

Dehydration Techniques of Flowers and Foliages

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SUMMARY

Preservation of flowers and other ornamental plant parts by drying has been a form of artistic expression and it was very popular in Victorian ages. Drying methods are one of the important and best technique to preserve the flowers and plant parts for their year round availability, longevity, quality and eco-friendly nature. The methods of flower drying viz., Air drying, sun drying, press drying, hot air oven drying, glycerin drying, freeze drying and embedded drying are used to preserve or drying of not only flowers but also other parts of the plants like foliages, branches, twigs, cones, nuts, fruits, berries etc.

INTRODUCTION

Flowers are the wonderful creation of nature regarded as symbol of love, beauty, purity and paradigm of life and are closely associated with the human being from the dawn of civilization. Flowers are used as loose flowers, cut flowers and dry flower for long time for decorating homes due to their beauty and fragrance. Fresh flowers and other parts of the plants are look beautiful, fresh and decorative but due to their perishable and delicate nature, it cannot be retain their beauty and fresh look for long time. In this context, flowers and plant parts can be dried, preserved and processed to retain its beauty, freshness and attractiveness for long time. The growing demand for the dry flowers and plant parts is increasing day by due to the change of purchasing power, standard of living of human being, people has been eco-conscious, choose eco-friendly and biodegradable substitute to fresh flowers in the world. The flowers and other parts of the plants can be dried by using Air drying, press drying, oven drying, glycerine drying, freeze drying and embedded drying these methods are generally used for making decorative floral products like wall hangings, greeting cards, floral pitchers, landscape calenders, potpourries, floral balls, pomanders, wedding cards *etc.* (Bhutani, 1990). The dry flower industry is labour dependent and it could empower or gives employment to the thousands of unemployed men, women and youth of the rural area.

Drying or Dehydration

Drying or dehydration means to dry something under artificially produced heat through controlled humidity, temperature and air flow.

Characteristics of dry flower

The important characteristics of the dry flowers are

- Novelty
- Longevity
- Aesthetics
- Flexibility
- Year Round Availability

Important considerations for better results in dehydration of flowers and foliage

- Flowers and foliage should be collect one or two days after irrigation
- Material for drying should be collected or harvested from the field after evaporation of dew and surface moisture
- Material for drying should be collected from the field on sunny day or dry season
- Faded, diseased and damage material should be discarded.
- All the stages of flower development should be collected.
- Harvested or collected material should be embedded immediately after plucking or harvesting.
- One type of flower or foliage should be embedded at a time.
- The flowers or plant parts should be harvested when it will obtained the high quality product.

Methods of drying

Air drying

Air drying is the cheapest, easiest, simplest methods of flower drying and no special equipment required, often referred to as “Hang and Dry”. Flowers are hung in an inverted position or kept in an erect manner in a well-ventilated, warm and shaded place. Protection from direct sunlight, dry atmosphere and plenty of ventilation are necessary. This technique is generally used in dry and summer season. Crisp texture flowers can be dried easily by hanging them in an inverted position or by keeping them in container in erect position. e. g. Helychrysum, Acroclium, Limonium, Cocks comb, Globe amaranth, Larkspur, Statice, Lily, Iris etc. It has been reported that the maximum percent moisture loss (83.50%) was observed with the air drying under shade in carnation (Sindhuja *et al.*, 2017).

Sun drying

Plant material or plant parts are embedded in drying medium in any container and exposed to the sun daily to facilitate rapid dehydration. Sun drying in India is practiced for wood rose, lotus pods, poppy pods, grass ear heads etc. Flowers like chrysanthemum, marigold, zinnia embedded in sand in upside down position and kept in sun, get dry in one or two days.

Press drying

The flowers and leaves while press drying is placed between the folds of newspaper sheets or blotting papers giving some space among flowers. These sheets are kept one above the other and corrugated boards of the same size are placed in between the folded sheets so as to allow the water vapor to escape. The original shape of the materials cannot be maintained by press drying but original colour is retained. The pressed flowers and foliage are used in making floral wall art, greeting cards, floral design and other art creation which may be framed for wall pin ups. E. g. Ageratum, Anemone, Butter cup, Candytuft, Celosia, Cocks comb, Chrysanthemum, Cosmos, Crocus, Geranium, Golden rod, Marigold, Pansy, Phlox, Rose, Salvia, Statice, Sweet pea, Zinnia etc.

Hot Air Oven

To have a better quality product, hot air oven drying is the best method. Electrically operated hot air oven at a controlled temperature is used for drying flowers in an embedded condition. The drying temperature and duration varies with plant size, structure and moisture content of the material. Colour of the dried material is significantly affected by drying equipment's and media. This is the faster method of drying as compared to the sun and air drying. E.g. African marigold, Bougainvillea, China aster, Chrysanthemum, Paper flower, Gerbera, Gomphrena, Statice, Candytuft, Strawflower, zinnia etc.

Glycerin drying

This method of preservation is most suitable for the drying of foliage of the plants. Freshly harvested and fully matured foliage has been found ideal for glycerinizing. The plant material are immersed in the glycerol solution found to be the best preservation methods for foliage. The concentration of glycerin treatment varies with the texture of foliage, viz., Thick texture foliage - 1 part of glycerin to 2 parts of water, medium texture foliage - 1 part glycerin to 2.5 part of water and Thin or fine texture foliage - 1 part glycerin to 3 parts of water (Verma *et al.* 2012).

Freeze drying

In this method of drying the water is removed from the flowers to be dried in the form of vapours with the application of heat from solid state by sublimation which requires high vacuum and low temperature. Freeze drying is one of the most advanced drying technique being used worldwide. It was introduced in the year 1813 by William Hyde Wollaston to the Royal society in London. The full drying cycle takes 5-9 days. This method maintained the natural colour, shape and texture of the flowers.

Embedded drying

In embedded drying, the water content of the flower is completely absorbed by the surrounding desiccant material. Flowers can be dried by burying them in a plant drying mixture or desiccant. The desiccant material generally used for drying are silica gel, sand, sawdust, borax, corn meal, alum etc. The containers used in embedded drying should uniformly get heated so that material evenly dry out from all sides. Aluminium or tin containers are normally used which may be cylinder or tray type.

Characteristics of good embedding materials

- **Fineness** – It should be very fine (0.02 – 0.2 mm)
- **Inertness to water vapour** – The embedding material should not react chemically with water vapours liberated during drying from plant parts
- **Optimum weight** – Embedding material should be cheaper and easy to handle and should be heavy in weight
- **It should not stick to the plant parts** – Lightweight powders are not used for embedding, since they are difficult to handle and leaves gaps during embedding

Table 1. Suitability of drying methods to flowers and plant parts

Sr. No.	Methods	Suitable plants
1.	Air Drying	Acroclinum, <i>Helichrysum</i> , <i>Limonium</i>
2.	Press Drying	Candytuft, Chrysanthemum, Euphorbia, Lantana, Ixora, Thuja, Mussaenda, <i>Golphimianitidia</i> , Pentas morn, Roses, Verbena, Larkspur, Pansy, Grasses, Garden fern, Foliage of <i>Cassia biflora</i>
3.	Hot Air Oven	Acroclinum, Chrysanthemum, Candytuft, Gerbera, <i>Gomphrena globosa</i> , <i>Helichrysum bracteatum</i> , Euphorbia, Delphinium, Rose, Zinnia, Bougainvillea, Narcissus, Dahlia, Gladiolus, Marigold, Nymphaea spp.
4.	Microwave oven	<i>Antirrhinum majus</i> , China aster, Small Chrysanthemum, Dahlia (pompon), <i>Dianthus caryophyllus</i> , Bougainvillea, Gerbera, Gladiolus, <i>Lagestroemia indica</i> , Narcissus, Phlox, <i>Ixora coccinea</i>

(Katagi *et al.*, 2014)

CONCLUSION

Dried flowers and plant parts are cheaper, eco-friendly, long lasting, biodegradable, easily available and therefore, possess a great potential in floriculture industry throughout the world. Dry flowers are good decorative items and which can be effectively utilized for making floral craft items, greeting cards, floral arrangements in sealed plastic containers, flower vase, pot pourris etc. and also dry flower industry has huge potential to provide employment to unemployed youths and rural women.

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