Effect of Tinted Colour and Embedding Media on drying qualityof chrysanthemum (*Dendranthema grandiflorum*) cv. Pusa Shwet in Hot Air Oven

ABSTRACT

The research on "Effect of tinted colour and embedding media for chrysanthemum (*Dendranthema grandiflorum*) cv. Pusa shwet" in hot air oven was conducted in Mata Gujri College, Fatehgarh Sahib during the educational year 2022-2023 inside the laboratory of Department of Agriculture, to determine the best tinted colourand media in microwave oven. We used six different embedded media for drying tinted chrysanthemumflowre i.e., sand, borax, silica gel, sand + borax (1:1v/v), sand + silica gel (1:1v/v), borax + silica gel (1:1v/v) were used. The data recorded on different parameters like percent moisture loss, sensory parameters and percent reducing sugar were subjected to analysis with Factorial CRD. Results indicate that presentability of the tinted chrysanthemum flowers was best in media sand tinted with yellow colour in hot air oven.

Keywords: Chrysanthemum, Media andColour, dry flowers, hot air oven

Introduction

Flowers look more attractive, tinting is a crucial means of value enhancement in where the colour pigments are weak or faint. It was a successful strategy for getting the appropriate colour at the post harvest stage by altering the colour according to the desired wish (Ranchana et al., 2017). For decoration purposes when a specific colour is required, tinting of white flowers may be the only option to get the desired colour. Chrysanthemum, tuberose and lillium are popular cut flowers, globally these blooms come in a variety of brilliant, vivid and cleared colours making them the perfect addition to any arrangement (Soni and Godra., 2017). Fresh flowers are very attractive though quite expensive, perishable in nature and available only for a particular season. So, to preserve flowers for a long time, we use different drying methods and on the other hand, dried flower products have long shelf life and maintain their aesthetic value for a long period of time (Malcolm1994). Dried flowers and plant parts play an important role and constituent about 70 percent of the total share of floriculture exports from India (Singh, 2005). The practice of drying flowers is very old age practice. For the aim of identifying different species of flowers, flowers were dried by botanists in the form of herbarium (Prasad *et al* 1997).Chrysanthemum is also one of them which are suitable for drying purpose.

Materials and Methods

The experiment was carried out in floriculture lab at Mata Gujri college, Sri Fatehgarh Sahib, Punjab during 2022-2023. We used different food dyes colour like orangecolour, yellow colour and green colour for tinted chrysanthemum and six different embedding media like sand, borax,

silica gel, sand:borax, sand:silica gel and borax:silica gel for drying tinted chrysanthemum in microwave oven. In microwave oven method, firstly flowers treated with different food dyes colour are taken for drying. Then metallic trays are used for the drying of flowers and were placed equally with media upto four inches of height. Good quality of flowers have been selected for drying and placed into the suitable media. After setting the flowers, the media was poured lightly and uniformly for protecting the petals without damaging them. The media was equally spread to equalize the pressure on all sides of the flower. After this, the different colour of flowers had been put in metallic trays that had been stored in the hot air oven with suitable temperature and duration. After that, the embedded flowers had been taken out from the media carefully. The flowers were picked up and collected properly one by one. The desiccant from the petals of the flowers was disposed with the help of smooth camel hair brush so that the original colour of the dried flower could be seen.

Results and Discussion

Moisture loss (%)

In chrysanthemum, highest moisture loss (82.61%) was observed in sand as compared to flowers drying with other desiccants. This might be because of fact that sand does not react with the water vapour produced during the drying process of flowers. Whereas least moisture loss (68.84%) was observed in silica gel. Similar findings were observed by Nirmla *et al*., (2008) in carnation. Among colours, maximum moisture loss (80.21%) was observed when flowers tinted with yellow food dye colour and minimum moisture loss (75.14%) was noticed on white colour.. Similar findings were observed by According to Oren Shamir Deborah (2001), the darkening of the bloom may be caused by greater moisture loss, which causes the pigments to concentrate once the water is lost.

The interaction between media ×colour showed the maximum moisture loss (85.07%)was recorded when orange colour flowers dried in sand. Moreover minimum moisture loss (58.62%) was recorded when white colour flowers dried in silica gel. This might be because sand has large particle size and heavier in weight and thus absorbs less moisture as well as it not able to retain moisture for longer duration. These outcomes are as stated by Nirmala *et al*., (2008) in the carnation and Dilta*et al*., (2014) in the rose buds and orange red colour in flowers may be due to the joint expression of anthocyanins and yellow – orange carotenoids. Similar results were observed by Bradshaw and Schemske 2003 ; Streisfeld and Rausher 2009 *a* in coloured Mimulus flowers.

Sensory Evaluation

Effect of media on sensory parameters like (colour, shape, texture, brittleness and overall acceptability) was found to be maximum (19.54) in sand followed by silica gel, borax + silica gel and borax. This may be due to the uniform temperature maintained inside the hot air oven which facilitated rapid, uniform and gradual removal of moisture from the flowers. Hence it avoids severe dehydration and shriveling of flowers. This helps in obtaining better quality dry flowersSimilar results can be observed by*Zomuansangi*and *Devi Singh*(2022) inchina aster.Saxena (2001) also noted that chrysanthemum flower embedded in sand also gave best result. There is no change in colour and structure of flowers. Effect of colour on sensory parameters like (colour, shape, texture, brittleness and overall acceptability) was found to be minimum (17.73) in sand + silica followed by sand + borax, silica gel and borax + silica gel. *Meman et al*., (2008) also observed that brighter colored flowers when embedded in sand as a medium. Among colours, effect of sensory parameters was (colour, shape, texture, brittleness and overall acceptability) was found to be maximum (19.00) in yellow colour. Similar findings was observed by Mishra *et al*., (2003) and Sangama (2004) who conclude that yellow blossoms retain their colour properly following dehydration whereas white flowers turned off – white, red, blue and other bright ones significantly darken. Kher and Bhutani (1979) noted that the embedded drying process produced dry flowers of the highest quality in terms of colour, look, texture, and shape. Whereas minimum (17.68) was observed in green colour.

The interaction between media ×colour on sensory parameters was found to be maximum (20.83) when orange colour flowers dried in sand and minimum (15.17) was found to be when green colour flowers dried in sand + silica. This might be due to the reason that media had an impact on the flower's colour and texture. Because there was more moisture in the flowers dried with silica than with sand alone, drying with sand generated smoother petal texture. These result can be supported with similar findings of Aravinda and Jayanthi (2004) by embedding chrysanthemum cv. Button type in sand.

Reducing Sugar (%)

Effect of media on reducing sugar was found to be maximum (9.11%) in hot air oven when flowers embedded with silica gel whereas minimum (5.55%) reducing sugar was recorded when flowers dried in sand + borax. According to different studies done on different fruits and vegetables, it is well known fact that drying increases the concentration of reducing sugar. Similar results can be observed by Desrosier and Desrosier (1982) reported that a food losses its moisture content when it is dried. For example, Fresh pear contained 17% carbohydrates, whereas after drying composition percentage increased to 65%. Similar results were observed by Gebhardt *et al*. (1982). Based on the aforementioned findings, flowers that have lost the maximum moisture have a higher sugar retention rate.

The interaction between media ×colour on reducing sugar was found to be maximum (11.53%) when green colour flowers dried in silica gel whereas minimum (4.97%) was found to be when

yellow colour flowers dried in sand + borax. This could be because of the flowers dried in silica gel may be due to the strong hygroscopic characteristics, which causes a great loss of moisture from the flowers. Hence, there is more concentration of sugar. Whereas sand is made up of large sized particles and heavier in size which result in less sugar content present in cut flowers. Similar results were observed by Dilta*et al*., (2014).

TABLE1 :"Effect of tinted colour and embedding media for chrysanthemum (*Dendranthema grandiflorum*) cv. Pusa shwet" in microwave oven and their interaction on different parameters.

	Moisture Loss (%)	**Sensory Parameters(colour, shape, texture, brittleness and overall acceptability)**	**Reducing Sugar (%)**
Media			
M_1	82.61	19.54	7.61
M_2	77.44	18.98	5.80
M_3	68.84	18.54	9.11
M_4	80.78	18.21	5.55
M_5	75.25	17.73	6.14
M_6	79.33	18.75	6.47
$CD_{0.05\%}$	2.90	1.12	0.23
Colour			
C_1	76.99	18.93	6.33
C_2	80.21	19.00	7.33
C_3	77.83	17.68	7.26
C_4	74.47	18.89	6.20
$CD_{0.05\%}$	2.37	0.92	0.19
Interaction			
M_1C_1	85.07	20.83	7.71
M_1C_2	81.49	19.58	8.81
M_1C_3	79.90	18.17	7.70
M_1C_4	83.98	19.58	6.23
M_2C_1	71.23	19.00	5.58
M_2C_2	75.27	19.08	6.85
M_2C_3	82.12	18.58	5.60
M_2C_4	81.15	19.25	5.18
M_3C_1	67.05	18.75	5.11
M_3C_2	77.71	17.58	10.95
M_3C_3	71.99	18.08	11.53
M_3C_4	58.62	19.75	8.86
M_4C_1	81.72	19.25	6.36
M_4C_2	80.89	18.67	4.97
M_4C_3	83.55	17.17	5.22
M_4C_4	76.97	17.75	5.66

M_5C_1	75.09	16.92	5.42
M_5C_2	84.89	19.25	5.80
M_5C_3	71.84	15.17	7.94
M_5C_4	69.17	19.58	5.40
M_6C_1	81.81	18.83	7.82
M_6C_2	81.01	19.83	6.63
M_6C_3	77.57	18.92	5.60
M_6C_4	76.92	17.42	5.84
$CD_{0.05\%}$	5.80	2.25	0.46

Conclusions: From the present studies, it can be concluded that sand is the most suitable media for loss for drying of tinted chrysanthemum flowers in hot air oven. Among edible food dye colours, yellow colour more uniform colour on florets of chrysanthemum when dried in hot air oven.

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