



## From Fresh to Forever: The Art of Flower Drying

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Flowers have always remained an integral part of man's life, and love for natural flowers is an inherent instinct. Fresh flowers are appealing and attractive, but maintaining their allure and fresh appearance for an extended period of time is difficult. To overcome this problem, the same flowers can be dried and processed into dry flowers. Dry flowers and plant materials have tremendous potential as substitutes for fresh flowers, and foliage has become the premier choice in their lifestyles for interior decoration. The dry flower industry is offering a creating job opportunities and entrepreneurial development. Flowers, including leaves and other botanicals, can be dried with various drying methods. The quality of dried flowers completely depends on the method of drying.

### Advantages of dry flowers:

- ✓ Dry flowers are both environmentally friendly and cost-effective, and can be reused.
- ✓ Dry flowers are useful in every season, especially during winter when fresh flower availability is limited and expensive.
- ✓ Dry flowers require less care and maintenance and are available throughout the year.
- ✓ Dry flowers and products can be used in generating diverse, economically useful products. Hence, it can be used in revenue generation throughout the year.

### Precautionary measures for selecting the plant material for drying

The selection of a suitable crop is the primary requirement to get better quality products. The following important measures should be taken while collecting the plant material to get the desired results:

- The flowers, foliage, and leaves should be healthy. The plant material should be cut with the help of a clean and sharp cutter.
- The flowers at different stages of development and the foliage at the peak of its growing season should be collected.
- Flowers with bright colours should always be preferred.
- The plant material to be dried should be cleaned properly and wiped of any moisture.

### Stage of harvesting

- The stage of harvesting for different flowers varies according to the species.
- Usually, flowers are harvested just before they are fully open, and the colour should not be faded.
- The delay in harvesting time (2–3 days) brings about the collapse of petals, which causes their shattering
- Flowers harvested at the fully open stage took less time for drying than those harvested at the tight bud and half-open stage in Helichrysum.
- Rose flowers harvested at the half-bloom stage provide superior quality dry roses with less drying time and better colour retention due to colour stability at this stage.

## Moisture content in dried flowers

- ✓ Lower moisture provides rigidity in flowers and results in uniform cell contraction, while higher moisture in dried flowers leads to flaccid flowers.
- ✓ The mechanical support provided by the media throughout the drying process ensures that the flower shape is maintained as long as the moisture content is less than 11.55 percent.
- ✓ To maintain their quality and firmness for more than six months, dried flowers must have a moisture content of 8–11.5%.
- ✓ Excessive drying results in petal shedding during handling. Drying below 8% moisture content leads to shedding, which is related to excessive moisture loss.

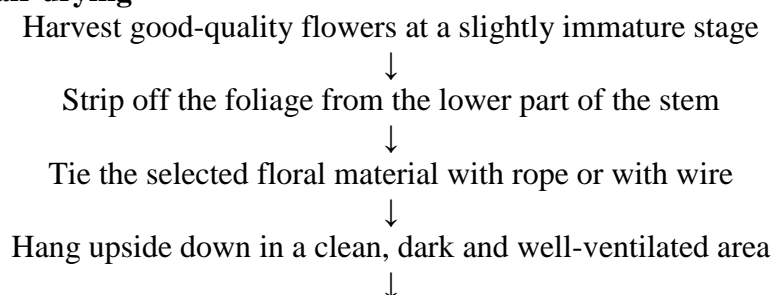
## Methods of drying

Drying of flowers is a method of preserving flowers or the process of removing moisture from the flowers. The quality and appearance of dried flowers and other ornamental plant parts are greatly influenced by the method of drying or the drying technique being followed. The NBRI, Lucknow, is a pioneer institute in India that works on the dehydration of flowers, foliage and floral crafts.

### 1. Air drying

Air drying is the easiest and most affordable approach for drying. It is also known as the "Upside Down" or "Hang and Dry" method of drying the plant material, which is attached to a rope or wire and is kept in a hanging position.

#### Flow chart for air drying



Keep it in the same position and without touch for the next 1-2 weeks for absolute drying.

**Table 1: Plant material suitable for Air drying with approximate drying time**

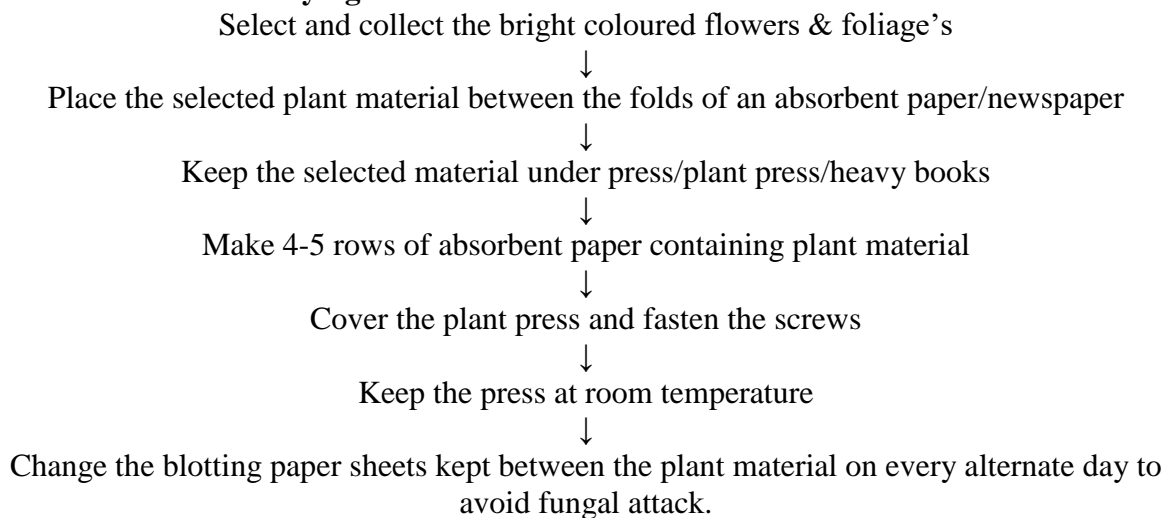
Plant material	Approx drying time(days)
<i>Gladiolus dalenii</i>	9- 10
<i>Dianthus caryophyllus</i>	9-10
<i>Cosmos peduncles</i>	7-8
<i>Hydrangea macrophylla</i>	8-9
<i>Limonium latifolium</i>	7-8
<i>Lilium dalhansonii</i>	7-8

### 2. Press drying

- Press drying is one of the most established techniques utilised and is accepted to have been first reported in 1820. Later, it was used by the herbalists or botanists for the preparation of a herbarium. In press drying, the flowers and foliage are placed between the folds of newspaper sheets or blotting papers, giving some space among the flowers.
- These sheets are kept one above the other, and corrugated boards of the same size are placed in between the folded sheets to allow the water vapour to escape.
- The drying time can be reduced if the sheets are kept in an oven at an appropriate temperature shape of the material cannot be maintained as it becomes flattened because the fresh material, after pressing within the iron or wooden frame, tends to stick to the paper used.
- The microbial attack is a common feature because the moisture and cellulose of the paper serve as the potential substrate for the sporulation and growth of these organisms.

- Though the flowers and foliage become flat after press drying, this material can be used for composing floral craft items like greeting cards, floral designs and other art creations which may be framed for wall pin-ups

#### Flow chart for Press drying



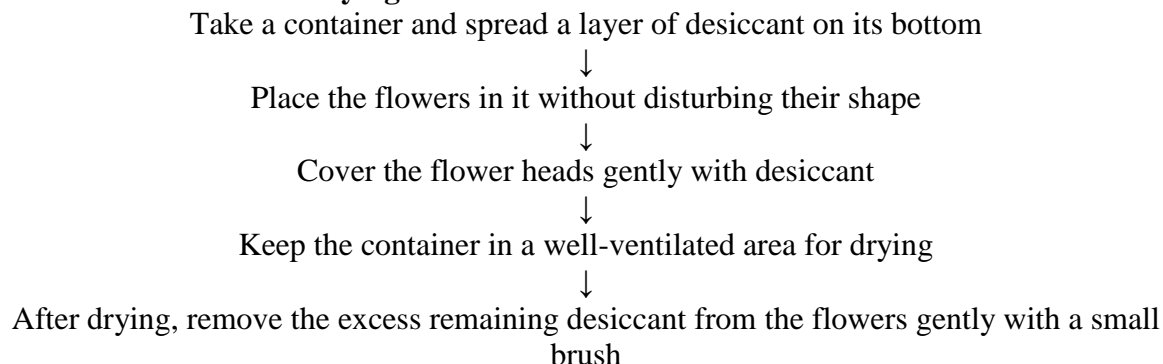
**Table 2: Plant material suitable for Press drying with approximate drying time**

Plant material	Approx drying time(days)
<i>Canscora diffusa</i>	7-8
<i>Leucas stelligera</i>	7-8
<i>Gnidia glauca</i>	9-10
<i>Calliandra haematocephala</i>	9-10
<i>Pentas lanceolata</i>	7-8
<i>Ixora coccinea</i>	7-8
<i>Plumeria rubra</i>	6-7
<i>Ranunculus acris</i>	6-7
<i>Pogostemon benghalensis</i>	7-8
<i>Gypsopilia elegans</i>	8-9

### 3. Embedded Drying in Desiccants

- Embedded drying is one of the best methods of flower drying, especially for flowers with a delicate texture and high moisture content.
- Silica gel is the ideal drying agent, and it is light in weight, streams effectively and makes it simple to encompass all the parts of the flowers for quick drying.
- The flowers that are not suitable for air drying can be well dried with this method. While testing various media such as sand, borax and silica gel, determined that maximum moisture loss was observed when the flowers were embedded in silica gel.
- The flowers dried in silica gel are less deformed and retain their maximum shape and colour.

#### Flow chart of desiccant drying



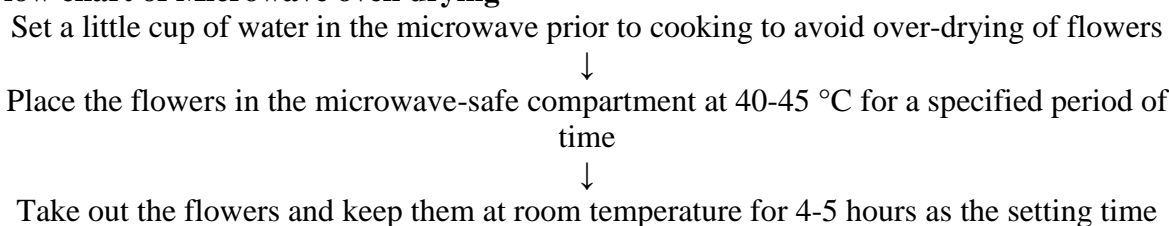
**Table 3: Plant material suitable for Embedded drying with approximate drying time**

Plant material	Approx drying time(days)
<i>Gerbera jamesonii</i>	6-7
<i>Tagetes erecta</i>	6-7
<i>Rosa indica</i>	6-7
<i>Helianthus annuus</i>	7-8
<i>Strelitzia reginae</i>	6-7
<i>Celosia cristata</i>	3-4
<i>Dendranthema grandiflora</i>	6-7
<i>Lagerstroemia speciosa</i>	7-8
<i>Echinacea angustifolia</i>	6-7
<i>Zinnia angustifolia</i>	5-6
<i>Lavendula bipinnata</i>	6-7

#### 4. Microwave oven drying

- Nowadays, hot air and microwave ovens are also being used for faster drying and to improve the quality of dry flowers. In these methods, plant material is kept at a controlled temperature for a specified time.
- Temperature plays an important role in the drying of flowers and other ornamental plant parts by influencing both qualitative and quantitative parameters. At higher temperatures, the rate of transpiration was comparatively much higher. With the increase in temperature.
- Drying time differs as per the size and moisture content of the flower. However, plants are typically dried in 2-5 minutes, and the material is kept at room temperature (for 4-5 hours as setting time, which varies from plant to plant).

#### Flow chart of Microwave oven drying

**Table 4: Plant material suitable for Microwave oven drying**

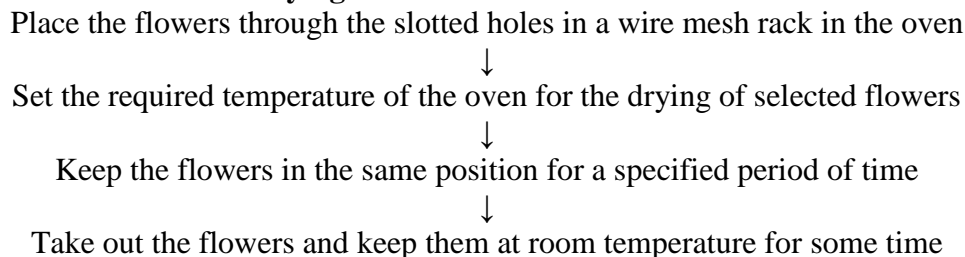
Plant material	Temp & Heating time
<i>Calendula officinalis</i>	45 °C for 4-5min
<i>Dahlia variabilis</i>	45 °C for 5-6min
<i>Dendranthema grandiflora</i>	45 °C for 4-5min
<i>Callistephus chinensis</i>	45 °C for 3-4min
<i>Dendrobium noblie</i>	50 °C for 2-3min
<i>Helichrysum bracteatum</i>	45 °C for 3-4min

#### 5. Hot air oven drying

- In this method, the plant material is kept at controlled temperature conditions. The flowers are slotted through holes in a wire mesh rack in the oven and are kept at a controlled temperature for a specified period of time.
- Time and temperature combinations vary from plant to plant and mainly depend upon the compactness and thickness of flowers. At higher temperatures, the rate of transpiration is comparatively much higher. With the increase in temperature, the diffusion pressure deficit of air increases, which stimulates the diffusion of internal moisture from the surface and further increases its vaporisation rate, thus leading to high moisture loss at higher temperatures.

- Half-opened flowers or flowers at the bud stage are suitable for drying in a hot air oven, while completely opened flowers are not appropriate, as their petals are free to expand and strip off effectively on drying

#### Flow chart of Hot air oven drying



**Table 5: Plant material suitable for Hot air oven drying**

Plant material	Drying time & Temperature
<i>Antirrhinum majus</i>	12 hrs at 50 °C
<i>Amaranthus caudatus</i>	10 hrs at 45 °C
<i>Callistephus chinensis</i>	9 hrs at 50 °C
<i>Dahlia variabilis</i>	11 hrs at 45 °C
<i>Dianthus caryophyllus</i>	11 hrs at 45 °C
<i>Caryophyllaceae Dendrobium</i>	10 hrs at 45 °C
<i>Zinnia elegans</i>	10 hrs at 45 °C
<i>Narcissus poeticus</i>	10 hrs at 50 °C
<i>Ixora coccinea</i>	9 hrs at 50 °C
<i>Helipterum roseum</i>	11hrs at 45 °C
<i>Lilium dalhansonii</i>	12 hrs at 45 °C

#### 6. Water drying

- There are some flowers that dry well in water. By the process of evaporation, the stems of the flowers are first positioned in water at a depth of a few inches, where water is taken up by the fresh flowers to keep the petals intact.
- The container and flowers should be kept in a dry, warm, and dark area for 6–10 days to dry normally. When the flowers have utilised all the water, they have dried effectively.

**Plant materials suitable for water drying:** *Hydrangea macrophylla*, *Centaurea cyanus*, *Gypsophila sp.*, *Celosia argentea*, and *Moluccella laevis*.

#### 7. Glycerin drying

- Glycerin is reported as one of the best osmotic reagents, effective for drying while maintaining flexibility, form, and texture.
- Preserved plant material is less brittle than dried plant material, making it less susceptible to shattering and mechanical damage.
- Several types of foliage have been successfully preserved by immersing leaves or crushed stems in a 33% glycerol solution. The resultant leaves are smooth and flexible, preserving foliage and berries in glycerin and hot water solutions, which introduced them into a nearly everlasting category.
- Freshly cut statice stems may be preserved by soaking in a 1:2 or 1:3 glycerol water solution for 48 hours, followed by microwave drying for 1 min at a medium-high temperature (34 °C).
- A solution of 10–30% glycerol in water was found to be satisfactory for preserving most of the foliage. Although this process is generally applicable to foliage.

**Plant material (leaves) suitable for glycerin drying:** *Ocimum gratissimum*, *Melia azedarach*, *Morus alba*, *Ficus benjamina*, *Ficus benghalensis*, *Ficus nuda*, *Magnolia spp*, *Eucalyptus globules*, *Lagerstroemia speciosa*, *Aspidistra elatior*, *Sorbus domestica*, *Fatsia japonica*, *Grevillea robusta*, *Digitalis purpurea*, *Camellia japonica*, etc

#### Skeletonization

- It is well-known that people utilize diverse plant materials for aesthetic purposes in different methods. This procedure removes all green pulp but keeps the veins of the leaf intact. Leaf venation preparation is an art that can be used for beautification and for interior decoration.
- The venation pattern of plant leaves offers great beauty. This results from the visual combination of their complexity and regularity.
- Fantabulous images of leaf veins can be acquired from leaves from which the soft tissue is excluded.

**Plant material (leaves) suitable for Skeletonization:** *Ficus religiosa*, *Ficus elastica*, *Magnolia grandiflora*, *Populus alba*, *Acer platanoide*, *Hydrangea macrophylla*, etc.

## Conclusion

Flower drying transforms fresh blooms into long-lasting decorative materials, preserving their beauty, colour, and form beyond their natural lifespan. Various techniques, such as air drying, pressing, silica gel drying, and microwave drying, offer flexibility based on flower type and desired quality. This art not only enhances aesthetic value but also supports sustainable practices by reducing waste and promoting eco-friendly crafts. Dried flowers are widely used in floral arrangements, home décor, and value-added products, creating income opportunities. With growing demand for natural and durable decorations, flower drying continues to gain importance, blending creativity with practicality in modern floriculture and lifestyle trends.