



DRY FLOWER TECHNOLOGY

Drying and preserving flowers and plant materials is a form of artistic expression that was very popular during the Victorian age and has once again gained popularity. Dried or Dehydrated Flowers or Plant part or Botanicals (Roots, leaves, Stem, Bark or Whole plant) can be used for ornamental purposes.

Dried flowers and other plant parts is a Rs. 100 crore industry in India and such dry decorative materials are globally accepted as natural, eco-friendly, long lasting and inexpensive. India is one of the major exporters of dried flowers to the tune of 5% world trade in dry flowers. This industry shows a growth rate of 15% annually. Potpourris is a major segment of dry flower industry valued at Rs. 55 crores in India alone. Easy availability of products from forests, possibility of manpower available for labour intensive craft making and availability of wide range of products throughout the year are the reasons for development of dry flower industry in India. This industry provides direct employment to around 15,000 persons and indirect employment to around 60,000 persons.

The processing of dried flowers involves drying, bleaching and colouring after their collection. Suitable packing methods are needed for their storage, transport and marketing. In India nearly 60% of the raw materials are sourced from natural forests and plains, only 40% of the flowers are cultivated for drying, bleaching and coloring.



Product Segmentation

1. Dried flowers and plant parts in bulk
2. Potpourri
3. Arrangements
4. Floral Handicrafts
5. Main blooms
6. Fillers
7. Liners
8. Exotics

Tips for collecting plant materials are as follows:

- Avoid collecting plants when they are wet or moist from dew.
- Use a sharp knife or pruning shears to cut flowers and plant materials.
- Select plant materials that are without insect or disease problems.
- Place stems in water while harvesting to prevent wilting. Some flowers may hold color better if allowed to stand in water for a few hours. Start the drying process as soon as possible after cutting.
- Collect more plant materials than needed to allow for some loss.
- Be mindful of where you collect plant materials; never remove unlawful or endangered plants.

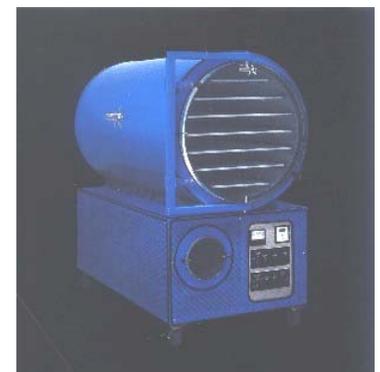
Drying Methods

Since flowers and foliage consists of more water, dehydration is necessary for getting dry flowers. Methods used for removing water from plant parts are air-drying, sun drying, oven drying, embedding (sand, borax, silica gel and combination of these materials), glycerining (Glycerinating), microwave oven drying, freeze-drying and press drying

Air Drying

Steps for air drying

1. Cut flowers of good quality at prime conditions or slightly immature.
2. Remove foliage from stems. If stems are weak or become brittle after drying, remove them and wire the flowers.
3. Group the stems into small bunches and tie with a rubber band. It will pull tighter as the stems shrink during drying.
4. Hang upside down in a warm, dry, dark area such as an attic, closet



5. or furnace room. Avoid damp rooms or direct sun on the flowers. Good air circulation is important.
6. Allow to remain until thoroughly dried. This normally takes two to three weeks.

Sun Drying

Plant material is embedded in drying medium (sand) in a container and exposed to the sun daily to facilitate rapid dehydration. In India, open sun drying is followed for drying many flowers. Flowers like small zinnias, marigolds, pansies, and pompon chrysanthemum embedded in sand in an upside down fashion and kept in the sun would dry in a day or two.

Oven Drying

Electrically operated hot air oven at a controlled temperature of 40-50° c is used for drying flowers in an embedded condition. Standardization of drying time and temperature were done at NBRI. For Helipterum, Chrysanthemum, Gerbera, and limonium took 48 hours at 45-49° C, French marigold took 72 hours, African marigold took 96 hours at this temperature. China aster, Delphinium, Rose buds and small flowers, and Zinnia took 48 hours at 40 – 44° C, Medium and large roses took 72 hours and very large flowers took 96 hours in 40-44° C.

Embedding Method

Embedding the flowers in a granular, desiccating material is probably the most commonly used method and many consider it the best all around method. Several materials may be used, and they vary in cost and the results that they produce. To cover a flower, put about an inch of desiccating



material at the bottom of the container; cut the flower stem to about a half an inch and stick this into the center of the material at the bottom to hold the flower. Next, pour the desiccating material along the perimeter of the container, away from the flower, building up a continuous mound of about an inch. Then tap lightly on the container and the material will move to the flower, not altering the form of the petals (in other words, the material will not weigh down the petals as it would

if it were just poured on top of the flower). Continue adding the material, tapping on the container, etc. until the flower is completely covered. Lastly, add an inch of the material above the top of the flower. Sand, Borax, kitty's litter, Silica gel, saw dust, perlite and combination of these materials are used in this method.

Water Drying

Some flowers dry well if placed in water. The stems of the flowers are initially placed in a couple of inches of water, then the water is allowed to evaporate and be taken up by the cut flowers. The container and flowers should be in a dry, warm and dark location. Hydrangeas, yarrow, bells-of-Ireland and celosia dry well with this method.

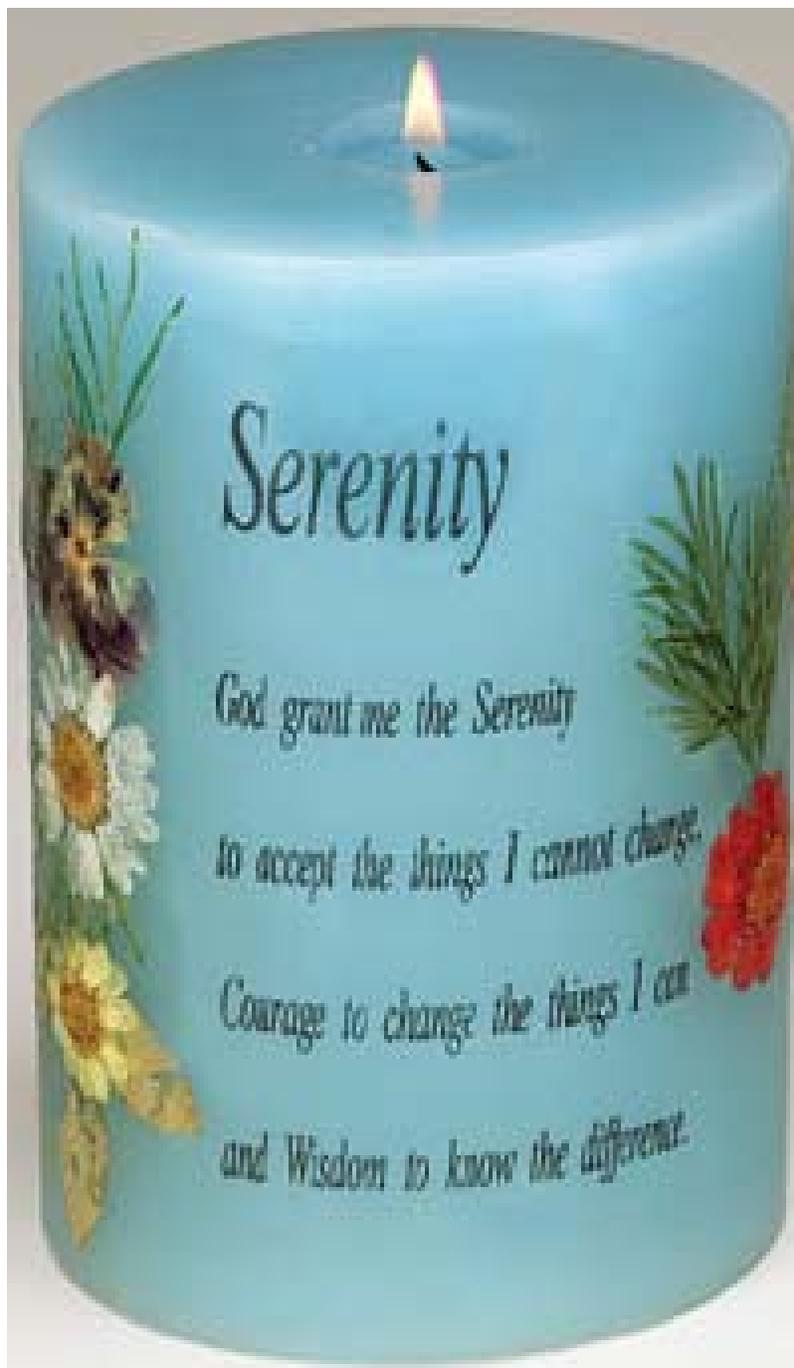
Microwave Oven Drying

Electronically produced microwaves liberate moisture from organic substances by agitating the water molecule. It is fast and the results are good. The flower has to be embedded in silica gel medium in a microwave safe open container along with a small cup with water nearby. Standing time of 10 minutes to few hours is needed after the drying for best results. When the temperature of the silica gel reaches about 160° F, it is done.

Glycerin Drying (Glycerining)

Glycerin preserves foliage by replacing the natural moisture present in the leaf with a substance that maintains the leaf form, texture and sometimes the colour. Fresh and fairly matured foliage is ideal for glycerining. About 50 per cent of most plant fresh weight is water, but brittleness is usually only a problem if the water content falls below 10 per cent.

At high humidity, all humectants absorb a great deal of water from the atmosphere, and so proportionally less humectant is required to keep foliage supple. At 90 per cent relative humidity, glycerol will have a water content of 215 g per 100 g of glycerol. Humectants can be



absorbed into plant tissue either by transpiration stream uptake or by immersing the cut foliage in a humectant solution.

'Sweating' occurs when a sudden drop in humidity from a high level results in a drastic reduction in the water holding capacity of the humectant, which then releases free water. Because this water cannot evaporate quickly enough, it collects as droplets on the surface of the plant material where it provides an ideal environment for bacterial or fungal growth. Sweating can be minimized by:

- keeping the level of humectant in the plant tissue as low as practicable;
- storing glycerined foliage at low humidity, and

Freeze Drying

Originally introduced in 1813 by William Hyde Wallaston to the Royal Society in London, it wasn't until the late 80's the freeze-drying industry discovered the allurements and longevity of freeze-dried flowers.

Freeze dried flowers are fresh flowers that have been specially dried to preserve their natural shape, colour and beauty. Freeze drying is accomplished by a process called sublimation. It requires a special freeze-drying machine.

It involves first freezing the flowers at (-)10°C for at least 12 hours. A vacuum pump slowly pulls the water out of the flowers as a vapor in one chamber, and then the vapor condenses as ice in another chamber.

Because of this process, the shape and natural color of the flower is maintained. For Roses it takes 15 – 17 days and for other flowers normally 10 – 12 days. Major flowers dried by this method are roses, carnation, bridal bouquets, etc,

Press Drying

Flowers and Foliage are placed in-between two folds of newspaper sheets or blotting paper and these sheets are kept one over other and corrugated boards of the same size are placed in-between the as to allow escape. The then placed in screws hours the to an electric hours at 40- Placing the



folded sheets so the water vapour to whole bundle is the plant press, its tightened. After 24 bundle is removed hot air oven for 24 45°C. foliage between

two pieces of waxed paper and pressing the wax paper with a medium hot iron easily preserves the flexibility and the fall colors of foliage. New pieces of waxed paper must be used for each pressing.

Bleaching

Bleached ornamental plant material provides a striking contrast when arranged with dried or dyed flowers. Bleaching also allows the use of dyes for coloring. Oxidative (Hypochlorite, Chlorite and Peroxide) and reductive bleaching chemicals (Sulphite and Borohydride) are used for bleaching ornamental flowers and foliage. Sodium Chlorite is an excellent bleaching agent because it is relatively selective for lignin without damaging fibre. In reductive bleaches, hydrosulphites (Sodium or Zinc Hydrosulphite) are cheap and have maximum bleaching power.

After bleaching with oxidative or reductive chemicals, yellowing of the plant materials is the main problem. To avoid yellowing, multi step bleaching i.e., alternating oxidative bleach with a reductive bleach create products with less yellowing. A final wash in a 2 % solution of Barium Hydroxide, Calcium Hydroxide, Sodium Bicarbonate or Aluminium Sulphate prevents yellowing.

Coloring Dried Flowers Preserving flowers with their natural colour is essential otherwise we have to improve the colour of the product by adding dyes. A dye is most often added to the glycerin preserving solution to permanently colour the decorative plant materials. Systemic dyes are available for use. They are acidic-anionic dyes, which are combined with water and glycerin to form a preservation solution that is absorbed by fresh cut flowers and foliage through the stem of the plant. As the water evaporates, it leaves behind the dye and glycerin for our desired color. Normally 1.5 ml to 5 ml dye/l of solution is prepared. Color take and preservation will take 2-8 days.

Sulphuring

It is used to prevent enzymatic granules have been burnt for along with dry flowers. It is very safety instructions.

Potpourri

Potpourri is usually a mixture of including flowers, leaves, basis of a potpourri is the plant. Two kinds of potpourri can be made - dry and moist. The most common, the dry method, is quicker and easier, but the potpourri does not last as long. Both methods require a "fixative", which is



colour change. Traditionally sulphur about 2 hours in a closed chamber toxic, so we have to check relevant

dried, sweet-scented plant parts seeds, stems and roots. The aromatic oils found within the

responsible for absorbing the aromatic oils and slowly releasing them. Herbs such as Artemesia, Thyme, Sage, Rosemary, Basil, Achillea (Yarrow), Lavender, Scented Geranium, Mint, Marjoram, Verbena, Anise and Fennel can be used for scent. The herbs and fruits should be thoroughly dried to prevent mildew.

Skeletonizing

As the name implies, this treatment eliminates all tissues but the "skeleton" or veins of leaves. Skeletonized leaves lend an interesting, lacy appearance to dried arrangements. Heavy-textured leaves are the best choices for this method of preservation. Boil leaves 40 minutes in 1-quart water and 2 tablespoons of lye. Rinse in cold water and scrape or brush the green pulp from the leaves; however, be careful not to destroy the network of veins. To lighten the color of the leaf skeletons, immerse in a 1-quart water and 2 tablespoon household bleach solution for 2 hours. Rinse and dry.

Post Harvest Handling of Dried Flowers

Since Dry flowers are made up of cellulose materials of plant origin, it invites lot of pests. They are hygroscopic in nature, if allowed to absorb moisture, problem of mould infection will occur. The dried flowers should be treated with a suitable biocide (insecticide and fungicide) and packed in waterproof containers.

Packing of dried Flowers

Dried flowers are fragile and require careful handling. Card board boxes, thermo cool packing, poly lined or wax paper lined cartons are normally used for packing dried flowers. Metallic tins and thermo cool boxes are also used for packing dried flowers. The dry flower arrangements are to be kept in transparent polypropylene boxes (100-200 gauges) for display. Moth balls and silica gel pouches should be kept inside the packing to avoid insect and moisture damage

When plant parts have been preserved, utmost care should be taken to prevent their damage. Specimens should be packed in closed boxes or in sealed plastic bags containing mothballs. Packets of silica gel should also be placed in the boxes to absorb any moisture in the air. Dried plant materials are highly flammable, and precautions should be taken to prevent fire hazards.

Future Areas of Research in Dry Flowers

- Standardization of raw materials for trade
- Standardization of production technology for dry flowers.
- Standardization of processing and packing.
- Identification of markets for new products

- Regulation of marketing strategies in various localities
- Application of modern drying techniques for quality

Research in dry flowers in India is limited and published information on dry flowers is almost nil. The drying technologies followed for flowers of temperate region can also be used for tropical flowers with some modifications. This area needs research and publication to reach large mass of rural areas. Research stations of State and Central Government institutions are undertaking limited work due to lack of required facilities. Since Dry flower is more industrial oriented, Farm scientist are reluctant to take research programmes and advanced studies on dry flowers, hence they should come forward to take up studies on dry flower technology in order to exploit the Indian dry flower potentiality. Organized Research set up (Govt. & Private) should be established. Proper funding for research in dry flower is a must since this industry shows great opportunity to our rural areas and cottage industries. So that India will be the leader in this area of development in near future.

 P.Arul Murugan¹,

 Dr.G.Thiyagarajan²,

 K.Ramesh³.

¹ final year B.Tech (Horticulture), HC&RI, TNAU, Coimbatore – 3,

^{2,3} Water Technology Centre, TNAU, Coimbatore-3.

arul_hort@yahoo.co.in

Note: The authors have used various sources in the preparation of this article. For further details please contact them.

