

# STANDARDIZATION OF DRYING LEVEL AND TIME IN MICROWAVE OVEN OF GERBERA VAR. IMPIREAL

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## INTRODUCTION

Floriculture has become a profitable industry in many parts of the globe. The export basket comprises dry flowers, fresh cutflowers, live plants, fresh bulbs and foliage among these dryflowers occupy highest percentage than other forms. Dryflowers have good demand both in domestic and international markets (Vishnupriya and Jawaharlal, 2014).

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 Rs.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. The USA has the largest demand for dried flowers, which is estimated around US \$2.4 million annually, followed by Germany and UK (Datta, 2004). Other exporting countries are west European countries, Japan, Hong Kong and Singapore. The Netherlands ranks first in export of dried flowers to the American market followed by Columbia, Mexico, India and Israel. In the recent years, Australia is emerging as a leader in dry flower export with Japan, Germany and the United States of America as their prime markets.

This apparent dearth of information suggests that the field is ripe for increased scientific investigation and rapid progress towards innovative process. In the view of the above issues the present study was under taken to Standardization of drying level and time in microwave oven of gerbera.

## MATERIALS AND METHODS

The present investigation were carried out to standardization of drying level and time in microwave 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.

Fully opened flowers procured from the garden of Mr. Mallikarjun, M. E., at Agaradahalli, which is situated about 100 km away from Shimoga town. 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 keeping position face up and dried in microwave oven at different drying level and time duration. Treatments are T<sub>1</sub> - 2 minutes low micro power level, T<sub>2</sub> - 2

## ABSTRACT

An experiment was laid out to evaluate micro wave oven drying method for better quality of dried gerbera var. *Impireal* was carried out in the Department of Floriculture and Landscape Architecture, College of Horticulture, Mudigere, Chickmagalore district, Karnataka during the year 2013-14. Significant difference was noticed with respect to dry weight and moisture loss of gerbera var. *Impireal* (Table 1). The maximum dry weight (1.43 g/flower) was recorded by the flowers dried at medium low level for 4.0 minutes. The maximum moisture loss (87.70 %) was noticed in flowers dried at 4.0 minutes with higher level of micro power density, followed by flowers treated with high level of micro power density with 3.0 minutes (87.03 %) duration. While the least moisture (85.55 %) was noticed in flowers dried at 2.00 minutes with low level micro power density. It conclude the flowers dried at medium level of micro power density with 3.0 minutes duration given good results with respect to color (4.10), shape (3.70), texture (3.60) and over all acceptability (4.20) compare to flowers dried at higher level of micro power density and higher duration.

## KEY WORDS

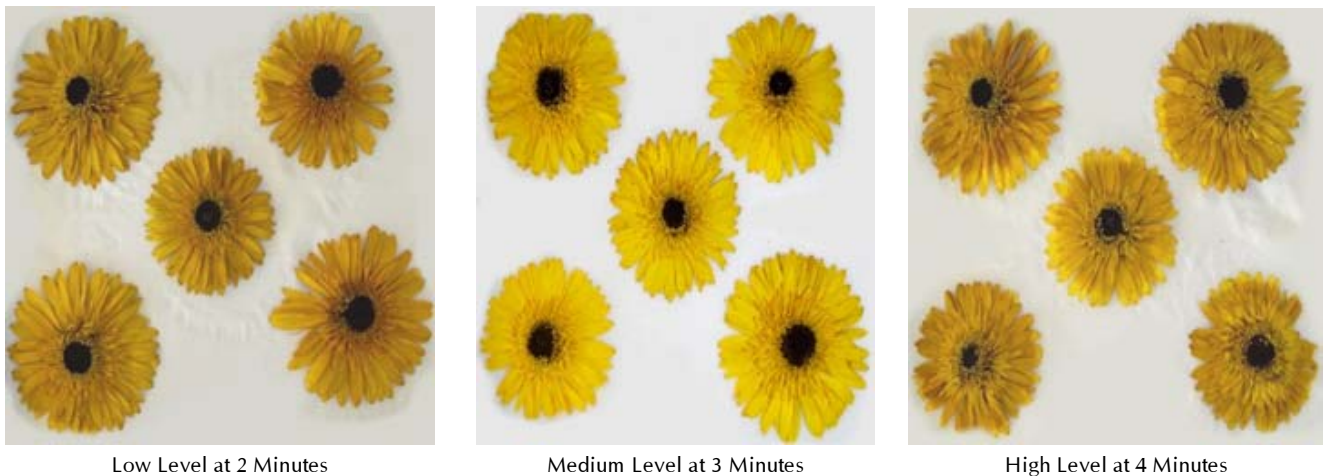
Gerbera  
Silica gel  
Time and micro wave oven

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**Plate 1: Microwave oven dried gerbera flowers var. Impireal**

**Table 1: Effect microwave oven drying at different level and time interval 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 (%)
Low level at 2 minutes	10.00	1.40	85.55 (67.66)*	10.21	9.20	9.90 (3.15)**
Medium level at 2 minutes	10.00	1.41	86.05 (68.07)	10.07	9.08	9.83 (3.14)
High level at 2 minutes	9.96	1.38	86.67 (68.59)	10.16	9.07	10.72 (3.28)
Low level at 3 minutes	10.03	1.42	85.83 (67.89)	10.14	9.14	9.86 (3.14)
Medium level at 3 minutes	10.03	1.42	86.78 (68.68)	10.06	9.06	9.94 (3.15)
High level at 3 minutes	9.90	1.29	87.03 (68.89)	10.22	9.02	11.74 (3.42)
Low level at 4 minutes	9.82	1.42	85.60 (67.70)	10.10	9.10	9.90 (3.14)
Medium level at 4 minutes	9.99	1.43	86.05 (68.07)	10.22	9.23	9.67 (3.11)
High level at 4 minutes	9.86	1.21	87.70 (69.47)	10.15	8.74	13.79 (3.71)
S. Em ±	0.08	0.01	0.10	0.05	0.05	0.04
CD @ 1 %	NS	0.04	0.37	NS	0.21	0.12
CV	1.37	1.28	0.23	0.98	1.00	1.57

\*Figures in parentheses are arc sine transformed values; \*\*Figures in parentheses are square root transformed values.

**Table 2: Effect microwave oven drying at different level and time interval on quality parameters of gerbera var. Impireal**

Treatment	Color	Shape	Texture	Over all acceptability
Low level at 2 minutes	3.10	3.03	3.05	3.23
Medium level at 2 minutes	3.57	3.30	3.18	3.72
High level at 2 minutes	3.61	3.26	3.16	3.74
Low level at 3 minutes	3.04	2.64	2.53	3.13
Medium level at 3 minutes	4.10	3.70	3.60	4.20
High level at 3 minutes	3.58	3.43	3.17	3.70
Low level at 4 minutes	3.24	2.75	2.65	3.38
Medium level at 4 minutes	4.02	3.28	3.34	4.08
High level at 4 minutes	3.03	2.58	2.48	3.04
S. Em ±	0.06	0.08	0.08	0.05
CD at 1%	0.30	0.36	0.37	0.22
CV	3.85	4.89	5.18	2.57

minutes medium micro power level,  $T_3$  - 2 minutes high micro power level,  $T_4$  - 3 minutes low micro power level.,  $T_5$  - 3 minutes medium micro power level,  $T_6$  - 3 minutes high micro power level,  $T_7$  - 4 minutes low micro power level,  $T_8$  - 4 minutes medium micro power level and  $T_9$  - 4 minutes high micro power level.

The experiment was laid out in a completely randomized block design with three replications. The quantitative and qualitative

characteristics 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 duration of drying treatment (Table 1 and 2).

## RESULTS AND DISCUSSION

Significant difference was noticed with respect to dry weight and moisture loss of gerbera var. Impireal (Table 1). The maximum dry weight (1.43 g/flower) was recorded by the flowers dried at medium low level for 4.0 minutes. The maximum moisture loss (87.70 %) was noticed in flowers dried at 4.0 minutes with higher level of micro power density, followed by flowers treated with high level of micro power density with 3.0 minutes (87.03 %) duration. While the least moisture (85.55 %) was noticed in flowers dried at 2.00 minutes with low level micro power density.

It is observed that increase in duration of treatment decreases the weight and increases the per cent moisture loss in gerbera. Thus higher moisture loss with increased duration of microwave drying and temperature rise caused augmented reduction of flower size during drying treatment. The rapid

method of drying coupled with increased moisture loss and increased duration also affected the shape of the dried flower. Similarly rapid drying at higher temperature was practiced higher temperature was earlier incarnation and roses (Chen *et al.*, 2000). Similar observations were recorded by Bhattacharjee and Dutt (2001), Katwate *et al.* (1992) and Dahiya *et al.* (2003) while drying chrysanthemum flowers. There is an increase in weight loss and increased per cent moisture loss with increased time duration when cut Carnation flowers are subjected for drying in microwave oven and also might be due to the additive effect of the desiccating property of silica gel by Biswas and Dhua (2010).

Dry flower diameter and shrinkage of flowers was found significant difference due to different durations and micro power levels in microwave oven. Dry flower diameter was maximum in flowers dried at 2.0 minutes with low level of micro power density, whereas minimum was noticed in flowers dried at 4.0 minutes with higher level of micro power density. The maximum shrinkage of flower was noticed in flowers dried at high level micro power density with 4.0 minutes duration, whereas the least was noticed in medium level of micro power density with 2.0 minutes. It might be due to the evaporation of moisture from the material. Similar observations were recorded by Biswas and Dhua (2010), in carnation.

Quality parameters found significant difference due to different level of micro power density and duration. However flowers dried at medium level of micro power density with 3.0 minutes scored the highest values (Table 2) in colour (4.10), shape (3.70), texture (3.60) and overall acceptability (4.20). The least score was noticed in flowers dried at 4.0 minutes duration with higher level of micro power density. It might be due to the higher micro power level may damage structural quality of flowers than low and medium level of micro power levels. At higher level of micro power density the quality of flowers may affect. This might be due to the fact that, silica gel being light in weight was unable to hold the flowers firmly.

When the temperature raised, silica gel jumped up, thus disturbing the position of flowers. The flowers dried at medium high level were poorest for their acceptability for shape (Vijayalaxmi, 2005). Aravinda and Jayanthi (2004) reported that among the different methods of drying microwave oven drying with silica gel as a medium recorded maximum score in terms of texture and shape. *Acroclinum* flowers dried in

microwave oven embedded in silicagel recorded maximum score for quality of texture Aprajita *et al.* (2010). Similar observations were recorded by Biswas and Sharmistha (2010), in calendula.

From the above study it can conclude the flowers dried at medium level of micro power density with 3.0 minutes duration given good results (Plate-1) with respect to color (4.10), shape (3.70) and texture (3.60) and over all acceptability (4.20) compare to flowers dried at higher level of micro power density and higher duration.

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