PLANTES TINTÒRIES:

RECUPERACIÓ, CONREU, EXTRACCIÓ I APLICACIÓ DE COLORANTS

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Les tintures d'origen vegetal s'empraren a Europa des de l'Antiguitat fins a final del segle XIX. Les plantes tintòries tradicionals (la ***rubia* o granza** -vermell-**,** el **pastel** -blau- o la ***gualda*** -groc-) es completaren progressivament amb d'altres espècies colonials (la **cotxinilla (insecte)** -vermell-**, l'indi** -blau- el **quercitró** -groc-**, els "palos" Brasil, Campeche, Amarillo** -un ventall ampli de colors-), i enriquiren la indústria tèxtil - la de les indianes en particular- i els mercats occidentals fins a l'inici del segle XX. El 1900 fou aproximadament el moment de la definitiva victòria dels colorants sintètics que s'havien desenvolupat a la segona meitat del segle XIX, a partir de la famosa descoberta de la *malveina* de William H. Perkin el 1856.[1]

D'aquesta cultura agrícola i industrial mil·lenària, anterior als colorants de síntesi, se n'han conservat importants vestigis: manuscrits, llibretes de receptes, llibres text sobre l'art de la tintura, biografies de tintorers, mostraris, etc. Tot un conjunt de materials que permetrien la reconstrucció d'alguns dels principals processos tintoris avui desapareguts. Tot resseguint i recuperant la informació que ens proporcionen aquestes abundants fonts històriques, preservades avui encara en les nostres biblioteques i arxius, es podria reconstruir un interessant itinerari tecnològic: des de la recuperació de les llavors i del seu conreu en les condicions més adients, fins a l'extracció de la matèria colorant i la seva aplicació a les fibres tèxtils, amb un potencial benefici científic i comercial ulterior.

De manera provisional, es podria iniciar la recuperació d'algunes de les plantes tintòries més conegudes, de les que tenim evidencies del seu conreu extensiu a Catalunya i a Espanya - o en el cas de les tropicals, en els jardins botànics. Entre d'altres, es podria iniciar el treball amb la *rubia* o granza, el pastel, la *gualda*, el

[1] FOX, Robert., NIETO-GALAN, Agustí. (eds.) *Natural Dyestuffs and Industrial Culture in Europe, 1750-1880.* Science History Publications. Canton MA, 1999; NIETO-GALAN, Agustí, *Colouring Textiles. A History of Natural Dyestuffs in Industrial Europe*. Boston Studies in the Philosophy of Science. Kluwer Academic Publishers. Dordrecht 2001.

quercitró, l'indi, i alguns "palos" americans. En funció dels primers resultats en la fase de conreu el projecte es podria estendre a d'altres plantes com: la *orchilla*, el sumac, la cúrcuma, el safrà, la grana d'Avinyó o el fustic. Un cop superada amb èxit aquesta primera fase de conreu, es passaria més endavant a les fases d'extracció i d'aplicació de la matèria tintòria a les fibres tèxtils.

A continuació s'adjunta una primera bibliografia selecta de fons impreses que permeten obtenir informació abundant de les tres etapes esmentades: conreu, extracció i aplicació. També s'adjunta una petita fitxa tècnica en anglès de les principals plantes tintòries.

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Fitxa tècnica de les principals plantes tintòrees utilitzades fins a l'inici del segle XX

1. Cochineal (Eng), cochenille (Fr.), Kochenille (Ger.), cochinilla (Sp.)

Natural history description: the female of the insect Dactylopius coccus cacti of the Rynchota species. Similar species are the D. confusus, the D. ceylonicus, the D. tomentosus. Feeds on a cactus called Nopal by the Mexicans. Depending on the variety, it gave between 3 and 6 harvests per year.

Colour and its changes: red. Using a tin salt solution as a mordant, the Dutch chemist Drebble (1572-1633) obtained a beautiful scarlat in 1630. It contains carminic acid ($C_{22}H_{20}O_{13}$) as a colouring matter.

Geographical location: Mexico, Central and South America. the Canaries. Orient.

Other details: the insects were used by the ancient peoples of Central and South America to dye red carmine. They were introduced into Europe after the discovery of America, and cochineal was one of the most highly prized red dyestuffs. It was mainly exported from Veracruz**.** A expensive dye, difficult to prepare.

2. Indigo, (Eng., Fr., Ger.) añil (Sp.)

N*atural history description*: Indigoferae or Isatis tinctoria. In the plants a colourless glucoside is found, called indican, which is soluble in water. By the action of a special ferment, indican divides into glucose and indoxyl. Indoxyl, by the action of oxygen in the air turns into indigo, more accurately called blue of indigo. Different varieties of the plant should be mentioned: Indigofera Anil, Indigofera argentea, indigofera caroliniana, indigofera endecaphyla, indigofera tintoria.

Colour and its changes: Its colouring matter was also known as indigo, held in some indogophere plants under the chemical form of indican ($C_{14}H_{17}NO_6.3H_2O$), which after hydrolysis and enzymatic fermentation yields indoxyl. Indoxyl could be kept in solution, in which it was orange, but atmospheric oxygen turned it blue, yielding indigo, an intense blue colouring matter.

Geographical location: Originally from India, it was introduced into the West Indies (America) by the Spaniards, and later exported from Mexico, Guatemala, Honduras, Santo Domingo. French East and West Indian indigo reached Europe in the 18th century. It also extended to Virginia, Carolina and Georgia in North America**.**

Other details: Indigo was extracted from indigofera plants especially on the indigo farms using basically the method followed to produce pastel from woad. In the second half of the 18th century, Spanish indigo from Guatemala offered the best quality; it cost twice as much as the French variety. Indigo did not require a mordant, and was commonly applied in calico-printing. It was prepared by boiling indigo, potash, and oropiment, and the solution was thickened by a gum.

3. Madder (Eng.), garance (Fr.), Krapp (Ger.), rubia (Sp.)

Natural history description: Rubiaceae, a perennial herbaceous plant, with a large quantity of long reddish roots with four-sided caules. Its colouring matter is alizarin, which can be obtained by aqueous (steam) extraction of the powdered roots of the plant.

Colour and its changes: The colouring matter contains, alizarin (1,2-dihydroxy-anthraquinone), among other substances. The colour is extracted from the powdered and dried roots of the plant, which could be grown in humid soils.

Geographical location. Mentioned in ancient times by Hippocrates, Theophrastus, Discorides, and Pliny. From the Middle Ages onwards, until the discovery of synthetic alizarin, madder was one of the most important dyestuffs and was widely cultivated. The juice of the root containing alizarin was used to prepare the famous Turkey red with greasy mordants and alum, a secret guarded in the East until the mid 18th century. It grew traditionally in the Mediterranean, Levant, Italy, Southern France, Holland and Switzerland. Smyrna was also an important centre of lizari production.

Other details: Its colouring matter is alizarin (1,2-dihydroxy-anthraquinone). It yields lacs in combination with metallic salts that act as mordants.

4. Logwood or Campeachy wood (Eng.), bois de Campeche (Fr.), Blauholz or Campecheholz (Ger.), Palo de Campeche o de Indias (Sp.)

Natural history description: A leguminous Cesalpinacea, a large tortuous tree measuring up to 15 metres high. The name is derived from Campeche bay in Mexico. It was also known as *Palo de India* or *Palo campeche*, though the plant can be found throughout South America.

Colour and its changes. Provides a range of very different colours, from yellow to blue and black. Its colouring matter is hematoxylin ($C_{16}H_{14}0_6$) (examined for the first time by Chevreul in 1812), linked to a vegetable sugar. Through atmospheric oxidation it becomes hemateine ($C_{16}H_{12}O_6$). It provides lacs of different colours in combination with different metallic salts. Brownish red, violet (alkaline); yellow (acid), violet lacquer (stannous chloride), violet blue (copper, tin salts), black (iron salts), blue (aluminium slats).

Geographical location: It grows in many places in Atlantic Central and South America. In particular in Brazil, Nicaragua, Cuba, Tobago, and Jamaica.

Other details: It was imported to Europe in large stumps barked and deprived of most of the alburnum (sapwood). It was discovered in Campeche Bay by the Spanish during the early explorations. One of the natural dyes most resistant to artificials; it was still used to dye nylon in recent times. It is found linked to a vegetable sugar in the form of glucoside.

5. Brazil wood or redwood (eng.), bois du Brésil (Fr.), Rotholz or Brasilienholz (Ger.), palo Brasil (Sp).

Natural history description The collective name "redwoods" was given to the dyeing woods of some indigenous leguminous plants in southern America, East and West Indies, China and Japan. Caesalpina brazilensis. The country Brazil seems to have received its name from the wood. Te Fernanabuco wood was even more highly prized. The colouring matter is Brasileine.

Colour and its changes: It provides a red colour which can be easily modified with the use of different mordants. Its colouring matter comes from the oxidation of brazilin ($C_{17}O_4H_{14}$), Brazilin can be coloured with oxides of different metals to yield red coloured lakes.

Geographical location: Brazil. South America, East and West Indies

Other details: Red woods from the East had been widely used in Europe since the beginning of the Middle Ages, to dye wool, cotton, and silk. Other woods: S. Marta wood, Nicaragua and Costa Rica wood. Bahama wood, California and Terraferma wood, Sapan wood. Soluble in water, and much used in calico-printing.

6. Archil or Orchil (Eng.), Orseille (Fr.), Orseille (Ger.), Orchilla (Sp.)

Natural history description Roccela tintoria, a lichen. The colouring matter is a phenol: orcinol, a preparation of a kind of dry leaf, growing on rocks and stones.

Colour and its changes: red

Geographical location: grows on the rocks of many Mediterranean Islands, the Canary Islands, the coasts of Western and Eastern Africa, Madagascar, the Mediterranean islands (Crete and the Greek Islands), Canary Islands, Cape Verde, Madeira, Senegal and Madagascar. From the thirteenth century onwards, it was traded in Florence.

Other details It was sold in lilac coloured powder, and was prepared by a mixture of Roccella tinctoria and Necanora tartarea especially by English, Scottish and Swedish dyers. It could be fixed straight onto the textile fibre without a mordant. Similar lichens from Scotland and Scandinavia were later used, such as the British dye cudbear: an archil extract.

7. Quercitron.

Natural history description: Quercus tinctoria. An oak with a black bark.

Colour and its changes: yellow. With tin mordants, a very fast orange was also obtained. Aluminium and chromium mordants provided greenish-yellows on wool and silk.

Geographical location: North America (Eastern U.S. and southern Canada)

Other details The use of the bark containing a yellow dyestuff was introduced into Europe in the eighteenth century by the American dyer Edward Bancroft. It was widely used even after the introduction of synthetic dyes for its fast yellow on silk and wool, and on cotton with mordants.

8. Weld (Eng., Ger.), gaude (Fr.) gualda (Sp.)

Natural history description: A plant, the reseda Luteola, containing a yellow dye particularly and the top of the flowers.

Colour and its changes: yellow. It does not turn pink. The colouring matter is a natural flavonoid, Luteoline, which is extracted from the upper part of the plant. Alum is its ideal mordant.

Geographical location: Europe: it was the main European yellow.

Other details: Commonly used for dyeing silk and wool in yellow. It was the chief yellow dyeing substance used in Europe before the introduction of quercitron bark.

9. Woad (Eng.), pastel (Fr. Sp.)

Natural history description: Its botanical name is Isatis Tinctoria. The main source of blue in Ancient Times and the Middle Ages. Its cultivation was quite successful in Languedoc, Provence, and Normandy.

Colour and its changes: An alternative source of blue. Its colouring matter appears to be chemically identical to indigo. The colouring matter of its leaves was obtained by soaking in water, drying and adding an alkaline solution.

Geographical location: Europe. A typical indigenous colour.

Other details: Extensively used for blue dyeing before the emergence of indigo.