www.wordlyknowledge.uz Volume: 1, Issue: 2, 2023

# OBTAINING NATURAL DYES FROM PLANT RAW MATERIALS

**Abdullayeva Munisa Muminjon qizi**

**Abstract.** The raw material for the production of natural dye is mostly vegetable matter such as seeds, leaves, roots, bark, heart wood, etc., of the plants. The most important part of the production of natural dyes is the sourcing of the raw material. The leaves can then be stripped of the plant and the roots put in a sheltered place to dry out. When dry the roots can be ground up into a powder and put in a pot with some water. This should be heated to extract the bright red dye. The use of alum as a mordant will give a deep red on wool. Fruits, vegetables, flowers, and more can all be used to create natural dyes for cotton and other fabrics, and they're a great way to get beautiful results without all of the chemicals found in traditional dyes. They're ideal for when you want to dye clothes with kids and are also biodegradable and easily disposable so you also don't have to worry about harming the planet with your dye project.

**Key words:** natural dyes, fabric, environmental standards, natural pigments, quantitative characteristics.

**Introduction.** Unlike synthetic dyes, natural dyes are free from harmful chemicals and carcinogens neither of which you want to breathe in or have on your hands or clothes. And because they're made from organic materials, you also don't have to worry about them doing any harm to the natural environment. The first step in how to make natural dyes for fabric is to figure out what organic materials you're going to use. Most of the time, this will depend on what colors you want to make; however, you could also just use what you have around the house and see what colors you can create. These days, interest in the use of natural dyes has been growing rapidly due to the result of stringent environmental standards imposed by many countries in response to toxic and allergic reactions associated with synthetic dyes. As a result, with a distinct lowering in synthetic dyestuff costs, the natural dyes were virtually unused at the beginning of twentieth century [1]. Nowadays in most of the countries, natural dyeing is practiced only as a handcraft and synthetic dyes are being used in all commercial dyeing processes. But, with the worldwide concern over the use of eco-friendly and biodegradable materials, the use of natural dyes has once again gained interest.

**Materials and methods.** There are various reports available on different methods of mordanting on different fibers such as cellulosic, protonic and synthetic for dyeing with different natural dyes. Various kinds of shades like black to brown, green to yellow to orange, can be obtained by application of different mordants [2]. Dyeing of cotton and silk with henna, indigo, marigold is reported. In contrast, natural dyes are environmentally friendly, exhibit better biodegradability and generally have a higher compatibility with the environment than synthetic dyes.

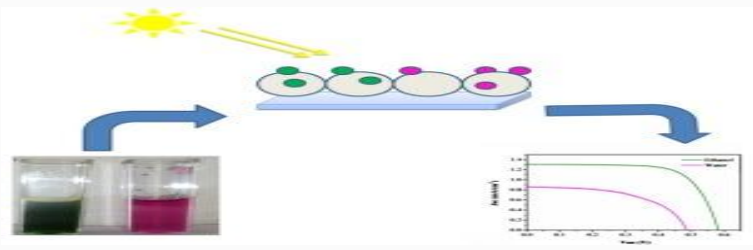
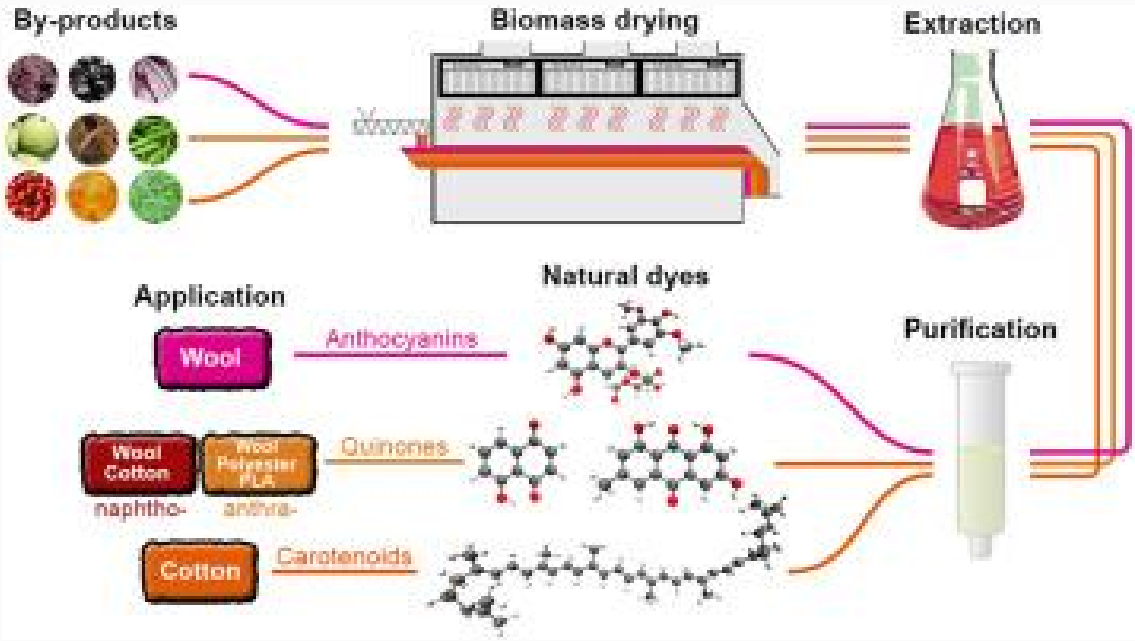


Figure 1. electrochemical properties of dye sensitized solar cells using natural pigments

www.wordlyknowledge.uz Volume: 1, Issue: 2, 2023

The process is economically viable as the raw materials are available at low cost and so cost of production is also very low. Natural dyes/colorants derived from flora and fauna are believed to be safe because of its nontoxic, noncarcinogenic and biodegradable in nature [3]. Many tribes of Arunachal Pradesh have been using this plant species traditionally in combination with other plants for extraction and preparation of dyes utilizing indigenous processes. Natural dyes are now a days in demand not only in textile industry but in cosmetics, leather, food and pharmaceuticals. The rich biodiversity of our country has provided us plenty of raw materials, yet sustainable linkage must be developed between cultivation, collection and their use [4]. The most sustainable source for such natural colorants would be by the valorization of by-products from the fruit and vegetable industries, but qualitative and quantitative characteristics of food by-products for this purpose remain scarce. Natural dyes also show mediocre stability and affinity toward textile fibers, which questions their potential feasibility for application and level of sustainability to overcome these issues. This review describes three dye classes along with their occurrence, mass, and concentration in by-products that are generated from agricultural losses as well as the fruit and vegetable processing industries. To tackle the shortcomings of natural dyes on fibers, several application techniques were collected from the literature. A discussion on techno-economic potential and environmental sustainability is included. The latter is done by including a life cycle assessment to investigate the environmental impact of extracting anthocyanins, quinones, and carotenoids from fruit and vegetable processing by-products and their subsequent application to the dyeing process. In the context of sustainable development, natural dyes are preferably extracted from waste biomass [5]. In this section, we provide an overview of the amount of fruit and vegetable waste with the expected concentrations of natural dye molecules. To understand which fruit and vegetable by-products are interesting as a source for natural dyes, an overview is given of the pre-consumer generated waste for the most common fruit and vegetables, as well as the concentrations of anthocyanins, quinones in Fig.2.




Textile dyers must know the chemistry of these natural colors and its added advantages of medicinal values. Use of suitable binary or ternary mixtures of similar or compatible natural dyes for coloring natural eco-friendly textiles in variety of soothing / uncommon shades with eco-friendly mordants and finishing agents are the most desirable product of the customers for future. So, a textile dyer must know the effects of variability for extraction, mordanting and dyeing and should follow only the standardized recipe for selection fiber mordant natural dye system to get

www.wordlyknowledge.uz Volume: 1, Issue: 2, 2023

reproducible color yield and color matching besides to follow different eco-friendly ways to improve color fastness to a possible extent. Usually, methods of collection and extraction of dyes are still crude and traditional with only a few experts related to cottage industries being well versed with dyeing procedures. Indigenous traditional knowledge on various resources including dye yielding plants is very essential for rural based development and future bioprospecting, provided proper precautionary measures are considered for sustainability, conservation and value-based selection of use pattern. Nowadays most of the natural dyers are interested to use natural dye materials in the same ways used for synthetic dyes. Natural dyes and their use in dyeing is probably the most ancient art of all times [6]. People started using natural dye as their first intellectual tool to portray their surroundings and themselves by this art. Though natural dyes have been used to color textiles from ancient times, but in the 19th century, synthetic dyes replaced natural dyes after discovery of mauve colorant. Natural dye is defined as any dye, pigment, or any other substance derived from natural sources such as plants, animals and minerals are renewable and sustainable bioresource products with minimum environmental impact. They have been known since antiquity for their use in coloring of textiles, food substrate, natural protein fibers like wool, silk and cotton, and leather as well as food ingredients and cosmetics.

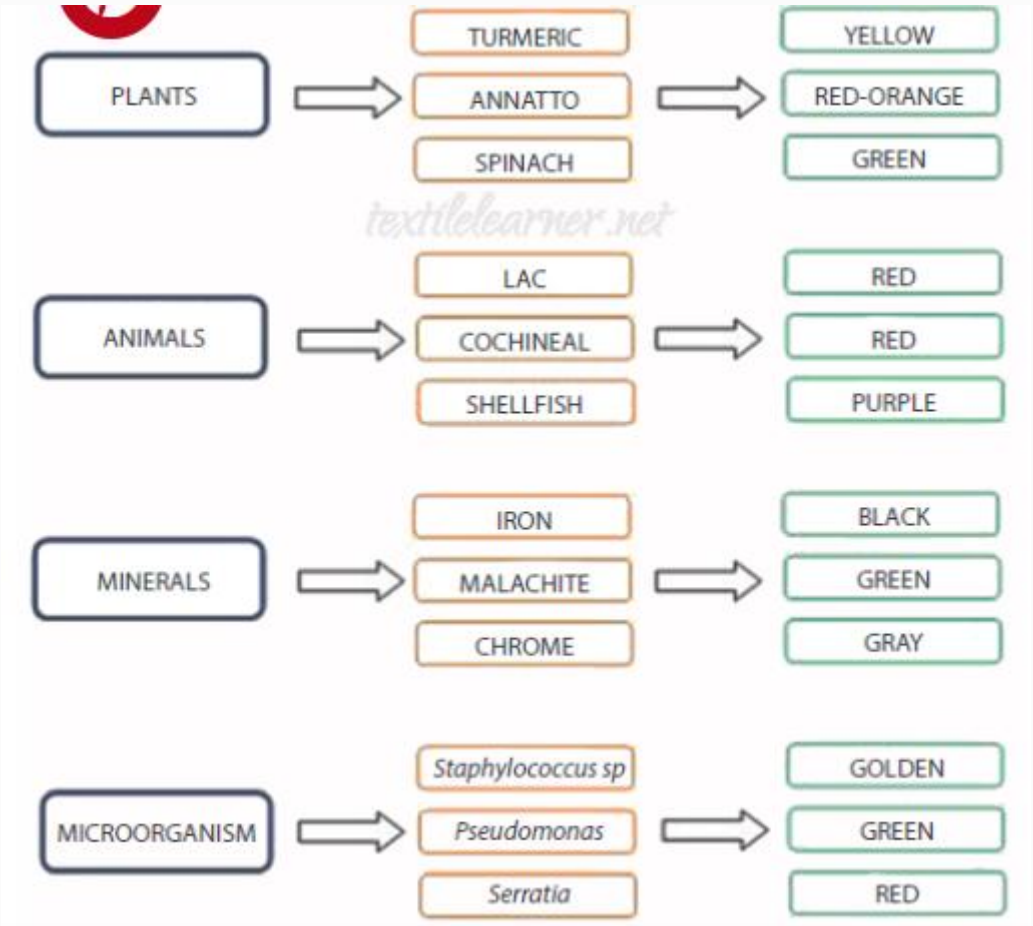



Figure 3. Classification based on method of preparation

The term ‘natural dye’ is conventionally taken to apply to those products that are derived from plant sources, although dyes derived from insects, such as cochineal, kermes and lac, are also included. The natural dyes are complex mixtures of components derived extracted from natural substances such as plants, animals or minerals. A large number of herbs, shrubs, trees, insects,

www.wordlyknowledge.uz Volume: 1, Issue: 2, 2023

animals, microbes and minerals have been identified for extraction of coloring compounds. Red, yellow, brown, blue, black, green and orange color can be obtained from natural dyes. Other problems include they are not biodegradable, have water pollution, environment unfriendly, and carcinogenic. [7] This situation leads to choose natural dyes as a reasonable replacement or solution, although we know that they are not successful in commercial. Natural dyes are biodegradable, fairly less harmful, ecofriendly, produces highly attractive and smooth shades. Natural colorants come from plants or animals, used in industries that are producing different products of human use. Natural dyes not only are biodegradable and biocompatible colorants but also give enormous functional properties to the material that is to be consumed. Natural dyes are organic and are derived or extracted from resources found in nature. Natural dyes are mostly eco-friendly, biodegradable, less toxic, and less allergenic as compared to synthetic dyes. However, studies have shown that certain natural dyes may have detectable mutagenic effects e.g., elderberry color and safflower yellow; others, like carmine, can cause asthma by continuous inhalation.

**Refrences**


1. Cristea G. Y., and Vilarem S. J (2003) : Ultrasound assisted enhancement in natural dye extraction from beetroot for industrial applications and natural dyeing of leather, Ultrason. Sonochem., 16 (6) : 782-789
2. Gokhale, S B, Tatiya, A U, Bakliwal, S R and Fursule, R A (2004) : Natural dye yielding plants in India, Nat Prod Rad, 3(4) : 228-234
3. Salam M A, Sheik R K and Farouique F I (2006) : Improvement of the color fastness properties onto bleached sulphonated jute with direct dyes, J Textile Apparel, Technol Management, 5(3) : 1-4.
4. Samanta A K and Agarwal P (2009 ) : Application of natural dyes on textiles, Indian J Fibre Textile Res, 34 : 384-399
5. Samanta A K, Konar A, Chakroborty S & Datta S (2010) : J Inst Engg (I), Text Engg; 91: 7. 17.
6. Senthikumar S, Umashankar P and Sujatha B (2002) : Indian Textile J, 112(6) : 15.
7. Agarwal A, Goel A & Gupta K C : Textile Dyers and Printer, 25(10) : 28