

Standardization of drying temperature and time in hot air oven of gerbera var. impireal



Floriculture

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ABSTRACT

In the present study efforts were made to Standardization of drying temperature and time in hot air oven of gerbera var. impireal at College of Horticulture, Mudigere, University of Agricultural and Horticultural Sciences, Shimoga during 2013-14. The flowers were embedded in silica gel keeping face up and dried in hot air oven at different temperatures and time duration. Minimum dry weight (1.25 g/flower) and maximum moisture loss (87.20 %) was recorded by the flowers dried at 50° C for 55 hours whereas; the maximum dry weight (1.48 g/flower) was recorded by the flowers dried at 45° C for 55 hours. The minimum shrinkage (9.55 %) was noticed by the flowers dried at 40° C for 55 hours (Table 5), whereas maximum (16.76 %) was noticed by flowers dried at 50° C for 55 hours. Significant difference was observed with respect to sensory evaluation for dried gerbera flowers due different temperature and duration in hot air oven. Among the different levels of temperature and duration the flowers dried at 45° C 45 hours scored the highest sensory points for colour (3.93), shape (4.04), texture (4.01) and overall acceptability (4.12) was significantly superior over other treatments, while the flowers dried at 50 for 55 hours recorded poor values in colour (2.57) shape (2.75), texture (2.65) and overall acceptability (2.86).

Introduction

Gerbera (Gerbera jamesonii B.) is considered as one of the nature's beautiful creations because of having excellent flowers of exquisite shape, size and bewitching colour. It is native to South Africa and Asiatic region and is popularly known as 'Transval daisy' or 'Barbeton daisy'. It is named in the honour of Traugott Gerber, a German naturalist. Gerbera is used extensively in flower arrangement and as a cut flower. The cut flowers are short lived, as they are perishable in nature. However, the concept of flower drying offers viable solution to preserve the beauty of gerbera cut flowers and their marketability.

The dried flowers industry in India is about years old and its products have got high export value. As a matter of fact, this industry was introduced initially by the British and located at Kolkata for its nearness to the north-east and eastern regions where exotic and diverse blooms were available in nature. Export of dried flowers and plants from India is worth of about ₹100 crores per year, which contributes to nearly 60 per cent of floriculture export to Europe, and it is below 1.5 per cent of the world requirement.

MATERIAL AND METHODS

Studies were conducted to standardization of drying temperature and time in hot air oven of gerbera var. impireal during 2013-14 at Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere, University of Agricultural and Horticultural Sciences, Shimoga, Karnataka, India.

Flowers were harvested in the morning hours between 8.00 and 9.00 am. Immediately after harvest, the cut ends of the flower stalks were immersed in water. After brought to the laboratory, the flowers were sorted for petal damage, pests and diseases. Stems of uniform size were selected and trimmed to uniform length and the treatments were imposed immediately. The flowers were embedded in silica gel and kept in hot air oven drying with different durations viz., T₁- Drying at 40° C for 45 hours, T₂- Drying at 45° C for 45 hours, T₃- Drying at 50° C for 45 hours,

T₄- Drying at 40° C for 50 hours, T₅- Drying at 45° C for 50 hours, T₆-Drying at 50° C for 50 hours, T₇- Drying at 40° C for 55 hours, T₈- Drying at 45° C for 55hours and T₉- Drying at 50° C for 55 hours. The experiment was laid out in a completely randomized block design with three replications. The different parameters viz., fresh weight, dry weight of flower, time taken for drying, moisture loss, fresh flower diameter, dried flower diameter, colour, texture, shape and over all acceptability of dried flowers as influenced by drying temperatures in hot air oven are presented in table 1 and 2.

RESULTS DISCUSSION

Dry weight of flowers was influenced by drying temperature in hot air oven. Minimum dry weight (1.25 g/flower) was detected by those flowers dried at 50° C for 55 hours. While maximum (1.48 g/flower) was noticed for those flowers dried at 40° C for 55 hours and dried at 45° C for 50 hours (Table 1). This might be due to exposure of the flowers to high temperature in hot air oven which facilitates faster and higher amount of moisture loss leads to least dry weight. Among the different drying temperatures in hot air oven, maximum moisture loss (87.20 %) was observed in the flowers exposed to hot air at 50° C for 55 hours, while the flowers dried at 40° C for 45 hours notice least (84.84 %) moisture (Table 1). The rate of moisture removal was more uniform at 45° C for 45 hours. This might be due to exposure of the flowers to high temperature of hot air which facilitates faster and higher amount of moisture loss. Hulgur (2011) and Salma (2010) reported that the flowers dried with combination of silica gel and hot air oven drying was associated with highest moisture loss in gerbera and *Dendrobium* Orchid flowers, respectively.

Significant differences were observed for dry flower colour, shape, appearance and over all acceptability due to drying at varying levels of temperature. The colour (3.93), texture (4.01), shape (4.04) and over all acceptability (4.12) were recorded maximum score in flowers dried at 45° C for 45 hours and moisture was removed in a steady rate without affecting structural in-

tegrity of the flowers (Plate 1). The uniform temperature in the oven facilitated rapid and uniform removal of moisture without affecting the colour. Similar results were obtained by Misra *et al.*, (2003) in which after dehydration, yellow flowers retain their colour properly, but white become off- white, red, blue and other bright ones become considerably dark. The darkening of flower could be due to increased moisture loss resulting in concentration of the pigments following water loss (Oren Shamir Debo-

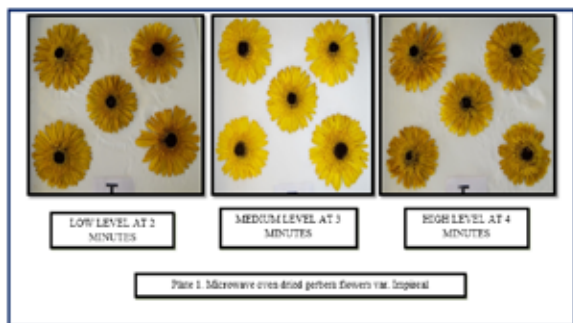
rah, 2001). Supporting results were reported by kher and bhutani (1979), who observed that embedded drying method yielded best quality dry flowers in terms of colour, appearance, texture and shape. This might be due to reason that the flowers embedded in desiccant like silica gel in turn maintained the original shape and appearance of the flower.

Table 1. Effect of hot air oven drying at different temperature and time schedule on physical parameters of gerbera var. Impireal

Treatment	Fresh weight (g)	Dry weight (g)	Moisture loss (%)	Fresh flower diameter (cm)	Dry flower diameter (cm)	Shrinkage of flower (%)
Drying at 40° C for 45 hours	9.80	1.48	84.93 (67.16)*	9.71	8.69	10.52 (3.24)**
Drying at 45° C for 45 hours	9.83	1.43	85.53 (67.64)	9.78	8.62	11.82 (3.43)
Drying at 50° C for 45 hours	9.89	1.41	85.74 (67.81)	9.70	8.34	13.97 (3.73)
Drying at 40° C for 50 hours	9.76	1.42	85.49 (67.61)	9.66	8.63	10.53 (3.21)
Drying at 45° C for 50 hours	9.76	1.48	84.84 (67.09)	9.70	8.70	10.30 (3.19)
Drying at 50° C for 50 hours	9.76	1.31	86.62 (68.54)	9.71	8.27	14.86 (3.86)
Drying at 40° C for 55 hours	9.84	1.44	85.40 (67.54)	9.78	8.85	9.55 (3.06)
Drying at 45° C for 55 hours	9.84	1.46	85.13 (67.32)	9.80	8.49	13.37 (3.65)
Drying at 50° C for 55 hours	9.77	1.25	87.20 (69.04)	9.81	8.17	16.76 (4.10)
S. Em±	0.07	0.01	0.20	0.31	0.11	1.16
CD @ 1 %	NS	0.13	0.85	NS	0.45	NS
CV	1.32	3.77	0.54	1.30	2.28	9.40

*Figures in parentheses are arc sine transformed values.

**Figures in parentheses are square root transformed values.



S. Em±	0.08	0.07	0.07	0.07
CD at 1%	0.31	0.30	0.29	0.27
CV	4.16	3.85	3.82	3.43

Table 2. Effect of hot air oven drying at different temperature and time schedule on quality parameters of gerbera var. Impireal

Treatment	Color	Shape	Texture	Over all acceptability
Drying at 40° C for 45 hours	3.06	3.21	3.12	3.31
Drying at 45° C for 45 hours	3.93	4.04	4.01	4.12
Drying at 50° C for 45 hours	3.23	3.42	3.32	3.53
Drying at 40° C for 50 hours	2.78	2.98	2.88	3.08
Drying at 45° C for 50 hours	3.81	3.93	3.90	4.02
Drying at 50° C for 50 hours	3.00	3.18	3.08	3.29
Drying at 40° C for 55 hours	2.73	2.93	2.83	3.03
Drying at 45° C for 55 hours	3.70	3.84	3.79	3.92
Drying at 50° C and 55 hours	2.57	2.75	2.65	2.86

Flower drying at higher temperature of 50° C for 55 hours score least values in colour (2.57), shape (2.75), texture (2.65) and over all acceptability (2.86) (Table 2), also resulted in petal shrinkage. Similar findings were observed in Carnation (Patil, 2003). Safeena *et al.* (2006) studied the response of drying in hot air oven at different temperatures (30° C, 40° C and 50° C) on the quality of rose (Sky Line, Lambada, Ravel and First Red) and found that drying of Dutch rose flowers at 40° C by embedding silica gel gave best results for colour, texture and appearance.

From the above experiment it can be concluded that drying temperature and time in hot air oven differ significantly. Among the treatments flowers dried at 45° C for 45 hours found the best results in var. Impireal with embedded in silica gel.

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