NEW ERA AGRICULTURE MAGAZINE

Drying techniques in cut flowers

Rajiyabegaum S. Hosalli[1], Laxman Kukanoor[2], Viresh M. Hiremath[3], Mukunda Shiragur[4]

Introduction:

Cut flowers play a vital role in enriching human life through beauty, emotion and tradition. Their vibrant colours and delicate fragrances can instantly uplift moods, reduce stress and create a calming atmosphere. Used in celebrations, rituals and ceremonies, they symbolize love, remembrance and joy across cultures. A simple bouquet can express feelings that words often cannot, making them powerful tools of communication. Economically, the cut flower industry supports millions of livelihoods, from growers and florists to global traders. Their cultivation also promotes biodiversity and innovation in horticulture. Indoors, they transform spaces with seasonal charm and elegance. Artists and designers often draw inspiration from their natural forms. Whether gifted or displayed, cut flowers connect people to nature and to each other. In every bloom lies a story of care, beauty and meaning. Drying the flowers significantly influences their quality depending on the method used. Proper drying techniques- like using silica gel or air drying- can preserve the flower's colour, shape and texture, making them visually appealing and long-lasting. Poor drying, however, may lead to faded colours, brittle petals and distorted shapes. Techniques like embedded drying with silica gel are especially effective for retaining vibrant colour and overall appearance (Sha *et al*., 2023).

Cut Flower

A detached, mature flower or inflorescence, harvested at the optimal stage of development, with a portion of the stem attached, intended for decorative purpose.

Rajiyabegaum S. Hosalli[1], Laxman Kukanoor[2], Viresh M. Hiremath[3], Mukunda Shiragur[4]

[1]PG Scholar, Department of Postharvest Management, College of Horticulture, Bagalkot, University of Horticultural Sciences, Bagalkot, Karnataka, India

[2]Dean, DSLD College of Horticultural Engineering and Food Technology (CHEFT), Devihosur-Haveri, Karnataka, India

[3]Assistant Professor, Department of Postharvest Technology, Office of Directorate of Extension, UHS, Bagalkot

[4]Associate professor, HREC Mugalkodh

History

The dry flower industry was brought to India by British. First time the flowers were dried commercially in Germany.

Oshibana

It is the art and craft of the pressed flower to retain the beauty and quality of a living flower.

Need for cut flower drying

- Popular for interior decoration
- Long-lasting alternative to fresh flowers
- Fresh flowers are appealing but difficult to maintain
- Dry flowers retain their beauty
- They are a key part of the rapidly growing floriculture industry

Global dried flowers market size is predicted to reach USD 0.64 billion by 2033 from USD 0.37 billion in 2024, registering a CAGR of 6.5% during the forecast period

Area and Production

As per National Horticulture database published by National Horticulture Board, during 2023-24 the area under floriculture production in India was 285 thousand hectares with a production of 2284 thousand tonnes loose flowers and 947 thousand tonnes cut flowers

Major producing states: Floriculture is now commercially cultivated in several states with Tamil Nadu (21%), Karnataka (16%), Madhya Pradesh (14%) and West Bengal (12%), having gone ahead of other producing states like Mizoram, Gujarat, Andhra Pradesh, Orissa, Jharkhand, Haryana, Assam and Chhattisgarh.

Major exporting destinations:

The major importing countries were U.S.A, Netherland, United Arab Emirates, U.K and Canada. There are more than 300 export-oriented units in India. More than 50% of the floriculture units are based in Karnataka, Andhra Pradesh and Tamil Nadu. With the technical collaborations from foreign companies, the Indian floriculture industry is poised to increase its share in world trade.

Major importing countries:

- USA – 27 Per cent of the world imports ($2.57 billion)
- Germany - 13.5 Per cent ($1.27 billion)
- Netherlands - 11.8 Per cent ($1.11 billion)
- United Kingdom - Per cent 8.16($765 million)
- France - 4.09 Per cent ($383 million)
- Japan - 3.41Per cent ($320 million)

Factors affecting on drying

1. **Temperature:** Higher temperatures can speed up the drying process, but excessive heat can damage the product
2. **Humidity:** Low humidity helps to remove moisture from the product more efficiently
3. **Air circulation:** Good air circulation helps to remove moisture-laden air and promote even drying
4. **Moisture:** Higher moisture content requires longer drying times
5. **Size and Shape:** Smaller pieces have a larger surface area to volume ratio, allowing them to dry faster

- **Larger pieces dry slower:** Larger pieces have a smaller surface area to volume ratio, making them dry slower
- **Uniform size helps:** Having uniform-sized pieces can help ensure even drying
- **Irregular shapes dry unevenly:** Irregularly shaped pieces can dry unevenly, with some areas drying faster than others
- **Regular shapes dry more evenly:** Regularly shaped pieces, such as cubes or slices, tend to dry more evenly
- **Thin, flat shapes dry faster:** Thin, flat shapes have a larger surface area-to-volume ratio, allowing them to dry faster

Top 5 cut flowers

1. Rose **2.** Gladiolus

3. Chrysanthemum **4.** Orchid

5. Carnation

Desiccants

A desiccant is a substance or material that is used to control humidity and remove moisture from the air or from a product.

Ex: sand, Silica Gel, Vermiculite, Borax, Perlite etc.

1. Silica Gel

Silica gel was first discovered in the year 1640s by Flemish chemist Jan Baptist van Helmont. It is Amorphous and porous form of silicon dioxide and Silica xerogel with an average pore size of 2.4 nanometers. It Strong affinity for water molecules and is widely used as a desiccant. It highly hygroscopic in nature. It having granular in shape like sugar. Because of xerogel of silicic acid it is called as silica gel.

Commercial Production

Walter A. Patrick he was an American Chemist who developed the first commercial silica gel, which was initially used to control humidity in military equipment during world war I.

Sodium silicate react with sulfuric acid to form a gel like substance

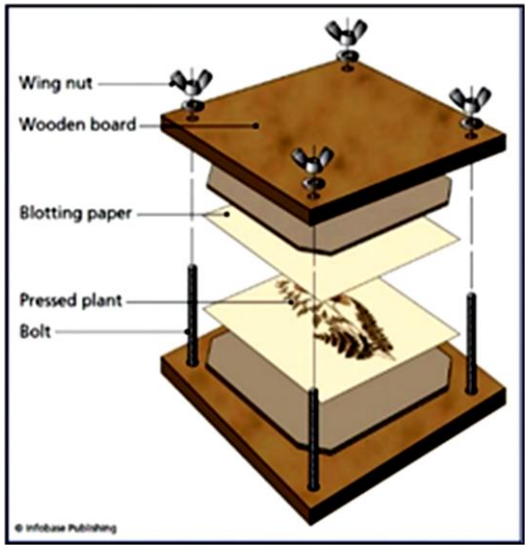
Sand: Oolitic Sand: Recommended for its rounded grains, which are less likely to harm flower petals. **Silica Sand:** Works exceptionally well because of its absorbent qualities.

Technologies for flower drying (Mir, 2022)

Air drying: It is common method of drying. Plant materials are attached to rope or wire are kept in hanging position either in dark or sun for quick drying. It is also known as Hang and dry method. It requires warm, clean, dark and well ventilated area with low humidity. Flowers of good quality and slightly immature flowers are suitable for air drying. It took 8-10 days for drying at room temperature.

Ex: Rose, Chrysanthemum, Helichrysum etc

Press drying: It was first reported in 1820. Flowers are placed between the folds of newspaper, sheets or blotting paper. These sheets are kept one above the other and corrugated boards of the same size and placed in between the folded sheet so as to allow the water vapour to escape. For fasten the drying wooden cardboard keep in hot air oven at temperature of 35-39℃ for 48 hours. Shape of the material cannot be maintained, but original colour is maintained. It requires 3-5 days for drying at room temperature



Ex: Chrysanthemum, Daisy, Cockscomb, Zinnia etc.

Hot air oven method: It is quick and relatively simple method. Here temperature plays an essential role in the drying of flowers.

It works on the principle of the dry air sterilization process through convection, conduction and radiation. The heating elements heat the air inside the chamber, which may be circulated evenly within it with the help of fans such that the sample surfaces are exposed to hot and dry air. This exposure causes the heating of external surface of items, and by the conduction process, the heat is transferred toward the center of the item. It requires temperature of 40-45℃. Half opened or bud stage flowers are suitable for hot air oven drying, were fully opened flowers are not suitable. It can maintain the shape and colour of flowers.

Ex: Rose, gerbera, orchids, zinnia, chrysanthemum, anthurium etc

Microwave oven method: It works on the Principle of Conversion of electromagnetic energy into thermal energy. It is quick method and it produces high product quality flowers. It Maintains colour, shape and texture of flowers. drying time varies based on flower size and moisture content. It requires temperature 100℃- 200℃ for flower drying and require 2-5 minutes drying

Ex: Rose, Carnation, Gerbera etc

Freeze drying: It is also known as lyophilization. It is a process in which water is removed from a product after it is frozen and placed under vacuum, allowing the ice to change directly from solid to vapour without passing through a liquid phase. Flowers are preserve by lowering temperature and using a vacuum to remove moisture. It requires 2 weeks for drying. It works on the principle of sublimation. It is the transition of a substance directly from the solid to the gas state, without passing through the liquid state. It requires temperature of temperature -50 to - 85℃. It maintains original shape and colour.

Ex: Carnation, Chrysanthemum, Rose etc

Embedded drying: To overcome the problem of petal shrinkage and other morphological changes in dehydrated materials due to air drying, the flowers are dried in embedding technique. The embedding materials cover flowers in such a way that the original shape of the flower is maintained. So it is called as one of the best method of flower drying. It is used to preserves delicate flower and preventing damages to flower. Suitable embedded media are sand, borax, silica gel, vermiculite, perlite. It requires 4-14 days for drying at room temperature.

Fig 1: Lisianthus Flowers were embedded in sand, silica gel and vermiculite

Ex: Lisianthus, Rose, Dahlia, Carnation, China aster.

Conclusion

Dry flower technology involves preserving the natural beauty of flowers through various drying methods. The techniques, like press-drying, silica gel drying and oven drying, retain the colour and shape of the flowers. The dried flowers can be used to create artistic and decorative items, providing economic and aesthetic benefits. This technology holds great potential for unemployed youth, housewives and rural women to start small-scale startups and generate sustainable income.

References

1. Sha, A., Topno, S. E., & Kerketta, A. (2023). Effect of Different Drying Media on Different Cut Flowers. *International Journal of Environment and Climate Change*, *13*(10), 1055-1062.
2. Mir, S. R. (2022). Dry flower technology in intensifying livelihood and employment generation: A review. *Bhartiya Krishi Anusandhan Patrika*, *37*(3), 227-231.