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Effect of microwave oven drying technology on dehydration of ornamental foliage

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Abstract
Dry flowers beauty and value can be reserved and enjoyed for years. A study was undertaken with an objective to standardize microwave oven drying technology for dehydration of ornamental foliages. It can be concluded that embedding in silica gel and microwave oven drying (720 micro power i.e. medium high) for 2 min found suitable technique for dehydration of ornamental leaves viz., *Mussaenda erythrophylla*, *Lantana camara* leaves, 2.5 min found appropriate for *Tagetes spp.* leaves, 3 min found ideal for *Bauhinia variegata*, *Azadirachta indica* leaves and *Thuja orentalis* foliage, 3.5 min found suitable for *Aralia balfouriana* leaves, 4 min found ideal for *Ficus religious* and *Schefflera arboricola* leaves. Embedding in sand and microwave oven drying for 4.5 min found appropriate for dehydration of *Ficus benjamina* leaves.

Keywords: Drying, dehydration, microwave oven, foliages

1. Introduction
With rising awareness, the use of environment friendly things like dry flowers turns out to be natural choice for beautification. In order to conquer problems of fresh flowers, drying and dehydration techniques play vital role (Bhutani, 1995) [1]. Diverse value added products can be prepared from dry flowers such as attractive flowery craft items like flower balls, floral segment landscapes, collages, table mats, bouquets, flower pictures, pomanders, wreaths, festive decorations, three dimensional arrangements of flowers for interior decoration and sweet-smelling potpourris, which is foremost piece of industry valuing alone Rs. 55 crore in India (Dadlani, 1997 and Raghupathy *et al.*, 2000) [2, 10]. Therefore, in the light of above information the present study was undertaken with an objective to standardize microwave oven drying technology for dehydration of ornamental foliages.

2. Materials and Methods
The experiment was carried out in Dry Flower Laboratory at Department of Floriculture and Landscape Architecture, Faculty of Horticulture, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia (Dist.), West Bengal-741252 during the period of 2017 to 2019. Fresh matured leaves were collected within the university campus free from blemishes, pest and disease in the morning after dew/moisture evaporation. Experiment was laid out in CRD (Factorial) with five replications and 8 different treatment combinations with sand and silica as embedding media. After embedding, embedded glass containers were placed in the electrically operated microwave oven at fixed micro power of 720 power i.e. Medium high. Treatments were set based on trial-and-error method for all the foliage. 10 different foliages were used for experiment purpose viz., aralia, ficus tree, marigold, mussaenda, bauhinia tree, peepal tree, thuja, lantana, umbrella tree and neem tree. The following observations were recorded from the experiment i.e. fresh weight of sample (g), dry weight of sample (g), moisture content loss (%) and dried samples were given subjective scores on average 10 points scale with reference to ornamental values viz., colour, texture, brittleness and appearance/shape retention. Based on cumulative score, ranks were given and the best treatment combinations were worked out (Raj and Gupta, 2005) [11]

3. Results and Discussion
3.1. *Aralia balfouriana*
The data presented in the Table-1 showed chief moisture loss percent (70.95%) was noted in silica gel (M_2), which is significantly far with sand (M_1) (66.70%) in micro oven dried aralia leaves.. There is no significant difference observed for quality parameters i.e. colour, texture, brittleness and appearance scores among drying media. Between drying durations, maximum moisture loss percent was observed in D_4 (77.71%), which is statistically far with D_1 (52.36%).

Colour score found insignificant as it ranged from 7.30 (D_4) to 7.90 (D_3). Texture score varied from 6.75 (D_4) to 7.65 (D_2). Peak score for brittleness and appearance was recorded in D_2 (8.15, 8.50), which is significantly far with D_4 (5.95, 6.95) respectively.

3.2. *Ficus benjamina*

Silica gel (M_2) recorded significantly maximum moisture loss percent (48.17%) and appearance score (7.10) compared to sand, whereas texture (7.25) and brittleness (7.90) score noted significantly higher in sand (M_1) in contrast to silica gel in micro oven dried ficus tree leaves (Table-1). Colour score was found insignificant among the drying media. Among drying duration, D_4 recorded supreme moisture loss percent (57.78%), which is significantly far with D_1 (34.75%). Utmost score for colour was noted in D_1 (8.50), while least observed in D_3 and D_4 (7.70). Texture and brittleness score was noted maximum in D_1 (7.50, 8.40) and minimum observed in D_4 (5.70, 5.90) respectively. Appearance score found highest in D_3 (7.80), whereas least was observed in D_1 (4.20).

3.3. *Tagetes spp.*

The data depicted in Table-2 revealed the effect of different drying media, duration and their interaction on micro oven dried marigold leaves. Silica gel (M_2) as a drying media noted maximum percent of moisture loss (70.19%), sensory score i.e. for texture (6.95), brittleness (7.15) and appearance (7.45), which are statistically far with sand (M_1), whereas colour score found insignificant among the drying media. Drying duration D_4 (77.18%) was recorded extreme moisture loss percent, which is statistically far with D_1 (49.62%). Highest score for texture was found in D_3 (5.60), whereas least noted in D_1 (4.30). Utmost score for appearance was recorded in D_2 (6.10), while least found in D_1 (5.10). There are no significant differences found for colour and brittleness scores among drying duration.

3.4. *Mussaenda erythrophylla*

A perusal of data (Table-2) on micro oven dried mussaenda leaves revealed that maximum moisture loss percent (68.40%) and quality parameter scores i.e. for colour (7.38), texture (7.23) and appearance (7.65) was recorded in silica gel (M_2), which are significantly far with sand (M_1) however brittleness (7.83) score was noted maximum in sand (M_1). Among drying durations, moisture loss percent varied significantly from 58.83% (D_1) to 65.21% (D_4). Uppermost score for colour, texture and appearance observed in D_4 (6.70, 7.20, 7.30), whereas lower most noted D_1 (5.0, 4.30, 4.80) respectively. Supreme score for brittleness found in D_1 (8.15), which is statistically far with D_4 (5.80).

3.5. *Bauhinia variegata*

Percent moisture loss found insignificant among the drying media as it varied from 52.32% (M_1) to 54.18% (M_2) in micro oven dried bauhinia tree leaves (Table-3). Silica gel (M_2) significantly recorded highest sensory attribute scores for colour (7.25), texture (6.83) and appearance (7.60) compared to sand (M_1), whereas brittleness score found insignificant. Between drying duration, greatest moisture loss percent was noted in D_4 (56.17%), which is significantly far with D_1 (49.45%). Highest score for colour and appearance was recorded in D_2 (6.90, 7.0), whereas least observed in D_4 (5.45) and D_1 (6.15) respectively. Texture score varied from 5.55 (D_1) to 6.65 (D_4). Brittleness score was found utmost in D_1 (8.20), which is statistically far with D_4 (5.20).

3.6. *Ficus religious*

Table-3 revealed that highest moisture loss percent (58.78%) noted in sand (M_1), whereas least (57.14%) observed in silica gel (M_2) in micro oven dried peepal tree leaves. There is no significant difference noted for quality parameter scores i.e. for colour, texture, brittleness and appearance among the drying media. Drying duration D_4 noted maximum moisture loss percent (64.29%), which is statistically far with D_1 (48.27%). Chief score for colour recorded in D_3 (6.90), which is significantly far with D_1 (3.40). Texture score noted maximum in D_1 (8.0), while minimum found in D_4 (5.60). Brittleness score was recorded utmost in D_1 (8.20), which is statistically far with D_4 (4.50). Appearance score was observed highest in D_3 (7.20), while least found in D_1 (4.10).

3.7. *Thuja orientalis*

Silica gel (M_2) as drying media noted maximum moisture loss percent (58.23%), which is statistically far with sand (M_1) (35.42%) in micro oven dried thuja foliage (Table-4). Sensory parameter scores i.e. for texture (7.50), brittleness (7.83) and appearance (7.05) was recorded significantly higher in sand (M_1) compared to silica gel (M_2), whereas colour score found insignificant. Peak moisture loss percent recorded in drying duration D_4 (53.26%), which is significantly far with D_1 (33.78%). Uppermost scores for colour, texture, brittleness and appearance was recorded in D_1 (7.65, 7.95, 7.90, 7.90), whereas lower noted in D_4 (5.30, 5.50, 5.35 and 5.35) respectively.

3.8. *Lantana camara*

It is clear from the data (Table-4) that silica gel (M_2) found as a most superior drying media for micro oven drying of lantana leaves as it resulted in highest moisture loss percent (75.08%) and sensory attribute scores i.e. for colour (7.73), texture (7.65) and appearance (7.70), which are statistically far with sand (M_1). Brittleness score found insignificant among the drying media. Between drying duration, percent moisture loss found insignificant as it ranged from 66.82% (D_1) to 71.67% (D_4). Maximum score for colour and appearance was recorded in D_2 (6.75, 6.55), whereas minimum observed in D_1 (5.80, 5.20). Utmost score for texture was recorded in D_4 (6.95), while least found in D_1 (5.90). There is no significant difference observed for brittleness score.

3.9. *Schefflera arboricola*

Silica gel (M_2) recorded significantly maximum moisture loss percent (61.36%) and quality parameter scores i.e. for colour (7.30), texture (6.55), brittleness (6.70) and appearance (6.60) compared to sand (M_1) in micro oven dried umbrella tree leaves (Table-4). Among drying durations, D_4 noted highest moisture loss percent (68.94%), which is statistically far with D_1 (43.37%). Sensory scores for colour and texture found maximum in D_3 (7.80, 7.0), whereas minimum noted in D_1 (5.40, 5.20) respectively. D_1 recorded highest score for brittleness (7.80), which is statistically far with D_4 (4.30). Utmost score for appearance noted in D_4 (7.30), which is significantly far D_1 (4.40)

3.10. *Azadirachta indica*

Table-5 shows the effect of different drying media, duration and their interaction on micro oven dried neem tree leaves. Silica gel (M_2) as embedding media recorded significantly maximum moisture loss percent (53.68%) and appearance score (7.40) compared to sand (M_1), however sand noted highest score for texture (7.60) and brittleness (7.25) in

contrast to the silica gel (M_2). Colour score found non-significant among drying media. Between drying duration, D_4 recorded peak moisture loss percent (58.87%), which is statistically far with D_1 (39.53%). Highest score for colour, texture, brittleness and appearance noted in D_1 (8.30, 7.90, 7.80, 7.70), whereas least noted in D_4 (6.40, 6.40, 5.80, 6.80) respectively.

Among interactions, embedding in silica gel and microwave oven drying for 2 min found suitable technique for dehydration of mussaenda (M2D2) and lantana (M2D2) leaves with moisture loss (68.72%, 73.86%) and quality parameters scores i.e. for colour (7.40, 8.50), texture (7.50, 8.10), brittleness (7.70, 8.10) and appearance (7.60, 8.60) respectively, 2.5 min found suitable for dehydration of marigold (M2D3) leaves with moisture loss (79.55%) and sensory scores i.e. for colour (8.20), texture (7.40), brittleness (7.0) and appearance (8.20), 3 min found ideal for dehydration of thuja (M2D2) foliage, bauhinia (M2D2) and neem tree (M2D2) leaves with moisture loss (61.96%, 53.18%, 53.21%) and sensory scores i.e. for colour (6.40, 7.80, 7.60), texture (6.20, 7.0, 7.20), brittleness (5.30, 7.40, 7.0) and appearance (7.0, 8.10, 7.60) respectively, 3.5 min found appropriate for aralia (M2D3) leaves with moisture loss (77.57%) and sensory attribute score i.e. for colour (8.20), texture (6.90), brittleness (7.50) and appearance (8.20), 4 min found suitable for peepal tree (M2D3) and umbrella tree (M2D3) leaves with moisture loss (63.68%, 71.48%) and sensory attribute scores i.e. for colour (7.40, 8.60), texture (6.60, 7.40), brittleness (6.40, 6.80), appearance (7.80, 7.60) respectively. These results were in line with (Kumari *et al*., 2017; Meman and Barad, 2009; Hemant *et al.*, 2016; Mathapati *et al.*, 2015 and Nirmala *et al.*, 2008) [4, 6, 3, 5, 8]. Embedding in sand and microwave oven drying (720 micro power i.e. medium high) for 4.5 min found suitable for ficus tree (M2D4) leaves with moisture loss (55.66%) and sensory attribute scores i.e. for colour (7.80), texture (6.60), brittleness (7.0) and appearance (6.80). Similar results also reported by Swamy *et al.*, (2009) [13], Patel *et al.*, (2017) [9], Nair and Singh (2011) [7]; Singh *et al.*, (2009) [11].

Table 1: Effect of drying media (M), duration (D) and their interaction on micro oven dried aralia and ficus tree leaves

	Aralia balfouriana							***Ficus benjamina***						
Treatments	**FW (g)**	**DW (g)**	**ML (%)**	**Colour**	**Texture**	**Brittleness**	**Appearance**	**FW (g)**	**DW (g)**	**ML (%)**	**Colour**	**Texture**	**Brittleness**	**Appearance**
M_1	0.66	0.21	66.70	7.60	6.93	7.48	7.80	0.52	0.30	43.40	7.90	7.25	7.90	6.35
M_2	0.67	0.19	70.95	7.83	7.20	7.45	7.85	0.45	0.23	48.17	8.00	5.80	6.30	7.10
S.Em (±)	0.00	0.002	0.318	0.04	0.03	0.03	0.04	0.00	0.00	0.26	0.04	0.03	0.03	0.04
CD at 5%	N/A	0.007	0.922	0.11	0.10	N/A	N/A	0.01	0.00	0.76	N/A	0.09	0.09	0.11
D_1	0.64	0.31	52.36	7.80	6.80	8.10	8.00	0.48	0.32	34.75	8.50	7.50	8.40	4.20
D_2	0.67	0.20	69.90	7.85	7.65	8.15	8.50	0.46	0.27	40.64	7.90	6.50	7.40	7.30
D_3	0.69	0.17	75.34	7.90	7.05	7.65	7.85	0.49	0.25	49.96	7.70	6.40	6.70	7.80
D_4	0.67	0.15	77.71	7.30	6.75	5.95	6.95	0.51	0.22	57.78	7.70	5.70	5.90	7.60
S.Em (±)	0.01	0.003	0.45	0.05	0.05	0.05	0.05	0.00	0.00	0.37	0.05	0.04	0.05	0.05
CD at 5%	0.01	0.01	1.303	0.15	0.14	0.14	0.15	0.01	0.01	1.07	0.16	0.12	0.13	0.15
M_1D_1	0.64	0.32	50.47	7.20	6.20	7.70	7.80	0.56	0.37	32.92	8.40	7.60	8.60	3.80
M_1D_2	0.64	0.22	66.30	7.80	6.90	7.90	8.60	0.45	0.27	40.94	7.80	7.40	8.20	7.20
M_1D_3	0.69	0.18	73.12	7.60	7.20	7.80	7.50	0.51	0.28	44.09	7.60	7.40	7.80	7.60
M_1D_4	0.67	0.15	76.91	7.80	7.40	6.50	7.30	0.57	0.26	55.66	7.80	6.60	7.00	6.80
M_2D_1	0.64	0.29	54.25	8.40	7.40	8.50	8.20	0.41	0.26	36.58	8.60	7.40	8.20	4.60
M_2D_2	0.69	0.18	73.51	7.90	8.40	8.40	8.40	0.46	0.27	40.34	8.00	5.60	6.60	7.40
M_2D_3	0.68	0.15	77.57	8.20	6.90	7.50	8.20	0.47	0.21	55.83	7.80	5.40	5.60	8.00
M_2D_4	0.67	0.14	78.51	6.80	6.10	5.40	6.60	0.45	0.18	59.91	7.60	4.80	4.80	8.40
S.Em (±)	0.01	0.005	0.637	0.07	0.07	0.07	0.07	0.01	0.00	0.52	0.08	0.06	0.06	0.07
CD at 5%	0.02	N/A	1.843	0.21	0.19	0.19	0.21	0.02	0.01	1.51	0.22	0.17	0.18	0.21

(M_1- Sand, M_2- Silica gel, D_1- 1.5 min, D_2- 2.5 min, D_3- 3.5 min, D_4- 4.5 min)

Table 2: Effect of drying media (M), duration (D) and their interaction on micro oven dried marigold and mussaenda leaves

	Tagetes spp.							***Mussaenda erythrophylla***						
Treatments	**FW (g)**	**DW (g)**	**ML (%)**	**Colour**	**Texture**	**Brittleness**	**Appearance**	**FW (g)**	**DW (g)**	**ML (%)**	**Colour**	**Texture**	**Brittleness**	**Appearance**
M_1	0.71	0.28	60.82	7.40	3.45	3.85	3.95	0.94	0.42	55.43	4.63	4.58	7.83	4.70
M_2	0.66	0.20	70.19	7.95	6.95	7.15	7.45	0.91	0.29	68.40	7.38	7.23	6.43	7.65
S.Em (±)	0.00	0.00	0.36	0.04	0.03	0.03	0.03	0.01	0.00	0.25	0.03	0.03	0.03	0.03
CD at 5%	0.01	0.00	1.04	0.11	0.08	0.08	0.09	0.01	0.01	0.72	0.09	0.10	0.09	0.10
D_1	0.69	0.35	49.62	7.30	4.30	5.90	5.10	0.84	0.35	58.83	5.00	4.30	8.15	4.80
D_2	0.75	0.27	63.47	7.90	5.40	5.40	6.10	0.89	0.35	60.98	5.90	5.60	7.85	5.80
D_3	0.71	0.21	71.75	7.70	5.60	5.50	5.90	0.95	0.36	62.64	6.40	6.50	6.70	6.80
D_4	0.59	0.13	77.18	7.80	5.50	5.20	5.70	1.01	0.35	65.21	6.70	7.20	5.80	7.30
S.Em (±)	0.00	0.00	0.51	0.05	0.04	0.04	0.04	0.01	0.01	0.35	0.05	0.05	0.05	0.05
CD at 5%	0.01	0.00	1.48	0.16	0.12	0.11	0.13	0.02	N/A	1.02	0.13	0.14	0.13	0.14
M_1D_1	0.73	0.37	48.77	7.40	2.80	3.80	4.80	0.85	0.41	52.07	3.90	3.10	8.10	3.10
M_1D_2	0.78	0.31	59.69	7.40	3.20	3.60	3.80	0.90	0.42	53.24	4.40	3.70	8.00	4.00
M_1D_3	0.79	0.28	63.94	7.20	3.80	4.00	3.60	1.04	0.46	55.59	4.70	4.80	7.90	5.20
M_1D_4	0.54	0.15	70.90	7.60	4.00	4.00	3.60	0.97	0.38	60.81	5.50	6.70	7.30	6.50
M_2D_1	0.65	0.32	50.47	7.20	5.80	8.00	5.40	0.83	0.29	65.58	6.10	5.50	8.20	6.50
M_2D_2	0.71	0.23	67.25	8.40	7.60	7.20	8.40	0.88	0.27	68.72	7.40	7.50	7.70	7.60
M_2D_3	0.63	0.13	79.55	8.20	7.40	7.00	8.20	0.86	0.26	69.61	8.10	8.20	5.50	8.40

M_2D_4	0.64	0.10	83.47	8.00	7.00	6.40	7.80	1.05	0.32	69.68	7.90	7.70	4.30	8.10
S.Em (±)	0.01	0.00	0.72	0.08	0.06	0.05	0.06	0.01	0.01	0.50	0.07	0.07	0.06	0.07
CD at 5%	0.02	0.01	2.09	0.22	0.16	0.16	0.18	0.03	0.02	1.45	0.19	0.19	0.18	0.20

(M_1- Sand, M_2- Silica gel, D_1- 1.5 min, D_2- 2 min, D_3- 2.5 min, D_4- 3 min)

Table 3: Effect of drying media (M), duration (D) and their interaction on micro oven dried bauhinia tree and peepal tree leaves

	Bauhinia variegata							*Ficus religious*						
Treatments	**FW (g)**	**DW (g)**	**ML (%)**	**Colour**	**Texture**	**Brittleness**	**Appearance**	**FW (g)**	**DW (g)**	**ML (%)**	**Colour**	**Texture**	**Brittleness**	**Appearance**
M_1	0.55	0.26	52.32	4.75	5.73	6.85	5.45	1.23	0.50	58.78	5.95	6.50	6.45	6.15
M_2	0.57	0.26	54.18	7.25	6.83	6.75	7.60	1.24	0.51	57.14	5.60	7.05	6.85	6.15
S.Em (±)	0.00	0.01	1.05	0.03	0.03	0.03	0.03	0.01	0.00	0.31	0.03	0.03	0.03	0.03
CD at 5%	0.01	N/A	N/A	0.08	0.09	0.09	0.09	N/A	0.01	0.88	0.09	0.09	0.08	N/A
D_1	0.59	0.30	49.45	5.60	5.55	8.20	6.15	0.98	0.51	48.27	3.40	8.00	8.20	4.10
D_2	0.49	0.23	52.91	6.90	6.35	7.40	7.00	1.19	0.51	56.57	6.00	7.10	7.70	6.50
D_3	0.54	0.25	54.48	6.05	6.55	6.40	6.45	1.25	0.46	62.71	6.90	6.40	6.20	7.20
D_4	0.60	0.26	56.17	5.45	6.65	5.20	6.50	1.52	0.54	64.29	6.80	5.60	4.50	6.80
S.Em (±)	0.00	0.01	1.49	0.04	0.04	0.04	0.05	0.01	0.00	0.43	0.05	0.04	0.04	0.05
CD at 5%	0.01	0.03	4.31	0.12	0.13	0.12	0.13	0.03	0.01	1.25	0.13	0.12	0.12	0.14
M_1D_1	0.56	0.29	48.76	3.70	4.10	8.10	4.50	0.99	0.47	52.22	3.60	7.60	8.00	4.20
M_1D_2	0.51	0.24	52.65	6.00	5.70	7.40	5.90	1.27	0.53	58.29	7.20	6.60	7.80	7.80
M_1D_3	0.56	0.26	53.22	4.90	6.50	6.70	5.50	1.17	0.45	61.74	6.40	6.20	6.00	6.60
M_1D_4	0.55	0.25	54.66	4.40	6.60	5.20	5.90	1.47	0.55	62.86	6.60	5.60	4.00	6.00
M_2D_1	0.62	0.31	50.14	7.50	7.00	8.30	7.80	0.97	0.54	44.33	3.20	8.40	8.40	4.00
M_2D_2	0.48	0.22	53.18	7.80	7.00	7.40	8.10	1.12	0.50	54.84	4.80	7.60	7.60	5.20
M_2D_3	0.52	0.23	55.75	7.20	6.60	6.10	7.40	1.32	0.48	63.68	7.40	6.60	6.40	7.80
M_2D_4	0.66	0.28	57.67	6.50	6.70	5.20	7.10	1.56	0.53	65.73	7.00	5.60	5.00	7.60
S.Em (±)	0.01	0.01	2.11	0.06	0.06	0.06	0.06	0.01	0.01	0.61	0.06	0.06	0.06	0.07
CD at 5%	0.02	N/A	N/A	0.17	0.18	0.17	0.19	0.04	0.02	1.77	0.19	0.17	0.16	0.19

(M_1- Sand, M_2- Silica gel, D_1- 2 min, D_2- 3 min, D_3- 4 min, D_4- 5 min)

Table 4: Effect of drying media (M), duration (D) and their interaction on micro oven dried thuja foliage and lantana leaves

	Thuja orientalis							*Lantana camara*						
Treatments	**FW (g)**	**DW (g)**	**ML (%)**	**Colour**	**Texture**	**Brittleness**	**Appearance**	**FW (g)**	**DW (g)**	**ML (%)**	**Colour**	**Texture**	**Brittleness**	**Appearance**
M_1	1.21	0.77	35.42	6.43	7.50	7.83	7.05	0.57	0.21	65.14	4.70	5.33	7.78	4.53
M_2	1.55	0.63	58.23	6.20	6.03	5.18	6.63	0.51	0.15	74.08	7.73	7.65	7.53	7.70
S.Em (±)	0.01	0.00	0.00	0.03	0.03	0.03	0.03	0.00	0.00	1.43	0.03	0.03	0.04	0.03
CD at 5%	0.02	0.01	0.00	0.08	0.09	0.09	0.09	0.01	0.01	4.13	0.09	0.10	0.11	0.09
D_1	1.14	0.75	33.78	7.65	7.95	7.90	7.90	0.58	0.21	66.82	5.80	5.90	7.70	5.20
D_2	1.32	0.63	49.14	6.55	7.15	6.10	6.10	0.53	0.18	69.51	6.75	6.45	7.95	6.55
D_3	1.46	0.67	51.12	5.75	6.45	6.65	6.65	0.48	0.16	70.43	6.20	6.65	7.80	6.35
D_4	1.59	0.76	53.26	5.30	5.50	5.35	5.35	0.57	0.18	71.67	6.10	6.95	7.15	6.35
S.Em (±)	0.01	0.01	0.00	0.04	0.04	0.04	0.04	0.00	0.00	2.02	0.04	0.05	0.05	0.05
CD at 5%	0.03	0.02	0.01	0.11	0.12	0.12	0.12	0.01	0.01	N/A	0.13	0.13	0.15	0.13
M_1D_1	1.09	0.85	22.60	6.90	8.50	8.70	7.20	0.59	0.24	61.71	4.40	3.90	7.60	3.40
M_1D_2	0.98	0.62	36.31	6.70	8.10	8.00	7.40	0.51	0.19	65.17	5.00	4.80	7.80	4.50
M_1D_3	1.34	0.76	39.54	6.30	6.90	7.70	7.30	0.51	0.19	65.89	4.60	5.70	8.00	4.90
M_1D_4	1.43	0.87	43.22	5.80	6.50	6.90	6.30	0.64	0.22	67.78	4.80	6.90	7.70	5.30
M_2D_1	1.20	0.66	44.95	8.40	7.40	7.10	8.70	0.56	0.17	71.92	7.20	7.90	7.80	7.00
M_2D_2	1.66	0.63	61.96	6.40	6.20	5.30	7.00	0.55	0.16	73.86	8.50	8.10	8.10	8.60
M_2D_3	1.58	0.59	62.70	5.20	6.00	4.50	5.80	0.44	0.12	74.96	7.80	7.60	7.60	7.80
M_2D_4	1.75	0.65	63.30	4.80	4.50	3.80	5.00	0.50	0.14	75.56	7.40	7.00	6.60	7.40
S.Em (±)	0.02	0.01	0.00	0.06	0.06	0.06	0.06	0.01	0.00	2.85	0.06	0.07	0.07	0.07
CD at 5%	0.04	0.02	0.01	0.16	0.18	0.17	0.17	0.02	0.01	N/A	0.18	0.19	0.21	0.21

{M_1- Sand, M_2- Silica gel (D_1- 2 min, D_2- 3 min, D_3- 4 min, D_4- 5 min), (D_1- 1.5 min, D_2- 2 min, D_3- 2.5 min, D_4- 3 min)}

Table 5: Effect of drying media (M), duration (D) and their interaction on micro oven dried umbrella tree and neem tree leaves

	Schefflera arboricola							*Azadirachta indica*						
Treatments	**FW (g)**	**DW (g)**	**ML (%)**	**Colour**	**Texture**	**Brittleness**	**Appearance**	**FW (g)**	**DW (g)**	**ML (%)**	**Colour**	**Texture**	**Brittleness**	**Appearance**
M_1	1.23	0.52	58.59	6.30	5.75	6.00	5.65	0.96	0.49	48.82	7.35	7.60	7.25	6.60
M_2	1.22	0.46	61.36	7.30	6.55	6.70	6.60	0.71	0.33	53.68	7.25	6.85	6.70	7.40
S.Em (±)	0.01	0.00	0.32	0.04	0.03	0.03	0.03	0.00	0.00	0.27	0.03	0.03	0.03	0.03
CD at 5%	N/A	0.01	0.94	0.10	0.09	0.08	0.10	0.01	0.01	0.79	0.10	0.10	0.09	0.09
D_1	1.19	0.67	43.37	5.40	5.20	7.80	4.40	0.78	0.48	39.53	8.30	7.90	7.80	7.70
D_2	1.29	0.52	59.68	6.50	5.80	6.80	5.80	0.88	0.45	49.73	7.50	7.60	7.40	7.30
D_3	1.12	0.36	67.91	7.80	7.00	6.50	7.00	0.86	0.37	56.86	7.00	7.00	6.90	6.80
D_4	1.30	0.40	68.94	7.50	6.60	4.30	7.30	0.83	0.34	58.87	6.40	6.40	5.80	6.20
S.Em (±)	0.01	0.00	0.46	0.05	0.05	0.04	0.05	0.01	0.00	0.39	0.05	0.05	0.04	0.05
CD at 5%	0.03	0.01	1.33	0.15	0.13	0.11	0.14	0.02	0.01	1.12	0.14	0.14	0.13	0.13

M_1D_1	1.36	0.77	43.91	5.00	4.80	7.20	4.00	0.92	0.59	34.79	8.60	8.20	8.00	7.40
M_1D_2	1.25	0.50	59.97	6.00	5.40	6.60	5.00	1.07	0.57	46.25	7.40	8.00	7.80	7.00
M_1D_3	1.15	0.41	64.35	7.00	6.60	6.20	6.40	0.98	0.44	55.69	7.00	7.40	7.40	6.40
M_1D_4	1.14	0.38	66.14	7.20	6.20	4.00	7.20	0.89	0.37	58.56	6.40	6.80	5.80	5.60
M_2D_1	1.02	0.58	42.83	5.80	5.60	8.40	4.80	0.64	0.36	44.27	8.00	7.60	7.60	8.00
M_2D_2	1.32	0.54	59.39	7.00	6.20	7.00	6.60	0.69	0.32	53.21	7.60	7.20	7.00	7.60
M_2D_3	1.09	0.31	71.48	8.60	7.40	6.80	7.60	0.73	0.31	58.04	7.00	6.60	6.40	7.20
M_2D_4	1.46	0.41	71.74	7.80	7.00	4.60	7.40	0.78	0.32	59.18	6.40	6.00	5.80	6.80
S.Em (±)	0.01	0.00	0.65	0.07	0.06	0.05	0.07	0.01	0.00	0.55	0.07	0.07	0.06	0.07
CD at 5%	0.04	0.01	1.88	0.21	N/A	0.15	0.19	0.02	0.01	1.58	0.19	N/A	0.18	0.19

(M_1- Sand, M_2- Silica gel, D_1- 2 min, D_2- 3 min, D_3- 4 min, D_4- 5 min)

Before drying After drying

Plate 1: Embedded in silica gel & micro oven dried *Aralia balfouriana* leaves

Plate 2: Embedded in silica gel & micro oven dried *Thuja orientalis* foliage

Plate 3: Embedded in silica gel & micro oven dried *Lantana camara* leaves

Plate 4: Embedded in silica gel & micro oven dried *Schefflera arboricola* leaves

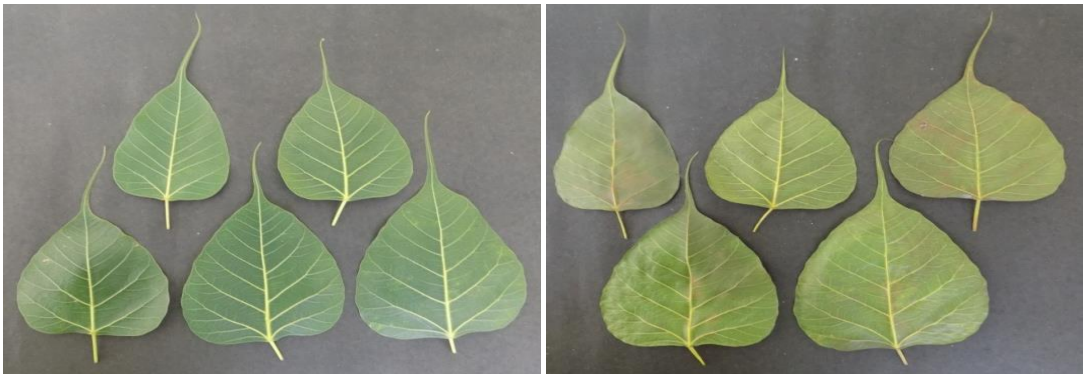
Before drying After drying

Plate 5: Embedded in silica gel & micro oven dried *Azadirachta indica* leaves

Plate 6: Embedded in silica gel & micro oven dried *Tagetes spp.* leaves

Plate 7: Embedded in silica gel & micro oven dried *Mussaenda erythrophylla* leaves

Plate 8: Embedded in silica gel & micro oven dried *Bauhinia variegata* leaves



Before drying After drying

Plate 9: Embedded in silica gel & micro oven dried *Ficus religious* leaves

Plate 10: Embedded in sand and micro oven dried ficus tree (*Ficus benjamina*) leaves

4. Conclusion

It can be concluded that embedding in silica gel and microwave oven drying for 2 min found suitable technique for dehydration of mussaenda and lantana leaves, 2.5 min found suitable for dehydration of marigold leaves, 3 min found ideal for dehydration of thuja foliage, bauhinia and neem tree leaves, 3.5 min found appropriate for aralia leaves, 4 min found suitable for peepal tree and umbrella tree leaves. Embedding in sand and microwave oven drying for 4.5 min found suitable for ficus tree leaves.

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