

Review Article

Producing Bio Colors Without Using Synthetic Chemicals

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A B S T R A C T

Many synthetic colors formed from chemicals have adverse effects on the environment. Bio colors are nowadays used in Holi festivals. Colors are also becoming an integral part of modern-day life. The use of colors is becoming a part of our everyday lives. There is a need for nontoxic colors in order to remove substances like lead, cadmium, chromium, and cobalt from the food chain. Bio-colors are mainly prepared from plant origins. The current review reports research and studies on the environmentally friendly production of colors. A natural color, like the color of unbleached fabric or unvarnished and unstained wood. A color that accurately reproduces the real color of the object shown in a photograph. Holi colors are traditionally particle powders or fluid splashes sprayed by hand, toy guns, or slamming balloons and are sourced from natural sources. Artificially produced colors pollute the environment with harmful substances like malachite green, rhodamine, gentian violet, lead oxide, copper sulfite, mercury sulfite, chromium iodide, silica, mica dust, and other adulterants used to make carrier materials attractive, or it has even been proven that such powders can be contaminated by fungi chemicals.

Keywords: Synthetic Colors, Harmful Effects, Natural Colors, Environment

Introduction

Colors which makes our eyes believe in the beauty of nature. The introduction of color took that big portion of industry and it was dyeing that expressed colors in its most diverse forms. During renaissance (in europe) it was also widely used in paintings and art pieces. Natural dyes have been used since ancient times for coloring and printing fabrics. Until the middle of last century, most of the dyes were derived from plants or animal sources by long and elaborate processes like mordanting the fibers using alum, copper and iron oxides along with the use of tin and zinc.

Use of alkanet (*Anchusa tinctoria*) root as a dye employing camel and sheep urine, lentils, vinegar, wild cucumber and barley malt etc as aids to producing color was also common at that time.

Indigo, Tyrian purple, Alizarin, Cochineal and Logwood were popular fabric dyes at that

time. The change to all of this came In 1856 when William Henry Perkin, an English chemist, while attempting to synthesize quinine from aniline, a coal tar byproduct, accidentally produced and discovered "mauve" the first synthetic dye. The late 18th and early 19th centuries saw

the extensive development of a pigment manufacturing industry as chemists discovered ways of creating new colors and established businesses to produce these pigments in fabric dyeing as well as in paintings and food industry.

Nature is beautiful and the creation of everything, which expresses itself in a wide range of colors. The use of alchemy of colors started from an early period of human existence. Indian have been the art of using different variety of natural colors in dyeing. The production of synthetic dyes causes rapid decline in the use of natural dyes, which were completely replaced within few centuries. Natural dyeing had developed like a folk art. However, in recent times the dyeing technique is interpreted on scientific principles and interaction between on the dye material is well reported¹⁻⁶.

The shade and saturation level of dye will vary based on the plant, fruit, or flower that we choose. Natural dyes are mainly from plant sources.

- **Red and Pink:** fresh beet, red and pink rose petals
- **Orange:** carrots, turmeric
- **Yellow:** Marigolds, Sunflower Green: spinach, mint
- **Indigo:** purple cabbage, blueberry

Plant dyes, the most common type of natural dye, are obtained from different parts such as leaves, flowers, fruits, pods, bark, etc.

- **Indigo:** A blue dye from *Indigofera tinctoria*
- **Madder:** A red dye from *Rubia tinctoria*
- **Animal Dyes:** less common
- **Lac:** a red dye extracted from resinous insects.

There are many different types of flower dyes, and they can be used to produce a wide range of colours, from bright to vibrant shades.

- Marigold (*Calendula officinalis*)
- Safflower (*Carthamus tinctorius*): yellow or orange dye
- Elderberry (*Sambucus nigra*) produces a blue or purple dye.
- Hibiscus (*hibiscus sabdariffa*) produces a red-to-purple dye.

Some of the Synthetic Chemicals and Their Harmful Effects

- **Green Color:** Is obtained from copper sulphate; it may cause allergies in eyes and irritation in the skin.
- **Purple Color:** Is obtained from chromium iodide; it may cause asthma and respiratory
- **Silver Color:** It obtained from aluminum bromide and may cause skin cancer as it is carcinogenic in
- **Black Color:** It is obtained from lead oxide and may cause renal failure or learning.
- **Red Color:** Is obtained from mercury sulphide, it may cause skin cancer, mental retardation, paralysis.

Use of Eco-Friendly Colors

It was made with natural things, like vegetables, fruits, and Use eco-friendly colors in suits that do not harm your skin.

It won't harm the

The eco-friendly colors are safe for

The colors normally used during the Holi festival are ⁷⁻¹².

Material and Method

Items used:

- Flowers (Bougainville, hibiscus, Indian rose)
- Pestle and mortar
- Beaker
- Filter paper
- Distilled water
- Dehydrator

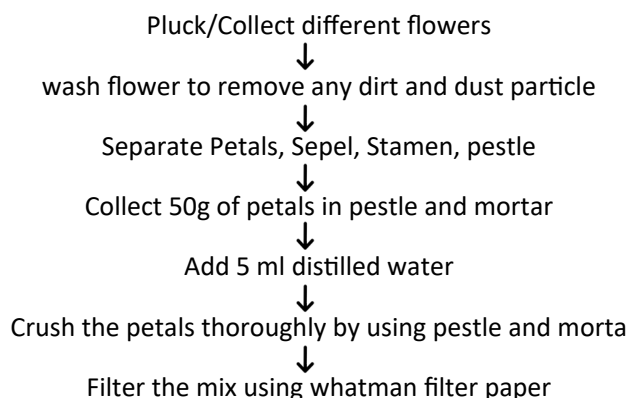
Methodology

We tried two methods to extract: (i) the pestle and mortar method and (ii) the dehydrator method.

Pestle and Mortar Method

We collected some fresh flowers (Bougainville, hibiscus, and Indian rose) from different localities of a lovely professional university. We separated petals, sepals, stamens, and carpels. Separated 50 g of petals were ground using a pestle and mortar. We added 5 ml of distilled water. Crush the petals thoroughly by using a pestle and mortar. We filtered the content of the pestle using Whatman's filter paper. We separated residue (in the filtration process, the solid particles left on the filter paper are called the residue) and filtrate (in the filtration process, the clear liquid collected on the beaker is called the filtrate). We extracted 50 ml of filtrate.

Methodology of Pestle and Mortar Method



Dehydrator Method

We collected some fresh flowers (Bougainville, hibiscus, and Indian rose) from different localities of a lovely professional

university. We separated the petals, stamen, and pestle. Separated 50 g of petals and kept them on the dehydrator tray. We dehydrated the petals for 6–8 hours. After 6–8 hours, we took the dehydrated flower petals out and finely ground them (Figure 1).

Methodology of Dehydrator Method

pluck/collect different flower
↓
Wash flower to remove any dirt and dust particles
↓
Separate Petals, Stamen, pestle
↓
Collect 50g of petals

Take a dehydrator tray, spread a butter paper

↓
Spread all petals separately on tray

↓
Put in dehydrator for 6-8 hours

Methodology of Pestle and Mortar Dehydrator Methods

We have used different flowers (Bougainville, hibiscus, and Indian rose) for making colors.

The health benefits of the flowers used can be given below (Table 1):

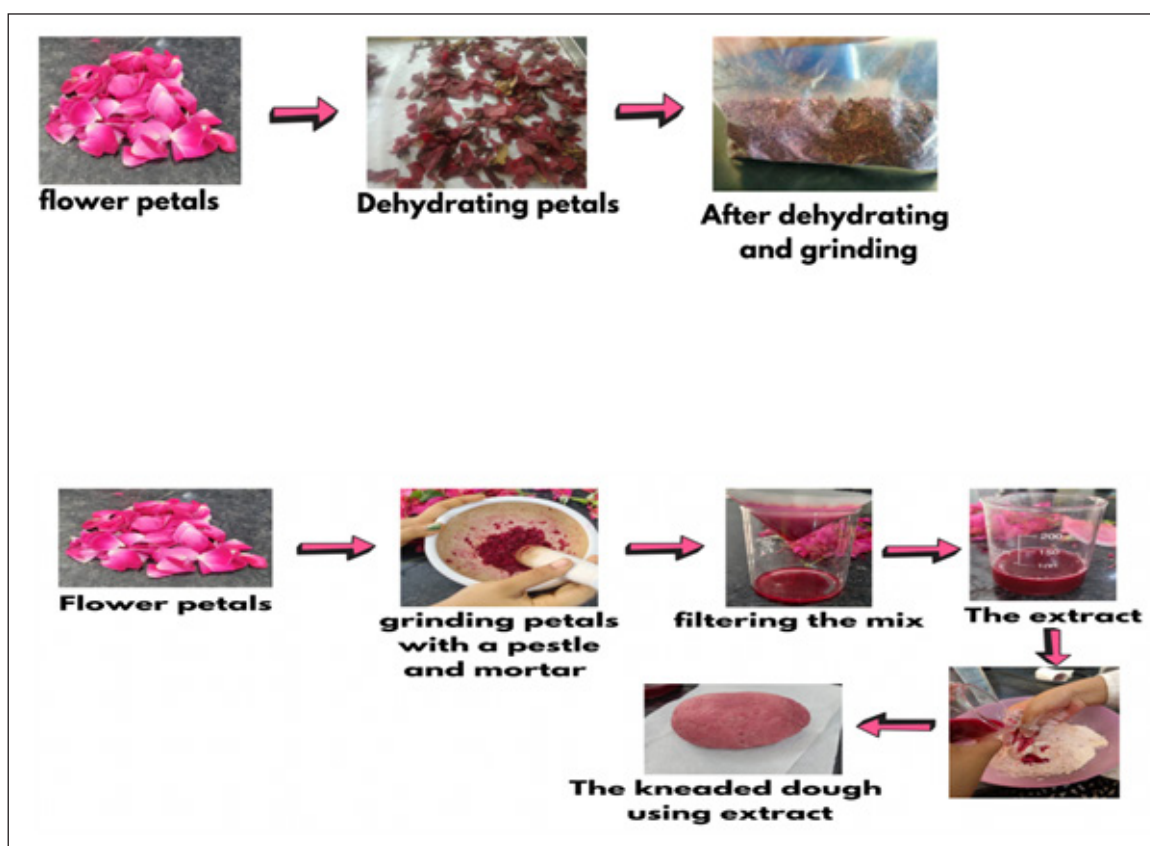


Figure 1. Pestle and Mortar Dehydrator Methods

Table 1. Health benefits of different flowers

Bougainvillea	Hibiscus	Roses
1. Antioxidant activity	1. Protects with antioxidants	1. Antioxidant activity
2. Anti-inflammatory properties	2. Fights inflammation	2. Anti-inflammatory properties
3. Antimicrobial activity	3. Lowers blood pressure	3. Antibacterial and antiviral activity
4. Antidiabetic effects	4. Lowers cholesterol	4. Wound healing
5. Hepatoprotective effects	5. Fights bacteria and supports liver health	5. Pain relief and Mood enhancement

Conclusion

The synthesis of colours by using environmentally friendly methods is becoming increasingly important. Frequent use of synthetic colours with hazardous chemicals in the manufacturing process leads to harmful effects that can adversely affect our skin and pollute our environment. Therefore, let us try to change our attitude towards the eco-friendly method of producing colours without using chemicals. Such powders may have no harmful effects if they come into contact with the skin. We have prepared natural dyes from flowers without using chemical dyes; these dyes are produced without any harmful effects on the skin. The powdered form of hibiscus that we prepared can be used for various purposes, like face packs, which will help restore the natural glow and bring elasticity to the skin; these powders can be used for bakery products; and male sugar icing, which can be consumed by everyone. Another natural dye, which can be easily made in homes by crushing and extracting the juice from Bougainville, hibiscus, and Indian rose, gives a vibrant colour and can be used in various food products. Thus, we should go for natural dyes and use eco-friendly methods, which will help to protect ourselves and the environment. So switching to natural methods of producing colours already seems better in the respects where synthetic dyes have fallen. Natural colours not only biodegradable and biocompatible colourants but also give enormous functional properties to the material that is to be consumed, either fabric or food.

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