.94	1.12	10.10	0.96	11.08	0.98	10.70	1.02
Mean	11.97	1.02	11.94	1.32	11.58	0.89		
S.D.	1.74	0.13	1.64	0.94	0.41	0.24		

Note: F.W- Fresh weight
D.W- Dry weight

ANOVA for effect of drying techniques on moisture loss of Dutch rose

Factors	DF	Cal 'F' value	'F' critical value	C.D. value 5 %	C.V. value
A-Techniques	3	11.65	0.000	0.436	13.18
B-Flower colours	2	20.21	0.115	0.378	
C- F.W and D.W	1	47.16	0.000	0.308	
AB	6	30.48	0.004	0.755	
BC	2	00.66	0.412	0.534	
AC	3	20.68	0.000	0.617	
ABC	6	30.92	0.002	1.068	

Effect of drying techniques on fresh and dry weight in Dutch

rose flowers was presented in table 1. The dry and fresh weight of Dutch rose was significantly influenced by drying techniques with different colours and there is a 13.18 per cent coefficient of variance between the techniques, flower colours and fresh and dry weight of the Dutch rose. White colour Dutch rose recorded maximum dry weight i.e., 0.89 g followed by yellow colour i.e.1.32 g and red colour recorded minimum dry weight i.e.1.02 g. Maximum flowers dry weight was recorded in silica gel drying i.e.0.72 g followed by microwave drying 1.02 g and mixture of borax and sand drying recorded 1.10 g and minimum dry weight was recorded with air drying (1.46 g). With respect to interaction includes drying techniques, flower colours and fresh and dry weight of flowers (ABC), all three colours of Dutch rose such as red, yellow and white recorded maximum dry weight when they dried in silica gel drying method compared to other drying techniques viz., air drying, mixture of borax and sand drying and microwave drying. Pertuit (2002) [4] reported that silica gel can absorb 40 per cent of its moisture and suitable for flower with tight petals like rose.

Table 2: Effect of different drying techniques on colour of Dutch rose

Techniques	Flower colours (Mean value)			Mean	'F' value	C.D.
	Red	Yellow	White			
Air drying	4.4	4.5	4.1	4.3	4.25*	0.79
Silica gel drying	4.7	4.9	4.6	4.7	9.50*	0.23
Borax + Sand	4.4	4.6	4.2	4.4	5.66*	0.77
Microwave drying	4.6	4.9	4.4	4.6	10.50*	0.20
Mean	4.5	4.7	4.3			

5 = Extremely good, 4 = Very good, 3 = Good, 2 = Bad, 1 = Very bad

* Significant at 5 % level

Colour of dried Dutch rose flowers as affected by different drying techniques is presented in table 2. The colour of dried flowers differed significantly at 5 % level due to different colours of Dutch rose and method of drying technique used. Yellow colour Dutch rose had retained good colour and received the maximum mean score of 4.7 when compared to the red (4.5) and white (4.1) colour Dutch rose. Silica gel drying technique was recorded significantly superior for colour retention of the Dutch rose as indicated by recording the highest mean score of 4.7, while these dried flowers recorded minimum mean score for colour retention in other three drying techniques such as microwave drying recorded 4.6, followed by mixture of borax and sand drying (4.4) and air drying recorded 4.3. Datillo (2001) [1] opined that rose colours that dry well and retain bright colour include orange, medium and dark yellow, medium red and medium and dark pink. Dark red tends to turn black and light pink becomes pale.

Table 3: Effect of different drying techniques on appearance of Dutch rose

Techniques	Flower colours (Mean value)			Mean	'F' value	C.D.
	Red	Yellow	White			
Air drying	4.1	4.5	4.2	4.2	4.66*	0.88
Silica gel drying	4.6	4.9	4.4	4.6	15.50*	0.27
Borax + Sand	4.4	4.6	4.0	4.3	3.63*	0.87
Microwave drying	4.7	4.8	4.2	4.5	6.33*	0.33
Mean	4.4	4.7	4.2			

5 = extremely good, 4 = Very good, 3 = Good, 2 = Bad, 1 = Very bad

* Significant at 5 % level

Silica gel drying method was found significantly superior for appearance of the flowers as indicated in Table 3 by recording the maximum mean score of 4.6 and followed by microwave drying 4.5, mixture of borax and sand drying scored 4.3 and minimum mean score was recorded by air drying technique *i.e.*, 4.2. In all the drying techniques *viz.*, air drying, silica gel drying, mixture of borax and sand drying and microwave drying yellow colour Dutch rose recorded maximum mean score *i.e.*, 4.7 with respect to appearance followed by red colour recorded 4.4, and minimum mean score recorded by the white colour Dutch rose (4.2). Safeena *et al.* (2006b) ^[8] reported drying different varieties of rose with silica gel gives good result for colour (2.51), appearance (2.52) and texture (2.38).

Table 4: Effect of different drying techniques on shape of Dutch rose

Techniques	Flower colours (Mean value)			Mean	'F' value	'F' crit
	Red	Yellow	White			
Air drying	3.3	3.6	3.4	3.4	0.27**	3.46
Silica gel drying	4.2	4.6	4.4	4.4	2.36**	5.14
Borax + Sand	4.1	4.4	4.2	4.2	1.40**	3.55
Microwave drying	4.2	4.4	3.8	4.1	0.25**	5.14
Mean	4.4	4.7	4.2			

5 = Extremely good, 4 = Very good, 3 = Good, 2 = Bad, 1 = Very bad

* Significant at 5 % level

** Significant at 1 % level

Shape of dried Dutch rose flowers as affected by different drying techniques is presented in table 4. The shape of the dried Dutch rose flowers non significantly differed with respect to different colours of flowers and method of drying techniques used. Yellow colour Dutch rose maintain the good shape after drying with highest mean score of 4.7 and followed by red colour Dutch rose (4.4) and white colour Dutch rose scored minimum *i.e.*, 3.4. Among the four drying techniques silica gel drying technique was proved as superior with respect to maintain the good shape after drying with highest mean score of 4.4 and followed by mixture of borax and sand drying scored 4.2, microwave drying scored 4.1 and minimum mean score was observed in the air drying *i.e.*, 4.2. According to Renuka, *et al.* (2016) ^[6] there were significant differences for shape of dehydrated flower for different treatments. Dhatt *et al.* (2007) ^[2] found that silica gel drying of rose buds had the best quality with respect to colour and shape.

Conclusion

From this study, it is concluded that with respect to time taken to dry Dutch rose in different drying techniques all three colours (red, yellow and white) has taken less time to dry completely in microwave drying technique (3 minute) and more time taken by air drying (192 minutes). It can be seen that moisture content of fresh and dried Dutch rose flower is ranges from 11.82 g to 13.88 g and 0.82 g to 2.62 g respectively. Maximum moisture loss was observed when the flowers were dried in silica gel drying technique and with regard to colour of flowers, red colour Dutch rose recorded maximum moisture loss (93.08 %). The colour and appearance of dried Dutch rose flowers differed significantly at 5 per cent level due to three different colours of Dutch rose and method of drying technique used. Yellow colour Dutch rose had retained good colour as well as appearance. It was also observed that silica gel drying technique showed the best results in all three colours (red, yellow and white) of Dutch

rose. Shape of the dried Dutch flowers non-significantly differed with respect to different colours of flowers and method of drying techniques used.

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