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A REVIEW ON BIO MATERIALS FOR EXTRACTION OF DYES

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ABSTRACT

Dyes are coloured organic compounds that are used to impact colour to various substances, including paper, leather, fur, cosmetics, waxes, greases, plastic and textile materials. Unlike most organic compounds dyes possess colour because they absorb light in the visible spectrum (400-700nm) and have at least one chromophore (colour bearing group) and conjugate group. Discussing about dyes versus pigments with regard to their solubility, organic colourants fall into two classes, viz dyes and pigments. The key distinction is that dyes are soluble in water or an organic solvent, while pigments are insoluble in 60th type of liquid media. Dyes are used to colour substrates to which they affinity. Pigments can be used to colour any polymeric substrate but by a mechanism quite different from that dyes, in that surface-only colouration is involved unless the pigment is mixed with the polymer before fibre or moulded article formation.

KEYWORDS: Organic dyes, Natural, Synthetic, Bio materials, Extraction

I. INTRODUCTION

Today the role and application of pigments have increased manifolds. There would hardly be any industries left where pigments do not play any substantial role. The challenge is now to discover pigments that are capable of not only long-lasting applications but also are environmentally good. So by trying to achieve the goal of the above stated by various experiments like separating from the various plants naturally. To our known information pigments are responsible for many of the beautiful colours we see in the plant world. Dyes have often been made from both animal sources and plant extracts. Some of the pigments are found in animals, for example Bilirubin is responsible for yellow colour seen in jaundice sufferers and bruises, and is created when haemoglobin is broken down. Recently this pigment has also been found in plants, specifically in the orange fuzz on seeds of the white bird of paradise tree. The Bilirubin in plants doesn't come from breaking down haemoglobin (in animals haemoglobin is broken down to heme, and then converted to bilirubin) chlorophyll molecules have similar ring structure to those of heme, and it appears that breaking down chlorophyll can also yield bilirubin-or almost. The breakdown products require just one more step to produce bilirubin. It is fascinating to realise that the process of degradation starts the same way in plants as it does in our own bodies.

II. COMPARISON BETWEEN NATURAL DYES AND SYNTHETIC DYES

Natural and synthetic substances are used to add colour to something or to change its colour. These substances are also called colorants, colouring agents, colouring dyes, pigments or tints.

III. NATURAL DYES

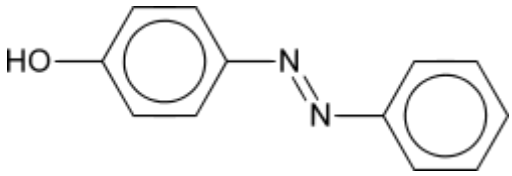
Natural dyes are taken from plants, invertebrates or minerals. The main source of natural dyes are yards, nuts, roots, flowers and vegetables.

III. SYNTHETIC DYES

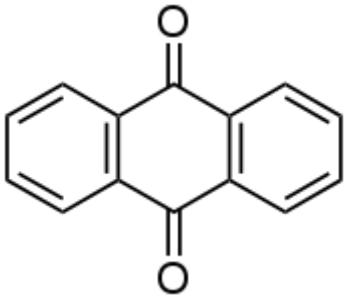
Usually synthetic dyes are organic compounds. They are derived from coal tar and in today's world they are derived from benzene and its derivatives. Synthetic dyes are used everywhere in everything from paper to clothes, from food to wood, this is because they are easy to apply, sustain for a long time, and cheap.

These synthetic dyes are classified into five types based on a chemical called chromophore :

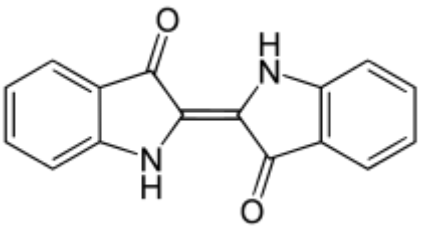
1. Azo Dyes



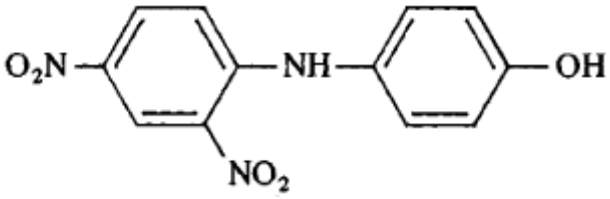
2. Antraquinone Dyes



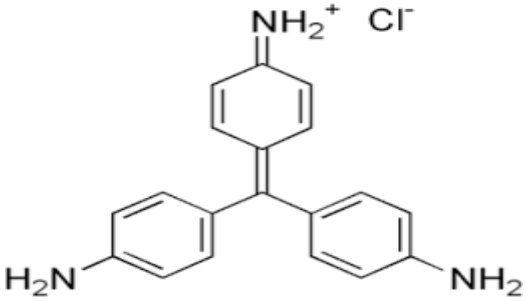
3. Indigo Dyes



4. Nitro and Nitroso Dyes



5. Triurylmethane Dyes



IV. MAKING OF NATURAL DYES

This process involves materials from nature that means a collection of plant materials which are fresh. They are chopped and then it is measured to add water twice that of the plant material. The plant material, water and the cloth which is to be dyed are placed in a pot and boiled for one hour with continuous stirring. Then strain the plant material and keep the bath aside. Place the fabric into a colour fixative and add salt to the bath as required (one part of salt for 16 parts of water or vinegar) and leave it for an hour. Remove the cloth from the fixative bath, wring it and then place it in the dye mixture and simmer it until the desired colour is achieved. Then dry it for a few hours.

V. NATURAL DYES FROM PLANTS AND ANIMALS

- Insects : cochineal beetles and lac seat insects.
- Animals : some species of molluscs or shellfish.
- Minerals : ferrous sulphate, ochre and clay.

One may think that minerals come under synthetic dyes but without a chemical treatment the natural materials won't work. These above mainly exhibit the colours from yellow to black in a spectrum. Now-a-days natural dyes became popular for no side effects, anti-aging properties, healthfulness and best performance.

In India there are more than plants that are used for dying purposeand with great medicinal values.

VI. DYES DERIVED FROM ANIMALS

- Cochineal insect - red
- Cow urine – Indian yellow
- Octopus / cuttlefish – sepia brown
- Murex snail – purple

- Lac insect – red, violet

VII. DYES DERIVED FROM PLANTS

- Catechu or cutch tree – brown
- Gamboge tree resin – dark mustard yellow
- Himalayan rubadha root – yellow
- Indigo fera plant – blue
- Kamala tree – red
- Weld herb - yellow
- Pomegranate peel – yellow
- Madder root – red, pink, orange
- Myrabolan fruit – yellow, green, black
- Saffron – saffron's golden yellow – orange
- Saf flower – water soluble red dye – yellow
- Annatto – reddish orange
- Pomegranate – reddish purple
- Tomato – red
- Paprika – intense red colour
- Henna – dyeing agent
- Turmeric – yellow
- Mushroom – oyster mushroom – greyish green
  Horse mushroom – yellowish green
  Meadow mushroom – yellowish green
  Turkey tail – depends on fungus' colour

The above mentioned plants have a great medicinal importance. For example, saffron is used to make medicine as an antispasmodic, eupeptic, gingival sedative. Saf flower medicinal importance is that it is used for treatment in form of infusion for circulatory system related diseases.

VIII. CONCLUSION

Based on the above information about natural dyes and synthetic dyes. One of the key reasons why natural colours look better than chemical colours is their pure colour. So natural dyes are best to choose as they not only contain color but also medicinal significance and pure aroma from the dye. The main reason to select natural dyes is that they last much longer than chemical dyes and look beautiful when compared with chemical dyes. Previously there is a question raised that natural dyes may meet the needs in terms of production volume and another problem is availability. Today's modern world have solution for every problem. By knowing new and easy techniques for more extraction of dyes from plants and animals these problems can be rectified. One

should know that synthetic dyes are mostly used for their low cost and easy availability but they may cause a major environmental problem because during the preparation of these dyes many toxic gases are released into the atmosphere. One of the toxic gases is sulphuric acid vapours. Sulphuric acid is potent and can burn the skin. So far there are no solutions for the release of toxic gases, which can be reduced by using natural dyes. Natural dyes have many advantages and hence it is better to prefer natural dyes over synthetic dyes.

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