International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
IJCS 2017; 5(4): 751-753

Received: 03-05-2017
Accepted: 04-06-2017

Renuka
Department of Floriculture and Landscaping, College of Horticulture and Forestry, Jhalarapatan, Jhalawar, Agriculture University, Kota, Rajasthan, India

SK Moond
Department of Floriculture and Landscaping, College of Horticulture and Forestry, Jhalarapatan, Jhalawar, Agriculture University, Kota, Rajasthan, India

Subash Chandra
Department of Floriculture and Landscaping, College of Horticulture and Forestry, Jhalarapatan, Jhalawar, Agriculture University, Kota, Rajasthan, India

Ashok Choudhary
Department of Floriculture and Landscaping, College of Horticulture and Forestry, Jhalarapatan, Jhalawar, Agriculture University, Kota, Rajasthan, India

Manoj Kumar Rolaniya
Department of horticulture, S.K.N Agriculture University, Jobner, Rajasthan, India

Sunita Koodi
Department of horticulture, S.K.N Agriculture University, Jobner, Rajasthan, India

Correspondence
Ashok Choudhary
Department of Floriculture and Landscaping, College of Horticulture and Forestry, Jhalarapatan, Jhalawar, Agriculture University, Kota, Rajasthan, India

Effect of drying techniques and embedding media on pigment content and shape of rose (*Rosa chinensis* Jacq.) and water lily (*Nymphaea alba* L.)

Renuka, SK Moond, Subash Chandra, Ashok Choudhary, Manoj Kumar Rolaniya and Sunita Koodi

Abstract
The present investigation entitled "Effect of drying techniques and embedding media on dried flower quality of Rose (*Rosa chinensis* Jacq.) and Water lily (*Nymphaea alba* L.)" was conducted in the Laboratory of Department of Floriculture and Landscaping, College of Horticulture & Forestry, Jhalarapatan, Jhalawar during October 2015 to March 2016.The experiment had 22 treatments studied on Rose and Water lily, including drying conditions viz. air drying without embedding (control), hot air oven drying (At 40^0 C, 50^0 C and 60^0 C for 24 hours) and microwave oven drying (2 minutes, 3 minutes and 4 minutes at 350 Hz) in a combination with three different embedding media was sand, borax and silica gel. The experiment was laid out in completely randomized design (CRD) with three replications
The results obtained show that the Minimum pigment loss in dried flowers of rose (20.27 %) was recorded in silica gel in microwave oven at 350 Hz for 2 minutes and maximum (63.14 %) in without embedding (control). Among the different drying conditions, temperature and duration the flowers dried in silica gel in microwave oven at 350 Hz for 3 minutes had the highest sensory scores for shape (8.57 and 7.87) for dried flowers of rose and water lily, respectively whereas the minimum scores for shape (5.04 and 4.93) were recorded with T_1 (control).

Keyword: Rose, Water lily, embedding media, silica gel, sand, sensory score

Introduction

Today floriculture is seen as a profession of higher potential returns per unit area as compared to the other horticultural crops. Commercial floriculture has attracted attention in India due to enormous export potential and increased domestic use of flowers in daily life with the improvement in living standards of people. There is an increasing demand all over the world for the decoration of living and working places with eco-friendly things like fresh flowers and foliages, dried plant parts and dry flowers. Fresh flowers though exquisite in their beauty are highly expensive. Also, they are perishable and delicate in nature and cannot retain their beauty and fresh look for a long time in spite of using best chemicals for enhancing vase life. Moreover, there is a non-availability of fresh flowers and foliages all round the year in all places. The dried flowers are near to natural, having beauty as well as an everlasting value, if preserved and processed with appropriate dehydration technology. Hence, the dried flowers are extra special as they can be kept and cherished for years together (Singhwi, 1996) [14]. The dry flower industry in India is about fifty years old and was introduced by the British. India stands fourth in dry flower exports worldwide. Potpourris being the major segment of drying flower industry valuing at Rs. 55 crores in India alone (Nirmala *et al.*, 2008) [8]. In recent floriculture trade, the export of dry flowers from India during 2013-2014 was Rs. 363.3 crores (Periban *et al.*, 2014) [9]. Rose is one of the top ranking cut flowers in the international flower trade and the dry cut flowers of roses are the most expensive and exquisite of all dried flowers traded in the international market (Barnett and Moore, 1999) [2]. Similarly, white water lily is a beautiful aquatic plant. It is a very popular plant for cultivation in ornamental ponds. Hence, considering the premium potential of rose and water lily in dry flower industry, the present study was planned to find out the most effective drying techniques and embedding media on dried flower quality of rose and water lily.

Materials and methods

The flowers of water lily open pond condition Jhalawar and flowers of rose were produced open field condition of a progressive farmer nearby Jhalarapatan, Jhalawar produced in the open field and pond condition of Jhalawar. The flowers at suitable stages of maturity for harvested in the months of October and November 2015 and put for drying and dehydration as per the treatments. Healthy, disease free and uniform flower stems were harvested at half bloom stage (Safeena *et al*., 2006b) [10] in the morning hours between 8.00 and 9.00 am by cutting with sharp knife. Immediately after harvest, the base of the flower stalks were placed in tap water and brought to the Laboratory, Department of Floriculture and Landscaping, College of Horticulture and Forestry, Jhalarapatan, Jhalawar to give various treatments. The stem length of each flower was kept at a uniform length of 10 cm. The leaves present on each cut stem were removed before using them for drying.Observations regarding pigment loss during drying and sensory parameters shape by scoring on a 9 point scale i.e. liked extremely (9 points), liked very much (8 points), liked moderately (7 points), liked slightly (6 points), neither liked nor disliked (5 points), disliked slightly (4 points), disliked moderately (3 points), disliked very much (2 points), disliked extremely (1 points).

Statistical analysis: The experiment was arranged in completely randomized design (CRD), with 22 treatments each having three replicates. Data were subjected to analysis of variance (ANOVA)using statistical software OPSTAT, CCS HAU, Haryana, India and the critical difference (C.D. P=0.05) was used to compare the means (Gomez and Gomez).

Table 1: Effect of drying techniques and embedding media on pigment loss during drying (%) in Rose

Treatment	Fresh pigment content (mg/g)	Dried pigment content (mg/g)	pigment content in dried flower (mg/g)
T_1	1.55	0.57	63.14
T_2	1.51	1.01	32.74
T_3	1.53	1.08	29.48
T_4	1.57	1.18	24.89
T_5	1.51	0.91	39.73
T_6	1.54	1.96	37.30
T_7	1.52	1.20	20.80
T_8	1.55	0.87	43.87
T_9	1.53	0.93	39.15
T_{10}	1.54	1.03	33.33
T_{11}	1.51	0.81	46.83
T_{12}	1.52	1.90	40.36
T_{13}	1.50	1.01	32.74
T_{14}	1.50	0.94	37.10
T_{15}	1.52	0.99	35.09
T_{16}	1.51	1.21	20.27
T_{17}	1.57	0.89	43.40
T_{18}	1.54	0.96	37.56
T_{19}	1.56	1.20	22.27
T_{20}	1.51	0.84	44.35
T_{21}	1.53	0.93	39.33
T_{22}	1.52	1.07	29.38
C.D.(p=0.05)	NS	0.034	3.19

Pigment loss during drying (%): It is evident from Table 1 that the pigment loss during drying varied significantly for different treatments. The pigment loss was maximum in T_1 (63.14 %) and it was minimum in T_{16} (20.27 %). The presented data also show that the pigment loss during drying was the maximum in flowers dried without embedding (control). The more loss of anthocyanin content may be ascribed to fact that there is degradation of anthocyanin and browning effect of anthocyanin at higher temperature. Since anthocyanins are water soluble and located in vacuoles so at higher temperature there is more moisture loss and release of higher amounts of ethylene which might have caused disintegration of tonoplast, thus leading to more degradation of anthocyanin pigments (Dilta *et al*., 2014) [5]. Similar results have also been reported by Minquez *et al*. (1994) [7] and Sharma *et al.* (2000) [11] in carrots. Better colour retention due to lesser anthocyanin degradation inT_{16} (Microwave oven 350 Hz + 3 Minutes + Silica gel) could be due to lesser heat generation in microwave oven as compared to other drying treatments along with added effect of silica gel embedding on pigment retention of flowers as higher dehydration temperature leads to higher loss of pigments without embedding. Silica exhibited slow heating effect at low temperature particularly for less duration, thereby, resulting in less disintegration of tonoplast as well as release of minimum amount of ethylene from the flower tissues, which might have ultimately resulted in lesser degradation of anthocyanin pigments. The results are in close proximity with the findings of Smith (1993) [15].

Table 2: Effect of drying techniques and embedding media on colour of dried flower quality of Rose and Water lily as assessed through sensory evaluation

Treatment	Colour	
	Rose	Water lily
T_1	5.08	5.01
T_2	5.31	5.20
T_3	5.90	5.71
T_4	7.18	7.01
T_5	7.09	6.91
T_6	7.04	7.01
T_7	7.12	7.02
T_8	7.39	7.05
T_9	7.16	7.09
T_{10}	8.09	7.16
T_{11}	7.57	7.02
T_{12}	7.17	7.13
T_{13}	7.27	7.26
T_{14}	7.25	7.02
T_{15}	7.19	7.05
T_{16}	8.04	7.54
T_{17}	7.26	7.13
T_{18}	7.69	7.21
T_{19}	8.13	7.95
T_{20}	7.39	7.33
T_{21}	7.52	7.39
T_{22}	7.77	7.55
C.D.(p=0.0 5)	0.321	0.136

The sensory scores for shape of dehydrated flowers of rose and water lily have been presented in Table 2. The results show that there were significant differences for shape of dehydrated flowers for different treatments. Amongst the treatments, T_{19} recorded the highest score for flower shape in rose (8.57) and in water lily (7.87), while the least score was recorded in T_1 in rose (5.04) and in water lily (4.93). The results also find supports from the findings of Safeena *et al.* (2006) [10] in rose, China aster and chrysanthemum, Aravinda and Jayanthi (2004) [1] in chrysanthemum and in zinnia. Least score for shape of dried flowers was noticed with the flowers dried without embedding (control). Kumari and Peiris (2000) [6] in rose. Bhalla *et al.* (2006) [3], Dhatt. *etal.* (2007), Nirmala *et al*. (2008) [8] and Sindhuja *et al.* (2015) [12].

References

1. Aravinda K, Jayanthi R. Standardization of drying techniques for chrysanthemum (*Dendranthemagrandiflora cv*. Button Type Local) flowers. J. Orn. Hort. 2004; 7:370-375.
2. Barnett T, Moore F. The ultimate book of fresh and dried flowers. Lorenz Books, USA. 1999, 3-4.
3. Bhalla R, Moona Dhiman SR, Thakur KS. Standardization of drying techniques of chrysanthemum (*Dendranthema grandiflorum,* Tzvelev.). J. Orna. Hort. 2006; 9(3):159-163.
4. Datta SK. Dehydration of flowers and foliage in floral crafts. Floriculture Today. 2001; 5:11-12.
5. Dilta BS, Behera TB, Gupta YC, Bhalla RB, Sharma P. Effect of embedding media, temperature and duration on hot air oven drying of rose (*Rosa hybrid* L.) *cv.* First Red. Ind. J. Applied Res. 2014; 4:233-239.
6. Kumari DLC, Peiris SE. Preliminary investigation of preservation methods to produce dried flowers of rose and statice. Tropical Agric. Res. 2000; 12:416-422.
7. Minquez ML, Jaran FM, Garrido FJ. Influence of the industrial drying processes of pepper fruits (*Capsicum annum cv.* Bola) for paprika on carotenoid content. J. Agri. Food Chemistry. 1994; 42:1190-1193.
8. Nirmala A, Chandrasekhar R, Padma M, Raj Kumar M. Standardization of drying techniques of carnation (*Dianthus caryophyllus*). J. Orna. Hort. 2008a; 11(3):168-172.
9. Periban S, Majumder J, Singh B, Rai T, Kumar R. Dried flowers: a new paradigm in Floriculture, 2014. *http:/www.Krishisewa.com/cms/articles/pht/*394-*dried-flowere.html.*
10. Safeena SA, Patil VS, naik BH. Standardization of stage of harvest for better quality of dry flowers of rose. J. Orna. Hort. 2006b; 9(2):224-226.
11. Sharma GK, Semwal AD, Arya SS. Effect of processing treatments on carotenoids composition of dehydrated carrots. J. Food Sci. Tech., 2000; 37(1):96-100.
12. Sindhuja S, Padmalatha T, Padmavathamma AS. Effect of embedding media on production of quality dry flowers in carnation. Plant archives. 2015; 15(1): 27-33.
13. Singh HP. Floriculture industry in India: the bright future ahead. Indian Hort. 2009; 54(1):3-8.
14. Singhwi MR. Dried flowers: an upcoming industry. Floriculture Today. 1996, 43-44.
15. Smith RC. Methods of preserving flowers NDSU Extension Service, North Dakote State Uni. of Agri. Applied Sci., USA, 1993.