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Standardization of glycerine dehydration technique in gerbera

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Abstract

The present research entitled “Standardization of Glycerine Drying Technique in Gerbera” was carried out at dry flower laboratory, Department of Floriculture and Landscape Architecture, Indira Gandhi Krishi Vishwavidyalaya, Raipur during the academic year 2021-22. The experiments were laid out using completely randomized design with three replications. The study was conducted while using different glycerol concentrations (1:1, 1:2, 1:3, 1:4 and 1:5) and durations (12 and 24 hours). Glycerol treatment did not show any effect on moisture loss. Time taken for drying was significantly reduced because of glycerol pre-treatment at 1:4 glycerol to water ratio for 12 hours. Glycerol pre-treatment showed increase in suppleness of dried gerbera flowers. Flowers treated with glycerol to water of 1:4 for 12 hours were found to be best with regards to colour (8.4), brittleness (5.46), texture (8.3) and appearance (8.2) recorded by sensory evaluation and were on par with flowers treated with glycerol to water ratio of 1:5 for 12 hours. Untreated flowers recorded poor performance with respect to all quality parameters.

Keywords: Standardization, gerbera, longevity, aesthetic properties, ornamental plants, glycerine

Introduction

India has been blessed with wide range of flower and ornamental plants species because of its varied agro climatic conditions thus, augmenting the floriculture trade. In recent situation of pandemic, the market of fresh flowers has declined rendering losses to farmers. Here, dry flowers become an alternative option for merchandising the produce as well as to increase the employment and income. Dry flower industry has been gaining popularity in our country from past four decades contributing over 60% to floriculture exports. Over 10 thousand tons of dried ornamentals were exported as assortments of value-added products which offer a wide range of qualities like novelty, longevity, aesthetic properties, flexibility and year-round availability. Potpourris and lotus pods form a major part of these exports. Export of dried flowers and plant parts generates revenue of more than Rs. 300 cores/year with Ramesh Flower Limited of Tuticorin (T.N.) having a 50% share of total export. A lot of art forms have evolved to achieve the objective of preserving flowers in their dried form such as resin casting, candles, photo frames, sweet-smelling potpourris, greeting cards, gift boxes, floral balls and pomanders. Advance drying techniques like microwave, glycerine and freeze-drying does not deter the quality and retain rich colour and texture which makes them ideal for fall and winter crafts. Glycerine, a humectant which is hygroscopic chemical helps to maintain the suppleness of dried material making it less susceptible to damage but very less scientific evidence is available on glycerine drying. The apparent lack of information paved a way for the present study entitled Standardization of glycerine drying technique in gerbera.

Materials and Methods

The present investigation was carried out to standardize concentration and duration of glycerol pre-treatment in gerbera during 2021-2022 at dry flower laboratory, Department of Floriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India. Fully opened flowers of Gerbera cv. Stanza were procured from the playhouses of Precision Farming Development Centre of College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya. Flowers are harvested between 8:00 to 9:00 am and kept in water a brought to laboratory where they are sorted for pests and diseases. Stems were trimmed to uniform length and treatments were imposed immediately. The flowers were kept in different concentration of glycerol for varied durations. Treatments are T₁ - glycerol: water in the ratio of 1:1 for 12 hours, T₂ - glycerol: water in the ratio of 1:2 for 12 hours, T₃ - glycerol: water in the ratio of

1:3 for 12 hours, T₄ - glycerol: water in the ratio of 1:4 for 12 hours, T₅ - glycerol: water in the ratio of 1:5 for 12 hours, T₆ - glycerol: water in the ratio of 1:1 for 24 hours, T₇ - glycerol: water in the ratio of 1:2 for 24 hours, T₈ - glycerol: water in the ratio of 1:3 for 24 hours, T₉ - glycerol: water in the ratio of 1:4 for 24 hours, T₁₀ - glycerol: water in the ratio of 1:5 for 24 hours, T₁₁ - control (drying without any pre-treatment). After pre-treatment the flowers were kept in silica gel and dried under shade. The experiment was laid out in completely randomized design with three replications. Quantitative and qualitative characters such as dry weight, moisture loss, time taken for drying, colour, brittleness, texture and overall appearance were measured.

Results and Discussion

The data presented in Table 4.1 for dry weight and moisture loss didn't show any remarkable changes in dried gerbera flowers as influenced by glycerol pre-treatment which depicted steady removal of moisture from flowers when dried

under shade. Similar results were observed earlier by Swamy, (2003) ^[9] and Patil, (2003) ^[7] in rose and carnation respectively for dry weight and moisture loss of flowers treated with different concentrations of glycerol for varying duration.

Significant differences were reported in time taken for drying due to glycerol pre-treatment. Pre-treatment with 1:4 glycerol to water ratio for 12 hours had shown drastic reduction in time taken for drying (5.7 days). Fully opened gerberas without any pre-treatment took maximum time for drying (8.5 days). The reduction in time taken for drying can be credited to the effect of glycerol pre-treatment. There was reduction in time taken for drying with decreased concentration and decreased duration of treatment. Patil, (2003) ^[7] also found reduction in time taken for drying in carnation but at higher concentration and duration. In general concentration of glycerol and duration of treatment are different for different flower specie.

Table 1: Effect of glycerol pre-treatment on quantitative and qualitative parameters of gerbera

	Treatment	Time	Colour	Brittleness	Texture	Appearance
1.	Glycerol: water in the ratio of 1:1 for 12 hours	7.06	7	6.03	6.8	6.66
2.	Glycerol: water in the ratio of 1:2 for 12 hours	6.76	7.3	5.83	7.13	7.1
3.	Glycerol: water in the ratio of 1:3 for 12 hours	6.4	7.6	5.73	7.23	7.36
4.	Glycerol: water in the ratio of 1:4 for 12 hours	5.7	8.4	5.46	8.3	8.2
5.	Glycerol: water in the ratio of 1:5 for 12 hours	6.16	8.16	5.56	7.8	7.76
6.	Glycerol: water in the ratio of 1:1 for 24 hours	8.3	5.5	6.83	4.8	4.7
7.	Glycerol: water in the ratio of 1:2 for 24 hours	8	5.86	6.66	5.16	5.2
8.	Glycerol: water in the ratio of 1:3 for 24 hours	7.7	6.26	6.6	5.4	5.53
9.	Glycerol: water in the ratio of 1:4 for 24 hours	7.46	6.53	6.36	5.8	5.9
10.	Glycerol: water in the ratio of 1:5 for 24 hours	7.16	6.73	6.2	6.26	6.23
11.	Control (drying without any pre-treatment)	8.5	5.23	7.53	4.4	4.3
	SEM ±	0.074	0.08	0.109	0.072	0.094
	CD at 5%	0.218	0.237	0.321	0.214	0.277

Quality parameters like colour, brittleness, texture and appearance showed significant differences due to glycerol pre-treatment. By sensory evaluation gerbera flowers treated with 1:4 glycerol to water ratio for 12 hours recorded highest score for colour (8.4), brittleness (5.46), texture (8.3) and overall appearance (8.2) followed by those treated with glycerol: water ratio of 1:5 for 12 hours with scores for colour (8.16), brittleness (5.56), texture (7.8) and overall appearance (7.76). This is because the suppleness of ornamental plant material can be preserved (plasticized) by treating with humectants which are hygroscopic chemicals that attract water vapour from surrounding atmosphere making the plant material less brittle (Joyce, 1998) ^[4] thus sustaining the suppleness of the dried plant material. The end product

obtained is more live in appearance and to touch as well as less prone to shattering and mechanical damage. Mathapati *et al.* (2016) ^[5] also found higher retention of quality parameters in gerbera var Imperial when treated with 1:3 glycerol: water ratio for 12 hours. From these observations it can be stated that quality of flowers can be efficiently maintained by treating flowers with glycerol which regulates the moisture loss through osmosis. Padmavathamma (1999) ^[6] and Raju (2001) ^[8] also obtained best quality dry flowers in statice and China aster respectively by glycerol pre-treatment but at higher concentration. In general glycerol concentration depends on nature of flowers. Poor performance was recorded by untreated flowers with regard to all display characteristics due to lack of plasticizing.

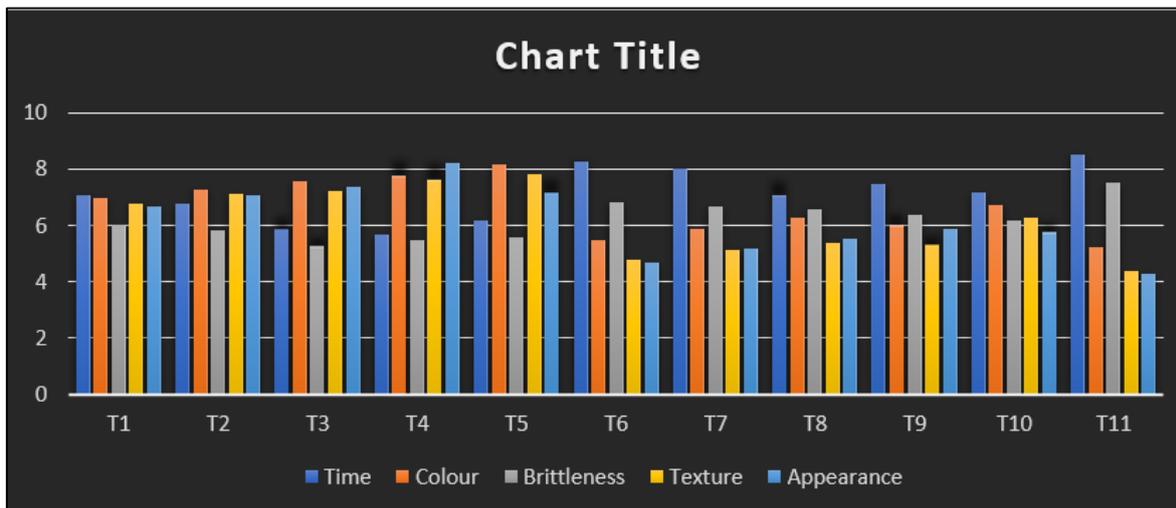


Fig 1: Quality parameters of dried gerbera flowers as affected by glycerol pre-treatment

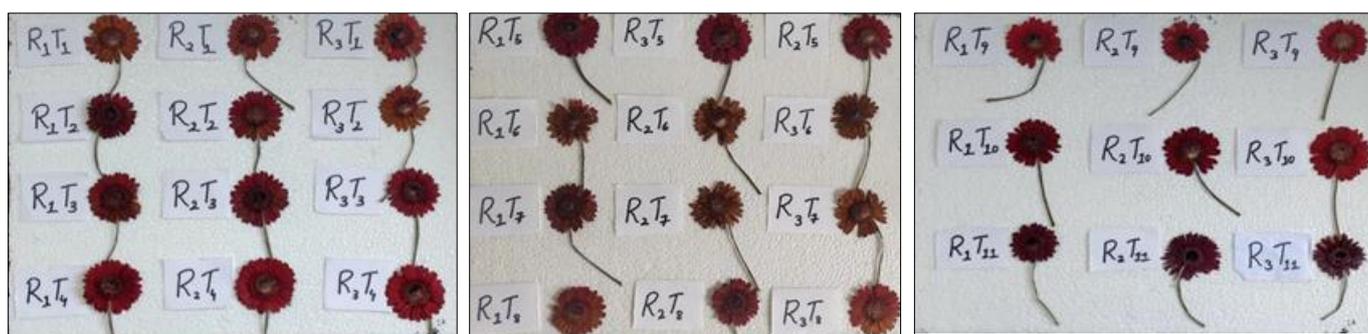


Plate 1: Plates showing the effect of pre-treatment on gerbera dried flowers



Shadow box frame (Square)



Shadow box frame



Wall hanging (hoop type)



Wall hanging



Coaster



Wreath



Scenery (A)



Scenery (B)



Greeting card (A)



Greeting card (B)



Candle



Resin Necklace

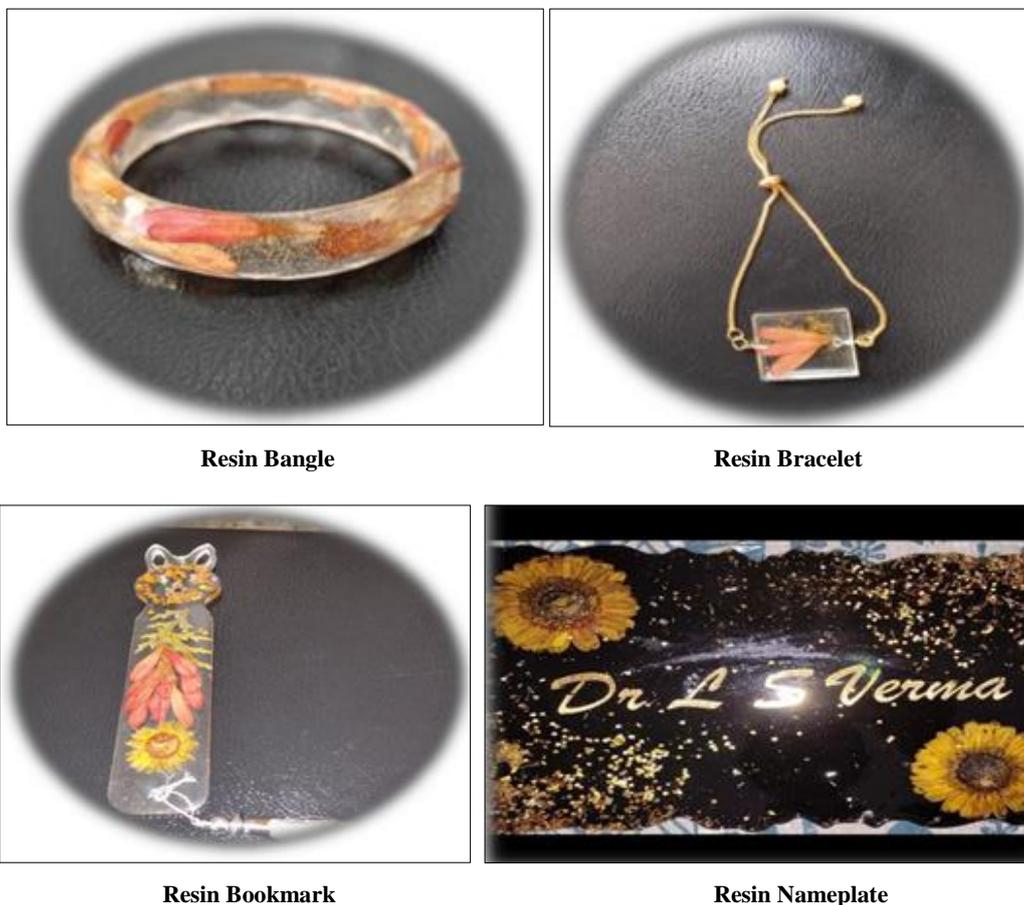


Fig 2: Value added dry flower products

Conclusion

The results of effect of glycerol pre-treatment on drying of gerbera flowers showed that treatment with glycerol: water ratio of 1:4 for 12 hours (T_1) performed best with respect to quality attributes like colour (8.4), brittleness (5.46), texture (8.3) and appearance (8.2) which was found to be on par with glycerol: water ratio of 1:5 for 12 hours (T_5). Therefore, it can be concluded that pre-treatment with glycerol: water ratio of 1:4 and 1:5 for 12 hours was found to be best for drying of gerbera flowers.

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