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Dehydration Techniques for Flowers

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Abstract

Drying and preserving flowers makes sense economically because ordinary flowers will only last about a week and dried flowers will last indefinitely. Drying flowers is such a rewarding experience because it is easy to do, the flowers usually dry remarkably well, Flowers can be preserved in several different ways, by hanging, pressing or with various drying agents. The objective of this study is to identify varieties of flowers and material which lend themselves for drying & apply feasible and scientific drying techniques for selected flowers and raw material. Eight commonly available flowers like carnation, chrysanthemum, daisy, gerbera, gladioli, marigold, orchid and rose were selected for applying drying techniques. These flowers were exposed to various drying techniques like Air Drying, water drying, Embedding technique (Sand, Borax, Silica gel), Micro oven Drying, Hot Air Oven Drying, Pressing and glecterenizing. From the results of the study it is found that certain techniques are suitable only to some flowers. Of all the methods tried, the method which is economically and commercially viable is embedding in sand, silica gel and Borax. The flowers dried in these techniques were used for three dimensional arrangements. The other method in which flowers are used for greeting cards and book marks and other creative arts is pressing.

Keywords: Drying, Dehydration, Preservation

1. Introduction

Flowers are associated with mankind from the dawn of civilization and in the modern era. These have become an integral part of human life. Love for flowers is a natural instinct. The beauty and fresh look of cut flowers can be retained only for few days even by using the best techniques of post-harvest technology but the charm of dried flowers and foliage can be maintained from a few months to years with lesser cost if protected from the damage of high humidity. Drying and preserving flowers makes sense economically because ordinary flowers will only last about a week and dried flowers will last indefinitely. Dried flower products are long lasting and retain their aesthetic value irrespective of the season (Malcolm1994) ^[1].

The charm and beauty of these plants, however, can be maintained for months to years by employing various techniques of dehydration. In addition to native and naturalized- plants number of cultivated plants especially flowering annuals Viz., Amaranthus, button daisy, celosia, dahlia, gomphrena, marigold, pansy, paper flower, salvia, straw flower, statice, bells of Ireland, etc. and other leading flowers like carnation, chrysanthemum, rose and lotus can be grown for dehydration.

What is Drying?

Drying of flowers is a method of preservation of flowers or the method of removing moisture from the flowers. Dry flowers since ages has been integral part of every household décor. Dry flowers are nothing but dehydrated flower botanicals and parts of plants. Anything from flowers to petals, to buds, stems, roots, fruits and leaves in a dried form come under the domain of dry flower. These hydrated botanicals can be used in natural, dyed, bleached or preserved forms and its usage one's imagination and the sky is the limit.

Why dry flowers?

- Dry flowers have good demand both in Indian and international markets.
- The abundance of available materials.
- It is estimated that about 80% of flower species can be dried and preserved successfully.

- Drying is also cheap and easy to do.
- Sophisticated training and expensive equipment are not needed to come up with variety of designs.
- Unlike fresh flowers that easily lose their marketable value and quality, dried ornamentals offer longer periods of sale if properly preserved, packaged, and handled.
- Another unique characteristic of dried ornamental is their versatility. They can be arranged into different crafts according to one's preferred style, design, and use.
- Dried plant materials provide distinctive indoor decoration.
- Arrangements made from dried materials are long lasting and require little care
- Drying flowers and foliage expands gardening activities without elaborate equipment or previous experience.

Objectives of the Study

- To identify, select and collect varieties of flowers and material which lend themselves for drying
- To apply feasible and scientific techniques for selected flowers and raw material.

2. Methodology

The present study was carried out in the laboratory of Department of Resource Management and Consumer Sciences, College of Home Science, Acharya N.G. Ranga Agricultural University as part of the State Plan research. Details of the flowers selected and techniques followed for different experiments are described

2.1. Selection of flowers for Drying

Different varieties of flowers were identified and among them eight commonly available flowers were selected for applying drying techniques. The eight type of flowers include carnation, chrysanthemum, daisy, gerbera, gladioli, marigold, orchid and rose. These flowers were selected because of easy availability in the market and also flowers are commonly used in the fresh flower arrangement so same flowers were selected for drying also. (Fig.1)



Fig1: Selection of flowers for Drying

2.2. Selection of Techniques for Drying

Eight drying techniques like air, water, desiccant drying (sand, Borax, silica gel) Hot air oven microwave oven drying, Hot Air oven drying and pressing were exposed to eight selected flowers.



Fig 2: Selection of Dehydration Techniques

2.3. Dehydration Techniques

For drying of flowers and foliage number of dehydration techniques are practiced which vary according to the suitability of any species and the purpose for which dehydrated material is required (Fig.2)

2.4. Air Drying

Air-drying is the easiest method of preserving flowers and plant materials. Many garden flowers and wild plants can be collected, tied together at the stem ends in loose bundles with rubber bands or pipe cleaners, and hung upside down in a warm, dry area. With good air circulation, flowers take 1 to 3 weeks to dry completely. Large flower heads should be hung individually. Most flowers can be dried on their own stems; however, some flowers, such as the strawflower, have a weak stem and require that a wire be inserted before drying to support the flower.

2.5. Embedding Method

The flowers can be dried with embedding in desiccants. The important desiccants are silica gel (white and blue), borax Powder, white river sand, alum powder, corn powder, saw dust, etc. The Desiccants selected in this study are sand, crystal silica gel and borax powder.

2.6. Sand Drying

Sand must be very fine, clean, dry, and preferably salt free. To dry with sand, place an inch or two of sand in a container; scoop away a small amount of sand to form a depression on the surface; place the flower head upright in this depression and press the sand in and around the outside of the flower to support it. Next, scoop a little sand into your hand and allow it to trickle in a fine stream around each petal. Start with the outer petals and work inward row by row, allowing the sand to build up equally on all sides of each petal so its position and shape are not altered. Flowers dried with sand are fragile so be very careful when removing them from the sand. Store in a strong carton to protect the petals from breaking. It takes flowers and foliage about three weeks to dry in sand. Flowers can be left indefinitely in sand, because sand is inert and won't affect the flower.

2.7. Borax

Spread the desiccant on the bottom of the box and position the flowers according to their shape. Flat flowers, such as daisies, should be placed face down; cup flowers such as tulips or roses, should be face up, sides supported by drying

agent; sprays of flowers should be laid down on the mixture. Once flowers are in place, gently add more mixture until they are fully covered. Be sure to fill spaces between petals, and also be sure no petals are touching each other if at all possible. The use of borax for preserving flowers has an advantage in that the flowers hold their shape and shrinkage is minimal. Generally the colour of the flowers is assured except pinks and reds may vary. But if the flowers remain in borax too long, they become brittle and lose their petals. When using a homemade borax mixture, boxes can be left uncovered, and the drying process can take two weeks or more.

2.8. Silicagel

Silica gel is a fairly expensive moisture-absorbing chemical desiccant. It is an excellent product for drying flowers. It is lightweight, dries flowers faster than borax mixtures do, and can be used over and over again if dried properly. It must be kept in an airtight container at all times. As silica gel absorbs moisture, the crystals in the gel change color. To dry silica gel for reuse, spread it in a shallow baking pan, and heat it at 250 degrees F for 1 hour.

Silica gel is considered the best material for drying flowers. Plastic storage boxes with tightly fitting lids are perfect. Build up the desiccant around the edges of the flowers. Sprinkle a light layer on top of each flower. Separate the petals carefully with a toothpick as sprinkle. Build up the layer on top until it is about one inch deep. Cover the container with a tight fitting lid and store in a dry place. Check in four to five days to see if the flowers are papery and dry. If you are using silical gel, flowers should be in airtight containers, and flowers should be dry in four to ten days.

Flowers can be dried in one of three positions: face up, facedown, or horizontally. Flat-faced flowers, such as daisies and coneflowers, dry well when placed face down in the drying mixture. Elongated, spike-type flowers should be dried horizontally. All other flower types can be dried face up.

2.9. Hot Air Oven Drying

The material must be dried at a very low temperature over many hours. The flowers are slotted through holes in a wire mesh rack leaving room for the stems to dangle below. The time required depends upon the density of the flowers. Compact flowers like marigolds, chrysanthemums, cornflowers and zinnias dry well in a fan-assisted, convection oven. The most ideal temperature for flower drying in hot air oven is 45° C - 65° C, Which is given for few hours to three days depending upon the flowers species.

2.10. Microwave Drying

Drying flowers in a microwave takes only a few minutes and keeps the flowers looking fresher and more colorful than some of the other methods. Place the flowers and material into microwave-safe containers, uncovered. Set a small cup of water in the microwave before cooking to prevent excessive drying. Drying time varies according to the size and moisture content of the flower, but in microwave oven plants are normally dried for 2-5 minutes and the material is kept at room temperature for 4-5 hours as setting time.

2.11. Water Drying

Water drying is a variation of preserving by air-drying. Strip off most of the leaves, and place the flower stems in 2" of

water. Place in a warm place, out of direct sunlight. The water is absorbed and evaporates as the flower dries. Hydrangeas, heathers, hybrid delphiniums, acacia, gypsophila, bells of Ireland, and yarrow dry well this way.

2.12. Pressing

Pressing is a method of preserving plants to use on pictures, stationery, place cards, etc. Most foliage and simple flowers with few petals press very well. Pansies are an excellent flower for pressing at all stages of flower development. Ferns make excellent pressed plants. Leaves and branches with foliage can be pressed to form plant materials with natural curve.

Pressing is done by placing plant materials between layers of an absorbent paper material and applying weight or pressure for at least 5 to 10 days or until the plants are dried. Newspapers, telephone directories, blotter paper, or tissues are good papers to use. Plant presses are also available. Flowers to press include: Aster, Bleeding heart, Buttercup, chrysanthemum, Columbine, Cosmos, Dahlia, Dogwood, English Daisy, Geranium, Larkspur, Lily-of-the-valley, Marigold, Pansy, Poppy, Rose, Sweet pea, Violet, and Zinnia.

2.13. Preserving Using Glycerin

Some foliage can be preserved using glycerin, Glycerin will not preserve the green color, but the foliage will retain its soft, pliable feel and can be painted or used naturally in arrangements. Foliage preserved with glycerin can be wiped or cleaned and will last indefinitely.

3. Experimental Procedure

3.1. Airdrying: Sample size of five flowers were tied using a thread and hanged upside down in a warm, dry room with good air circulation.

3.2. Hot air oven drying: The flowers were kept in trays and dried in electrically operated hot air oven at 40°C to 50°C.

3.3. Microwave oven drying: The flowers were kept in Microwave containers in upright position and they were dried in microwave oven

3.4. Method of embedding flowers in desiccants: To overcome the problem of petal shrinkage, the flowers were dried by embedding in desiccants viz., borax mixture, fine sand and silica gel. Plastic containers were used for embedding at room temperature in a well-ventilated room. About one inch layer of the desiccant was poured into the bottom of container and the flower stems were pushed into the medium. Desiccant was then gently and gradually poured all around and over the flower up to 4 to 5 cm above, so as to fill all the crevices in between the petals without disturbing the shape of flowers. After embedding the flowers with desiccants the containers were kept at room temperature in a well-ventilated room for dehydration.

3.5. Water Drying: Flowers were kept in the container of water till the water is evaporated and flowers are dried.

All eight flowers were exposed to Air drying technique, Water drying, Pressing, sand drying, silica gel drying, Borax drying, Microwave oven and Hot air oven. A total of 64 experiments were conducted and observations recorded.

3.6. Observations

Observation sheet was used to record pre and post dried status of flowers and also to record the amount of time taken for each Drying technique.

3.7. Parameters recorded

The following observations were recorded for drying studies.

3.8. Time taken for drying: The time taken for drying of flowers by different methods was recorded as number of hours or number of days at the end of drying.

3.9. Quality display: Quality parameters like colour, appearance and texture were assessed by means of sensory evaluation. Panel of judges assessed the quality parameters viz., colour, appearance and texture

4. Results and Discussion

Different flowers took different time to dehydrate in different techniques. With regard to the time taken for Air Drying Marigold and carnation have taken more time ie.12 days and orchids, gladioli have taken less time i.e.7 to 8 days. (Fig.3) in this method most flowers became dark and some flowers do turn brown light colored flowers will be faded and will be brittle. As a result of the brittle nature of air-dried flowers, creating the bouquet is a tedious task. Pertuit (2002) observed that flowers dried by air drying are extremely stiff once dried. Blue and yellow flowers retain their colour when air dried but pink flowers fade

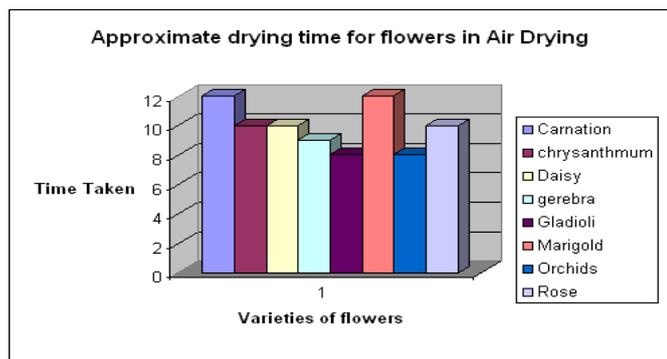


Fig 3: Approximate amount of time taken for drying flowers in Air Drying

From the Fig.4 it is understood that the amount of time required in Borax drying i.e.10 days taken by gerbera, chrysanthmum and Marigold as the flowers are thicker. Whereas less time taken by carnation, rose and orchids i.e 7-8 days.

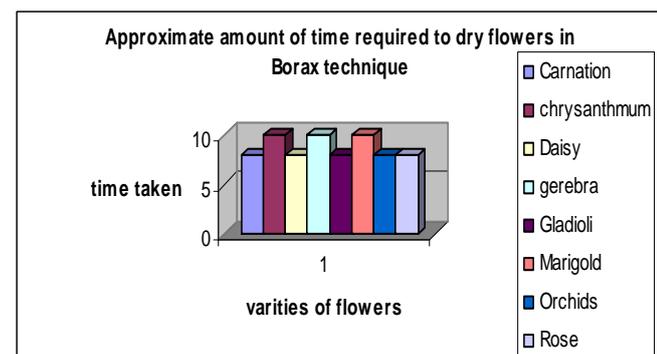


Fig 4: Approximate amount of time taken for drying flowers in Borax Technique

The time taken to dry in Silicagel method is less i.e 7 days is the maximum time taken by chrysanthmum and minimum is 4 days taken by rose, carnation and Gladioli, when compared with air drying technique. (Fig.5) The Pre and post dried status of the flowers in Silica gel drying states that all flowers retained their shape and colour but only red colour becoming darker and white colour of gladioli turning to off white. Flower shape and colour are natural in this method.

The result is matching with the study conducted by Safeena 2005” Standardization of Drying technology for Dutch Roses “that observed the significant difference in the time taken for drying of flowers due to desiccants, it was lesser when silica gel was used as an embedding medium (5.09 days)which completed the task in almost half the time of sand.

The amount of time taken to dry the flowers is more in sand drying technique i.e Marigold has taken more i.e 2 weeks, whereas Chrysanthmum, Daisy and gladioli has taken least amount of time 8 days. (Fig.6.) Even though this technique is taking more time to dry but it is the best and cheapest one available and it is convenient to use. Pre and post dried status of flowers in sand drying technique indicates that colour, form are retained in all the flowers and also texture is papery indicating that all the flowers are dried well.

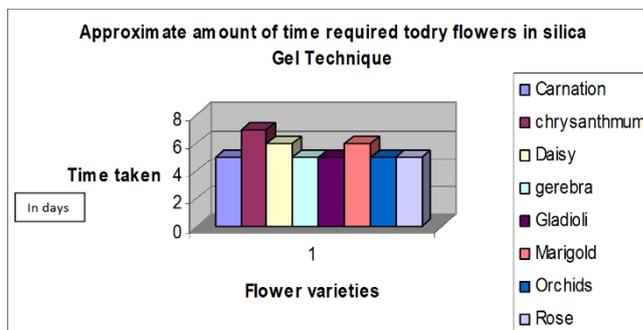


Fig 5: Approximate amount of time taken for drying flowers in in Silica gel Drying

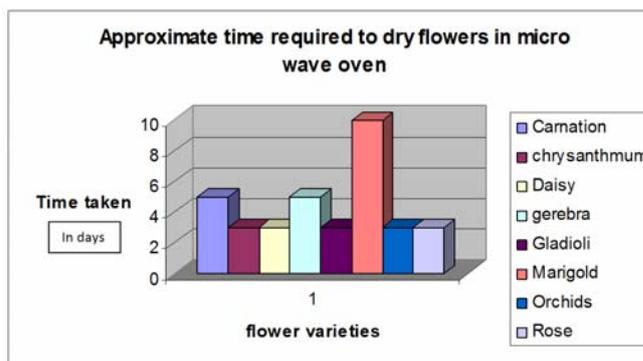


Fig 6: Approximate amount of time taken for drying flowers in Sand Drying

4.1. Press Drying

Approximate amount of time taken to dry flowers in press drying seen in the Fig.7 that carnation has taken the more time to dry i.e 12 days but Orchids and daisies have taken less amount of time i.e 6 days to dry. While flowers are essentially flattened, they will retain some shape, and occasionally retain the impression of the flower that is being pressed above or below it. It is important that you use paper between the layers of flowers. The papers retain moisture, and also the stains that the flowers themselves produce. Most flowers will be darkened, muted or browned in nature.

The flowers which are dried in water drying has taken more amount of time for most of the flowers except for daisy, gerbera and marigold which have taken less amount of time i.e. 8 days. The flowers dried in this method not retained colour and shape but shrinkage of flower can be seen.

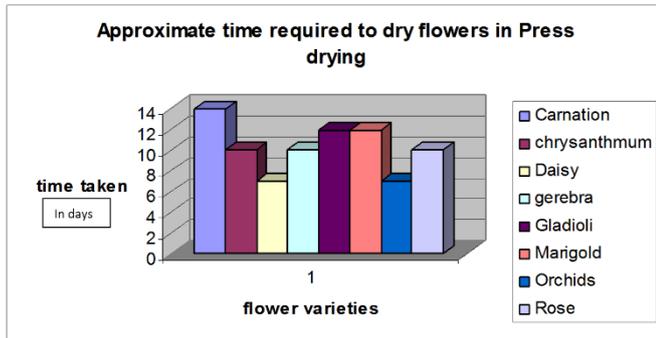


Fig 7: Approximate amount of time taken for drying flowers in Press Drying

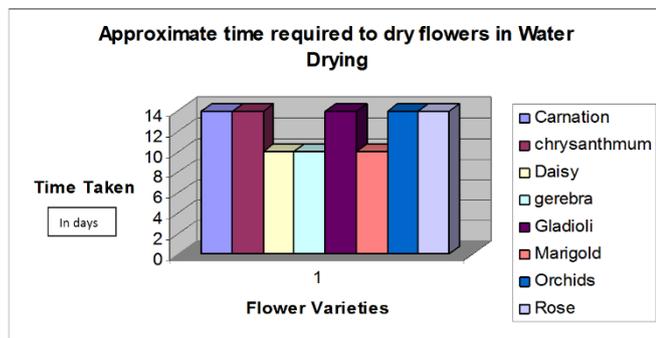


Fig 8: Approximate amount of time taken for drying flowers in Water Drying

The time required to dry flowers in Microwave oven can be seen from the fig.8. and found that Marigold has taken more amount of time i.e. 10 mts, and Carnation, Gerbera have taken 4 mts and other flowers took only 2 mts to dry. Flowers dried in this method retained colour and drying time is also less but the shrinkage off lower is seen in this method. It is noted from the Fig. 9 that Chrysanthemums, Marigold and Rose have taken 2days to dry in Hot Air Oven, where as other flowers have taken less than one day. Pre and Post Dried status of flowers in Hot Air Oven shows that almost all the flowers retained colour but the shape of the flowers shrivel and lose their shape. Roses have emerged as the best with hot air oven technique. This is one technique where roses retain their shape and colour very well. These roses can be dried with stalks and can be directly used in dry flower arrangements with or without value addition.

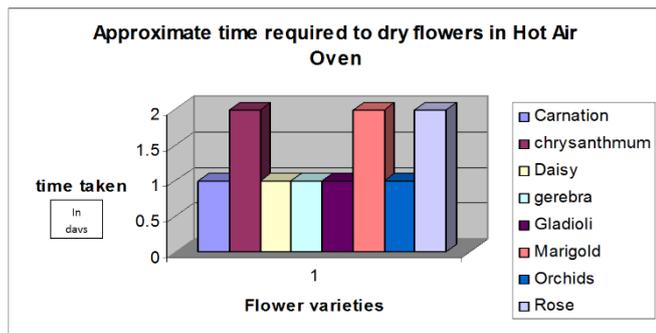


Fig 9: Approximate amount of time taken for drying flowers in Hot Air Oven Drying

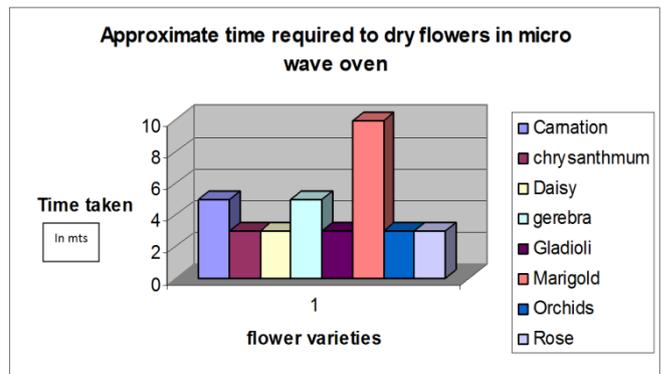


Fig 10: Approximate amount of time taken for drying flowers in Micro Wave oven

Embedding Method Is Good



5. Conclusion

From the results of this study it is understood that even though different methods can be used for drying, certain techniques are suitable only to some flowers. Of all the methods tried, the method suitable for most off lowers which is economically and commercially viable is embedding in sand, silica gel and Borax. The flowers dried in these techniques were used for three dimensional arrangements. The other suitable method in which flowers are used for greeting cards and book marks and other creative arts is Pressing.

The dehydrated flowers retain their original shape, size and colours and can be used in value addition which includes distinctive and artistic greeting cards, landscapes, wall hangings, table mats, Photo frames, paper weights, magnets, decoration of different types and sizes of glass containers etc. This floral craft can become the basis of cottage industry both for domestic and International Markets.

Development of awareness among the youth and Rural women about dehydration of flowers and preparation of value added dried flowers is very much essential at this juncture.

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