

# **SELECTION OF PLANT SOURCES FOR DYE EXTRACTION**

## Natural colors

- Color like so many other attractive elements in nature attracted and continued to fascinate mankind from the earliest times. They were not content to enjoy color through their eyes. They wanted to feel it enjoy it intimately with which began personal adornment. No doubt flowers and leaves served for a while but they faded and shriveled away shedding their color to use.
- Natural coloring matters are broadly classified in three categories.
- Vegetable origin: Colorants derived from root, leaf, bark, trunk, fruit and flowers of plants.
- Animal origin: Lac, Cochineal and kermes have been the principal dye yielding insects.
- Mineral origin: Various inorganic metal salts and metal oxides

## Resurgence of Natural dyes

- Only after 1856, the development of synthetic dyes came into existence and still dominates the entire dyestuff industry. These synthetic dyes have received faster acceptability due to its ease in dyeing, reproducibility and cost factors. But in the late 1994, Germany struck a severe blow to dye-stuff industries and subsequently other European countries also executed ban on import of textiles and garments, colored with a series of azo dyes made from aromatic compounds, which are carcinogenic, allergenic and poisonous.
- With the present national and international awareness of environmental ecology and pollution controls, natural dyes appear to be the ideal choice since they are chosen from the non toxic lot and can be handled very easily and safely however it is not so simple, there are some problems encountered in the use of vegetable/natural dyes as well.

# Problems associated with Natural dyes

There are some problems encountered in the use of vegetable/natural dyes as well. The are as following:

- Non-availability because of difficulty of collection.
- Bulk isolation of dye-stuff.
- Standardization of dyeing procedure.
- Color yield.
- Complexity of dyeing process.
- Reproducibility of shade.

## Advantages of Natural dyes

- But in the twenty first century maintaining a safe environmental balance becomes even more important. The co-operation of individuals, communities and countries to make this happen become a global necessity and the following properties are often considered to be advantages of natural dyes.
- They are obtained from renewable resources.
- No health hazards, sometimes they act as health cure.
- Practically no or mild reactions are involved in there preparation.
- No disposal problems
- They are unsophisticated and harmonized with nature.
- Lot of creativity is required to use these dyes judiciously.

# Indian Flora

India is an advantageous position since the country holds a rich reservoir of natural products. Thus started in India a chapter in chemistry, which has over the years grown into specialized area. Different parts (leaves, bark, seed, flowers, roots and wood) of number of plants have been reported to yield the dye but a large number of them hitherto remain unexplored. As the uses of natural dyes do not cause pollution, it is of immense importance to explore the additional sources of natural dye from rich flora of our country which are abundantly occurring plants. Research work done has led to the new color yielding plants namely Al (root), Alkanet, Amaranthus (Flower), Balsam (Flower), Babool (Bark), Bougainvillea (Flower), Canna( Flower), Carthamus (Flower), Catechu, Cassia fistula (Bark), Cosmos (Flower), Eclipta ( Weed), Eucalyptus (Bark), Gompherena (Flower), Hibiscus (Flower), Hollyhock (Flower), Lawsonia (Leaves), Nerium (Flower), Nyctanthes (Flower), Plumeria (Flower), Tectona (Leaves), Terminalia (Bark) and Tulsi (leaves).

## Specialized Technique for Dyeing

It is a specialized technique of dyeing of the fabric/ yarn of cotton by natural dyes for the lovely shades using common mordants like alum and salts of iron, tin and chrome with good wash fastness and light fastness. It really stands for the pride and glory of the craft of India as this art of natural dyeing has been in Indian culture from a very long time. Because of the beauty of its results, those who use them, claim that no chemical dye has that luster the under glow of rich color that delicious aromatic smell and the soft light and shadow that gives so much pleasure to the eyes. These colors are alive as all beauty is alive.

# COLLECTION OF DYE PLANTS

- Plants can be collected from wild forest or grow them, or purchase dye plants from shops specializing in natural dyes. You may have some dye plants already growing in your garden, since you can extract interesting colors from a range of common garden and roadside weeds. If you collect plants or plant parts for dyeing, be sure to use plants that grow in abundance, taking care not to collect any rare or protected species.
- You will need a lot of plant material. A four-to-one ratio of fresh plant material to fabric (by weight) for dyeing is generally recommended, and plant fabric like cotton require even higher proportions. Kids can have fun experimenting with different proportions of plant materials.
- The list below includes just a fraction of the plants others have used to produce dyes. Your results will depend on a host of factors, including soil type, moisture content, mordant used to bind the dye (if any), fabric, ripeness or freshness of the material, how finely you shred it, and proportion of plant material to fabric.

# COMMON PLANTS THAT CAN BE USED AS NATURAL DYE SOURCE

## Garden Flowers



**Senecio hybridus flower**



**Tagetes erecta flowers**

**Portulaca oleracea flowers**



**Plumeria rubra flowers**



**Nerium oleander flowers**



**Mirabilis jalpa flowers**



**Ixora coccinea flowers**



**Hibiscus rosa sinensis flowers**

# How to screen natural dye yielding plants by simple methods:

- Test-I: Squeeze the plant part preferably flowers and leaves between the fingers if color is discharged, it may be a good source of natural dye
- Test-II: If the color is retained on the fingers even after washing the hand with water, it may be a good source of natural dye with probably good wash fastness.
- Test –III: Crush the plant part in pestle-mortar and smear the crushed plant paste on filter paper, if the color retains on paper, it may be a good source of natural dye
- Test-IV: Place this filter paper under table lamp for 3-4 hours, see if the color remains the same or fades off, if the color does not fade, it may be a good source of natural dye with good light fastness properties
- Test-V: Take hot water and put crushed plant part, if it releases color into the water, it may be a source of natural dye.

# Collect your plant material

Collect your plant material from your region.

- A good rule of thumb is to have as any colored part of the plant.
- This is at least true with flowers, fruits skin, leaves, bark but you may find other plants yield as much dye with less collected plant material, especially when they dry out.
- Flowers yield best color when used fresh, but still yields color when dried.
- Fill the pot with plant material and cover with water. Boil at least one hour.
- At this point, you may want to let the dye bath stand at room temperature overnight.
- This will release more dye from the plants.
- To test the color, submerge a glass jar into the dye bath.
- The water should show some deep color
- . Strain the dye bath through the screen into another container and dispose of the plant material into your compost pile.
- Pour the dye bath back into the dye pot. Submerge the mordant fabric for dyeing.

# Simple Methods of Dye Extraction

## Simple Methods of Dye Extraction

- The extraction methods of vegetable dyes basically depends on medium in which the dye is extracted. There are mainly four methods used in extraction of natural dyes.
- **i. Aqueous Method:**
- Boil known amount dyestuff in 100 ml. of soft water at 100 C.
- Filter the dye solution
- Record the optical density
- **ii Alkaline Method:**
- Prepare 1% alkaline solution with addition of 1 g. Sodium carbonate/Sodium hydroxide in 100 ml. of water.
- Enter the dye material and boil at 100 C.
- Filter the dye solution
- Record the optical density
- **iii Acidic Method**
- Prepare 1% of acidic solution by adding 1 ml. of HCL in 100 ml. of Soft water. Enter the dye material and boil at 100 C.
- Filter the dye solution
- Record the optical density
- **iv. Alcoholic Method**
- Add 50 ml. of alcohol to 50 ml. of water
- Enter the dye material and boil
- Filter the dye solution

# Preparation of Vegetable Dye

- The basic raw materials required for manufacturing of vegetable dyes are natural produce and requires following steps for manufacturing of vegetable dyes.
- i Collecting the parts of the plants (leaves, barks, stems, flowers, fruits, seeds).
- ii Testing of raw material for assessment of color contents,
- iii Dyeing.
- iv Size reduction by pulverizing
- v Separation of different size by vibrating screen,
- vi Extraction of coloring component
- vii Phase separation
- viii Fine filtering
- ix Drying of coloring matter (Dyes) in spray dryer,
- x Packing: Liquid form, Paste form or Powder form