

# მღებავი მცენარეები

რეცეპტები და გამოყენება



## CHROMATICS: PLANTS, HUMANS AND NATURE

RECIPES AND USAGE OF DYE PLANTS

# OAK ACORNS (GLANDES QUERCUS)

The so-called “galls” that form on oak leaves are collected, crushed, and boiled. Shavrov notes that this method is the best for increasing the weight of silk and for setting a dark color, especially in combination with iron mordants.

**Recipe:** These are best collected as they ripen and should not be stored for too long as the colour will bleach from them. Their colours range from fawn to brown depending on when they were collected, if the acorns are unripe or have been lying for a while the resulting dye will not be a very deep colour.



**Method:** Soak the acorns overnight in approximately 1 gal (4.5 L) water. Boil the acorns in the same water for 1 hour. Remove them by straining and add enough water to make the dye bath up to the required amount. Enter the wet mordanted fabric and simmer for about 1 hour, depending on the desired colour. Allow the dye bath to cool slightly, then remove the fabric and rinse. Wash it in warm soapy water and rinse until the water is clear.

# INDIGO (INDIGOFERA)



The homeland of indigo is India, and its name also originates from there. This dye was very widespread throughout Asia. It was also known in Mesopotamia, Egypt, Greece, and Rome. In Georgia, indigo is grown in the Batumi Botanical Garden. Due to its high value, it was often called “blue gold.” Historically, indigo was imported into Georgia from Iran. In the 18th and 19th centuries, indigo was the most important dye substance in America. Processing indigo is hazardous to human health because it contains toxic substances. In Bengal, this even led to a slave uprising in 1858. Today, thousands of tons of synthetic indigo are produced worldwide each year and are used for dyeing denim.

# TEA (CAMELIA CHINENSIS)

**Recipe:** Tannin in tea leaves imparts brownish hues to woolens and cotton. Before dyeing, the fabric (in this case, wool) is pre-treated in an alum mordant bath. Tea is boiled in water for 15 minutes, the leaves are strained out, and cold water is added to prepare the dye bath. Then the fabric is placed into the bath and boiled for 30 minutes; afterward, it is rinsed with water and dried.



To achieve a darker shade, the fabric is transferred from the dye bath to a second bath (which contains iron sulfate,  $\text{FeSO}_2$ ), where it is boiled for an additional 10 minutes.

# POMEGRANATE (PUNICA GRANATUM)

For dyeing, pomegranate peel is used. It is placed in a pot, and the silk is boiled together with it. After being removed and cooled, the silk is placed back into the dye bath and left there for seven days.

Periodically, the silk is taken out of the pot in a dried-out state, left for about 15 minutes, and then returned to the pot again. After seven days, the silk acquires a deep black color.



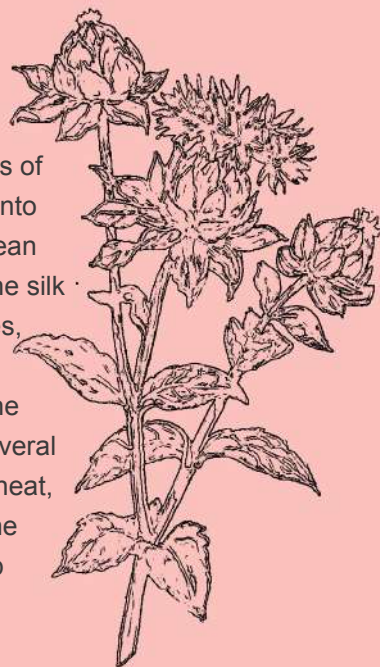
# SAFFLOWER (CARTHAMUS TINCTORIUS)

Distribution area: Safflower grows in the countries of the Near and Asia Minor regions, as well as in India. It is also cultivated in the Caucasus.

In the Eastern Caucasus, it is known by the name “Armenian saffron.”

Safflower is a plant from the daisy family (Asteraceae). In human history, it is known as one of the oldest dyes. Its remains have been found on fabrics preserved in Egyptian tombs from the 2nd millennium BCE (12th Dynasty), and it was also discovered in the tomb of Tutankhamun.

Safflower is also used to produce vegetable oil, which is utilized both as food and in cosmetics. In addition, safflower is widely used in medicine as a substitute for insulin.

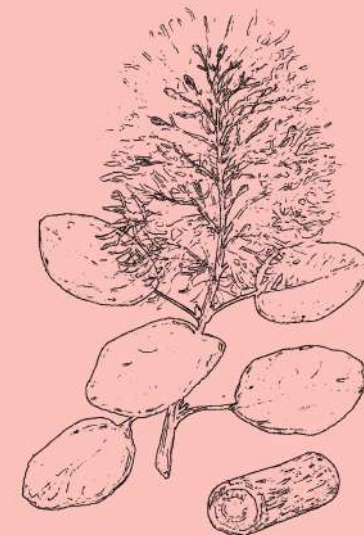


**Recipe:** The dye is prepared from the petals of the flower’s corolla. The petals are placed into small bags and then immersed in warm, clean water until an orange color is obtained. If the silk is not dipped into the dye bath several times, the resulting color will remain orange.

To achieve a lighter, yellow-toned shade, the petals from the bags are divided among several pots. By simmering the safflower over low heat, pomegranate juice and ash are added to the mixture. This combination produces a deep red-pink tone.

When dyeing with safflower and its various combinations, many different colors and shades can be achieved (10–16 gradations).

# SMOKE TREE (COTINUS COGGYRIA)



A genus of plants from the smoke-tree family (Anacardiaceae). It is a tree or shrub that produces small yellowish-green flowers. It grows on dry, rocky and stony slopes, as well as in shrublands. For dyeing, both the leaves and the bark are used. When collecting the leaves, it is preferable that they are freshly sprouted and still green. Leaves gathered in spring are considered the best, although they can be stored for 3–4 years.

**Recipe:** For dyeing fabric, smoke-tree leaves are boiled separately, after which the leaves are removed because they tend to stick to the fabric and can cause uneven coloration during boiling. Yarn, however, is dyed together with the leaves.

As for the bark of the smoke tree, it is crushed, soaked in water for two days, and then boiled together with the material to be dyed. Afterwards, the material is cooled in steam, dried in the sun, and then washed. This process also produces a yellowish color.

# BLACKWOOD (HAEMATXYLUM CAMPECHIANUM)



Its Greek name translates as “blood tree,” because the inner part of the wood has a reddish color. However, when exposed to air for a long time, a chemical reaction occurs and

the color changes to dark purple and then to black. The dye substance is obtained from the inner wood to produce dark brown or black shades. The wood itself is also used for making furniture and parquet flooring.

**Recipe:** soak the logwood overnight in the dyepan with approximately 1 gal (4.5 L) water. Boil for 1 hour , then stain to remove the wood chips. Add more water to make the dyebath up to the required amount. Enter the wet mordanted fabric and simmer for approximately 1 hour, or until the desired shade is obtained. Allow the dyebath to cool slightly, then remove the fabric and rinse well. Wash in warm soapy water and rinse until the water is clear. It produces purple fabric. The second dyeing can be carried out in the dyebath, producing lighter colours.

To get dark blue colour, instead of alum mordant, you should use fabric mordanted with copper. (The dyeing technique is the same).

# BRAZILWOOD (CAESALPINIA ECHINATA)

**Recipe:** The preparation recipe differs in order to obtain different colours. The brazilwood is available in the form of wood chips or sticks. To get dark red colour, simmer the brazilwood for 30 minutes in approximately 1 gal (4.5 L) water. Stain to remove the wood chips, then add more water to make the dyebath up to the required amount. Enter the wet mordanted fabric and simmer for 1 hour. allow the dyebath to cool, then remove the fabric and rinse. Wash it in warm water and rinse until the water is clear.

To get purple colour the recipe is the same, but instead of using alum mordant, you should use fabric premordanted with chrome.

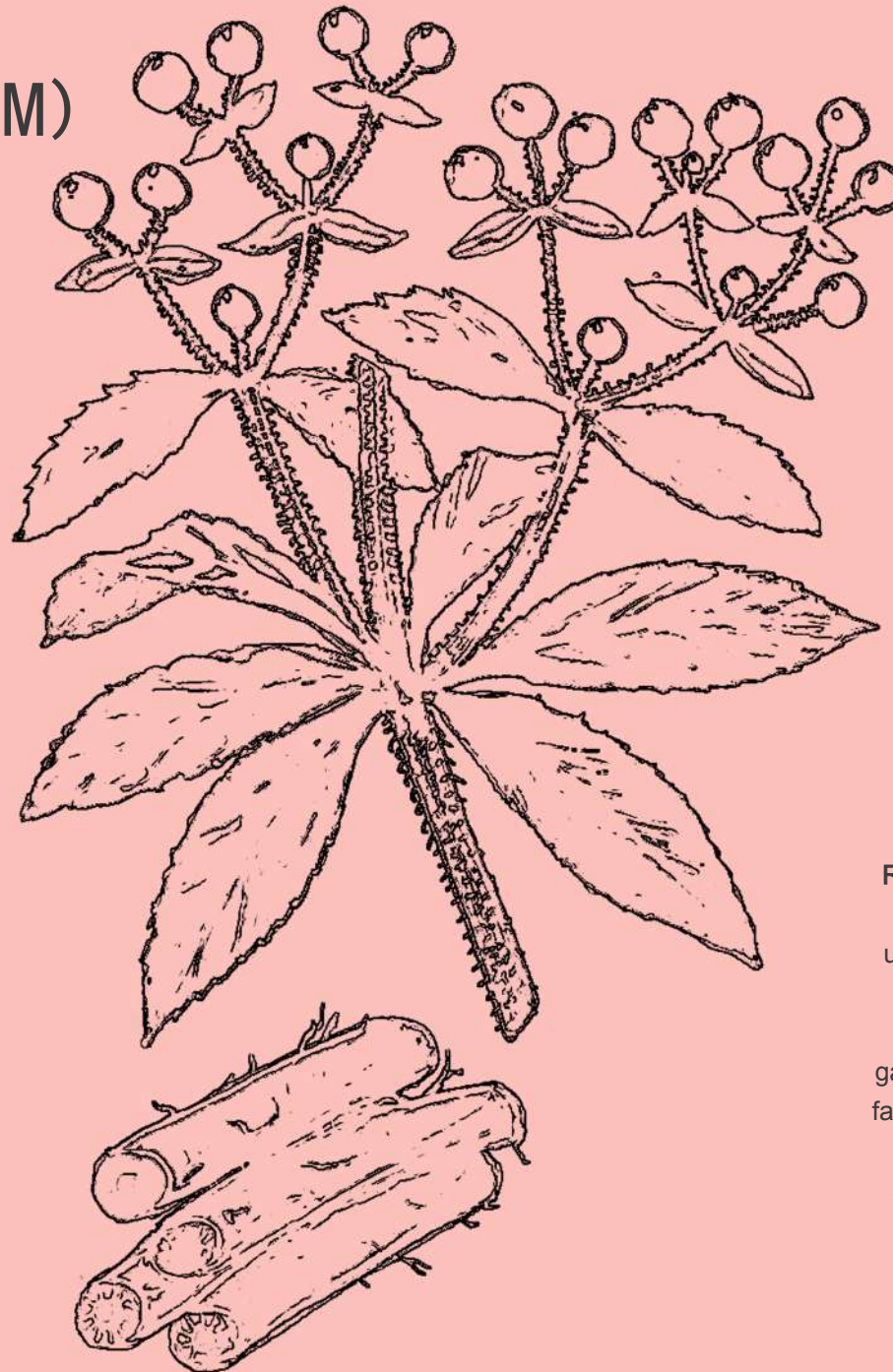


# MADDER (RUBIA TINCTORIUM)

Madder is one of the most familiar and ancient dyes. It is a genus of plants from the madder family. It has entire, oppositely arranged leaves and small yellow, greenish, or whitish flowers gathered in semi-umbels in the leaf axils. There are about 55 species, two of which are found in Georgia. Since ancient times, cultivated madder (*Rubia tinctorum*) has been grown and used for dyeing silk, cotton, and woolen fabrics (including carpets). Madder is also used in folk medicine for the treatment of rickets.

Remains of fabrics dyed with madder were discovered in the tomb of Tutankhamun, as well as during excavations in Pompeii and Corinth.

**Recipe:** The roots of the madder plant are used for dyeing. For this purpose, the roots are dug up in spring and summer. They may be used immediately after harvesting or after a certain period of storage, since they do not lose their coloring properties over the years.

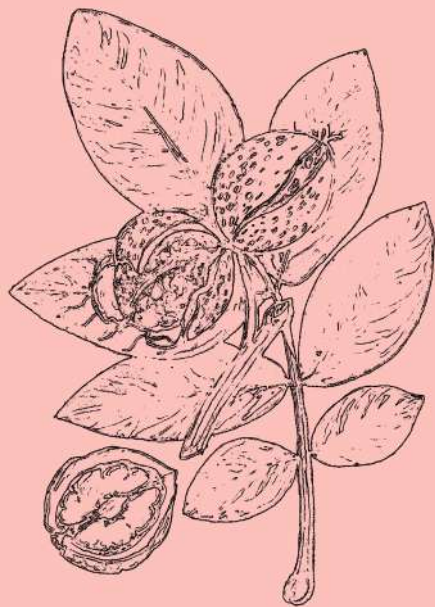


For dyeing with madder, the roots should be washed, chopped, and soaked for two days. It should be noted that when dyeing with madder and mineral dyes, the yarn is first treated in a tin salt solution (mordanting process). The tin salt is dissolved in cold water, and then the yarn is boiled in it. The boiled yarn is then placed together with the madder into a previously prepared dye bath.

After that, the boiling process begins and continues for 1.5–2 hours. Once boiling is complete, the material is allowed to cool in steam, dried in the sun, and then washed. It is also possible to dye with madder without pre-boiling the yarn in the tin salt solution.

**Recipe 2:** 300 g of madder is used per kilogram of fabric. When dyeing with madder, alum is used as a mordant. Soak the madder in a small amount of water overnight. The next morning, bring to a boil and pour the hot liquid into 4 gallons (15 l) of cold water. Soak the pre-treated fabric in water and squeeze it well before putting it in the dye solution. Put the fabric in the solution, bring to a boil and continue boiling for 45 minutes. Then drain the water and dry it.

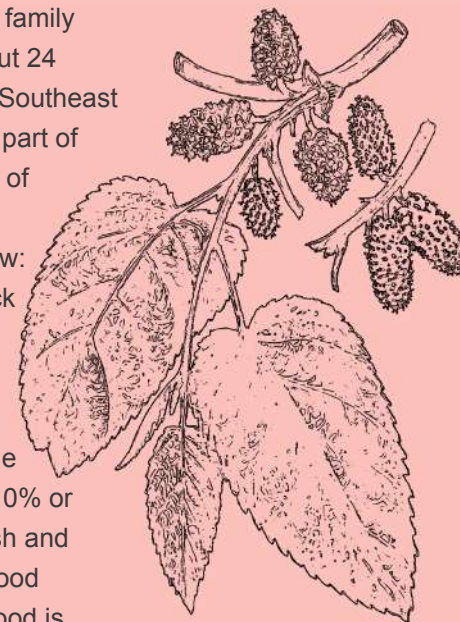
# WALNUT SHELL (JUGLANS REGIA)



Walnut, walnut tree (*Juglans regia*), is a deciduous tree from the walnut family in the class of dicotyledons. It is naturally distributed in Asia Minor (Anatolia), the Balkan Peninsula, Iran, China, the Caucasus, and Central Asia. In Transcaucasia, it grows wild almost everywhere, forming small groves, though it is more often found as solitary trees. In riverplain forests, it grows mixed with oak, elm, and hornbeam. The walnut's leaves, green husk, shell, and bark are used for dyeing purposes. They produce a brown to yellowish-colored dye.

**Recipe:** The outer green husk of the walnut fruit separates from the ripe nut in autumn. Freshly fallen green husks dry and turn brown. Both freshly fallen and stored husks are used, since they retain their dyeing properties for years. Fresh husks produce a darker shade, while stored ones give a lighter tone. For storage, the husks are dried in the sun. To prepare dye from walnut husks, the following method is used: the green walnut husks are soaked in water for one week. Afterwards, this water is brought to a boil, and silk is dyed in the resulting dyebath. This produces a brown color. However, when the silk is placed into the dye bath again for a second time, the color becomes a lighter brown tone. When dyeing with walnut husks, be cautious not to scorch the yarn, so it is not boiled for too long (30–40 minutes).

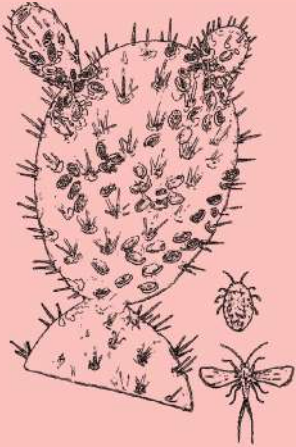
# MULBERRY (MORUS ALBA)



Mulberry is a plant from the mulberry family (*Moraceae*). The genus includes about 24 species, distributed across East and Southeast Asia, Southern Europe, the southern part of North America, the northwestern part of South America, and partly in Africa. In Georgia, two species of mulberry grow: white mulberry (*Morus alba*) and black mulberry (*Morus nigra*). White mulberry has been cultivated in Georgia since ancient times, and China is considered its homeland. The fruit of the mulberry, which contains 10% or more sugar, is used as food both fresh and dried, as well as for making various food products and alcoholic spirits. The wood is used in carpentry and woodturning, and also for making musical instruments.

**Recipe:** Both mulberry leaves and the heartwood are used as dyes. To prepare the dye, aged/yellowed mulberry leaves are collected and placed in water in alternating layers together with the yarn. The boiling phase lasts for 1.5–2 hours. Afterwards, the dyed yarn (or fabric) is cooled in steam and then dried in the sun. For the final result, the washing and drying procedures are repeated. A darker shade is obtained from the heartwood of the mulberry tree. For this purpose, the wood is finely cut and crushed, and by following the same process and method, a darker yellow color is achieved.

# CACTUS COCHINEAL (DACTYLOPIUS COCCUS)



One of the most expensive and important animal-derived dyes. In the Georgian context, it is called “ch’iaferi.” Ch’iaferi is an insect that lives on cactus. the Ararat cochineal (armenian cochineal) existed since ancient times and after the discovery of America, it was found that similar insects also live there on cactus, particularly on the Opuntia species (prickly pear cactus). It was widely used in pre-Columbian civilizations. Among indigenous tribes as early as the 10th century BC, and in the Inca Empire, cochineal was stored in the

form of dried insects, as at that time it was the only way to dye fabrics red. Cochineal contains an organic dye substance - carminic acid - which in its natural form produces a raspberry color. With the addition of tin salt, a bright red is obtained. with iron ions and ash, a vivid purple color is produced. To fix the color and achieve different tones, alum and tin salts were used. Today, cochineal is listed in the Red Book. It is also used for medical purposes (in homeopathy).

**Recipe:** soak cochineal overnight in a small amount of water. The following morning add the oxalic acid ( $H_2C_2O_4$ ), stannous chloride ( $SnCl_2$ ), and cream of tartar and boil for 10 minutes. Add cold water to make a dyebath of 4 gallons. Before immersing the fabric in the dyebath, thoroughly wet it and squeeze out excess moisture. After Immersing heat to boiling. Boil for 1 hour, rinse and dry.

The brochure was prepared by the State Silk Museum as part of the exhibition “Chromatics: Plants, Humans and Nature” dedicated to International Museum Day.

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