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ECO-DYEING

Dyeing in ancient times often consisted of numerous stages, and to obtain the desired color fabrics could be painted for several weeks. Dyeing was considered to be an art.

At the end of the XIX-early XX centuries, the art of dyeing with natural dyes was virtually lost. The first synthetic dyes, colorful and relatively simple in the methods of application, superseded natural dyes from the practice of not only industrial but also home coloring of fabrics and yarn. For several decades, most of the ancient recipes have been forgotten and lost.

But nowadays people are satiated with artificial and synthetic materials. We are more likely to begin to consume products without artificial additives and use natural materials, because the issue of ecology is currently acute. Part of the planet's population (mostly developed countries) has consciously returned to nature in all aspects of people's daily life (food, clothing, housing, medicine, etc.) and wants to use natural products (eco-clothing, eco-food, eco-housing and other eco-labels).

Natural dyes are organic compounds that are produced by living organisms and stained animal and plant cells. Their chemical nature is different. They are in all cells and perform many functions [1].

Natural dyes can be classified as follows[2].

- by color (coloring);
- by origin (plants, animals, bacteria);
- by chemical structure (only from the middle of the 19th century);
- by areas of use.

The main source of raw materials for the production of natural dyes is currently plants. Plants have special colorants – pigments, which are known about two

thousand. Many plant pigments are used as dyes. For example, roots of carrots give a yellow dye, and sweet beet – red food dye.

The production of natural dyes is 10,000 tons per year, which is 1% of the total output of synthetic. The growth of natural dyes up to 90,000 tons per year is to increase. The production of natural dyes is concentrated mainly in Mexico, in some countries of the Mediterranean and in Asia [2].

Coloring the fabric consists of three stages: extraction (extraction of dye), fixation and washing. Each material is dyed in its own way.

To extract dyes from leaves, fruits, corms or roots, they are pre-soaked during the day in soft cold water. After that, the plants are boiled in the same water for 15-30 minutes. Per of 100g plants take 1-2 liters of water. The obtained substance is filtered into a dish for dyeing. To completely remove the dye from plants they are boiled for another 15-20 minutes in 1-2 liters of water, mixed with a decoction. For more intense paint, the decoction is occasionally allowed to go sour.

Coloring fabrics with plant dyes requires preliminary or subsequent processing of fiber with metal salts – scrubbing. It is necessary to fix the dye. They can be chemical (alumina, copper sulfate) or natural (natural formic acid, citric acid) [1]. Applying the above mentioned metal salts makes the coloring much more stable while washing and in the sun light. This is carried out in three ways:

1. pretreatment
2. protrusion simultaneously with coloration
3. ultimate drilling.

Advantages of natural dyes [2]:

1. huge wealth of living and inanimate nature, as raw materials for the production of natural dyes: minerals and other fossils, numerous plants, animals, bacteria;

2. ease of extraction of natural dyes from natural raw materials.

3. all natural colorants are nature friendly and humans friendly, biodegradable and, moreover, many of them have therapeutic properties and are biologically active

4. the use of natural dyes may be carried out using the same technologies as synthetic ones.

Disadvantages of natural dyes [1]:

1. difficulties in standardizing the final product, since the composition of natural colorants depends on many factors (location, climate, raw materials, etc.);
2. relatively low resistance of natural dyes to various influences (sun, weather, light stability, etc.);
3. difficulties in the organization of industrial production.

As a conclusion, natural dyes, in contrast to artificial ones, are environmentally friendly, as they can be obtained from flower petals, plant fruits, bark of trees and other materials. Natural dyes can be extracted at home, they are easy to use and easy to dye the fabric. But the main disadvantage of natural dyes is that they do not give a vivid color when dyeing the fabric, if you do not use fixing agent for dyeing, then the coloration of the fabric over time becomes pale. However, natural dyes are produced and used, gaining their own place in textile products.

REFERENCES

1. Natural dyes and auxiliary substances in chemical and textile technologies // Yu. A. Kalinnikov, I. Yu. Vashurin. [Electronic resource].-Electronic data. Mode of access: <http://www.chemnet.ru/rus/jvho/2002-1/77.pdf> - Title from the screen.
2. «Revival of Natural Dyes» G. Krichevsky. [Electronic resource].-Electronic data. Mode of access: <https://rusnor.org/pubs/library/14714.htm> - Title from the screen.