

**AMARELOS
DURADOUROS EM
PLANTAS DE PORTUGAL
*EM BUSCA DE UM
SABER FAZER***

MARIA JOÃO MELO

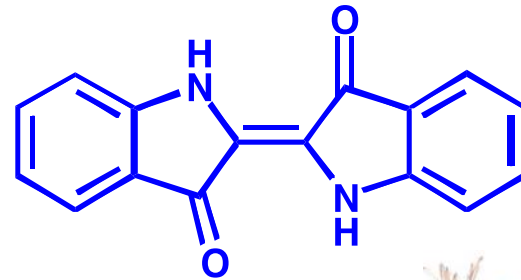
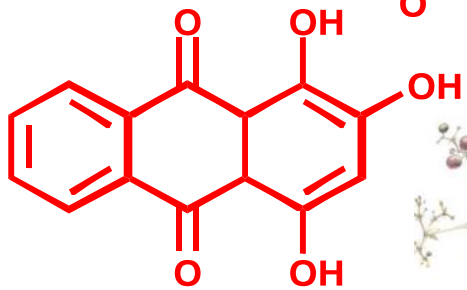
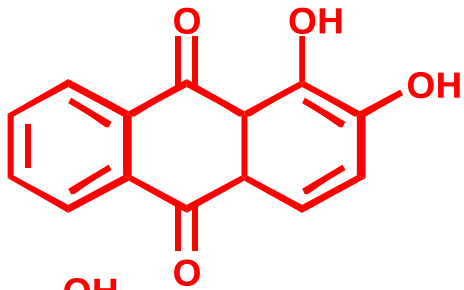
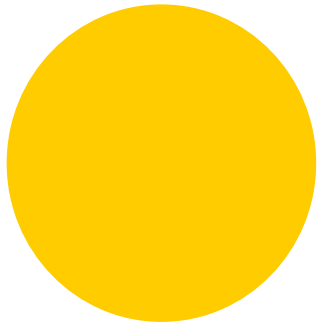
Paula NABAIS

Adelaide Clemente

M. Conceição Oliveira

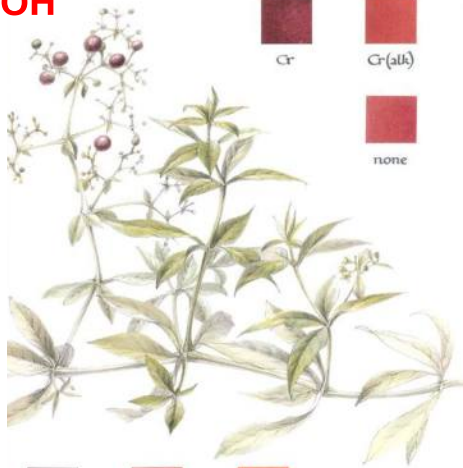
LACV
requimte
LABORATÓRIO ASSOCIADO
PARA A QUÍMICA VERDE

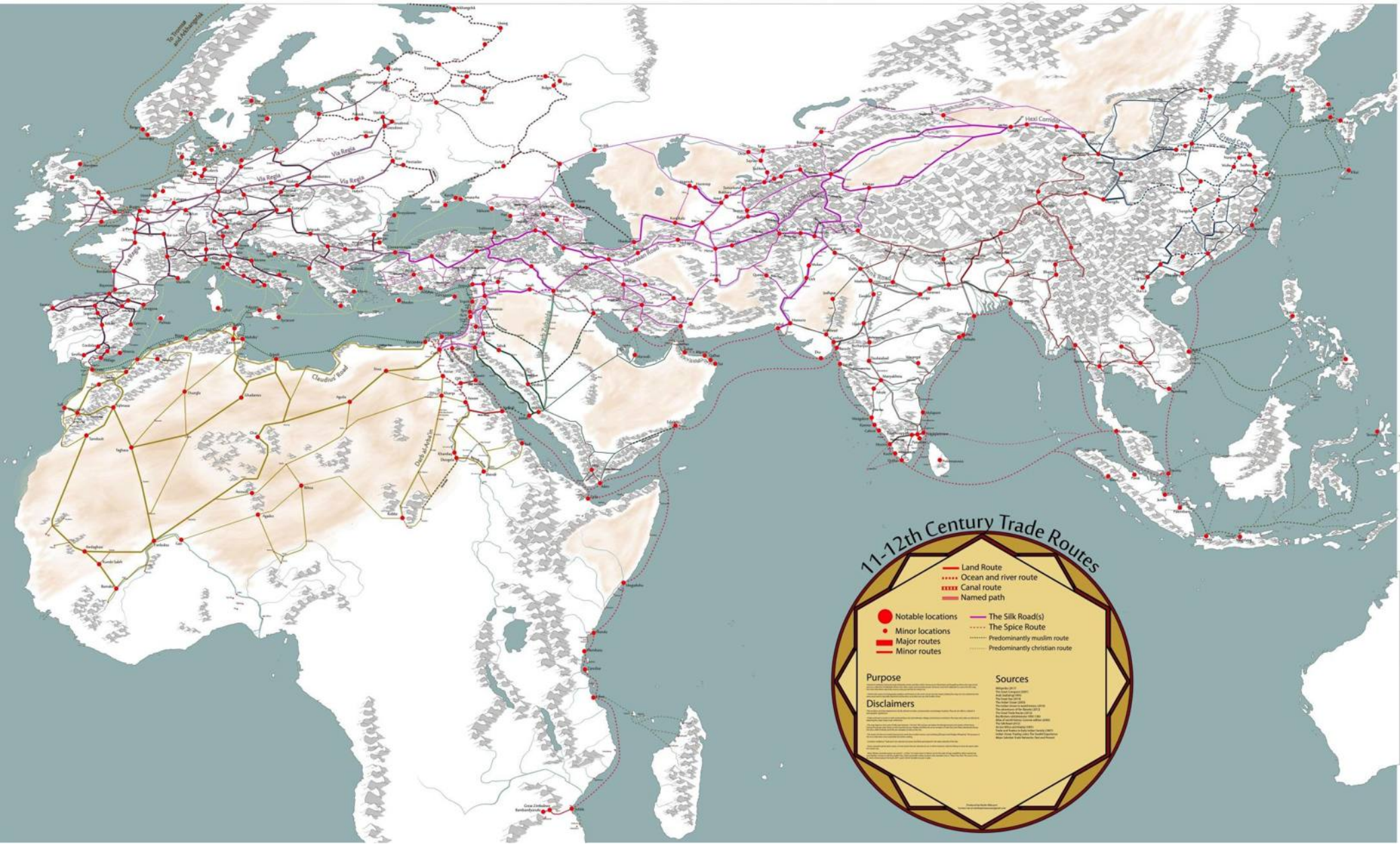




1868, 1880 & 1897

1868

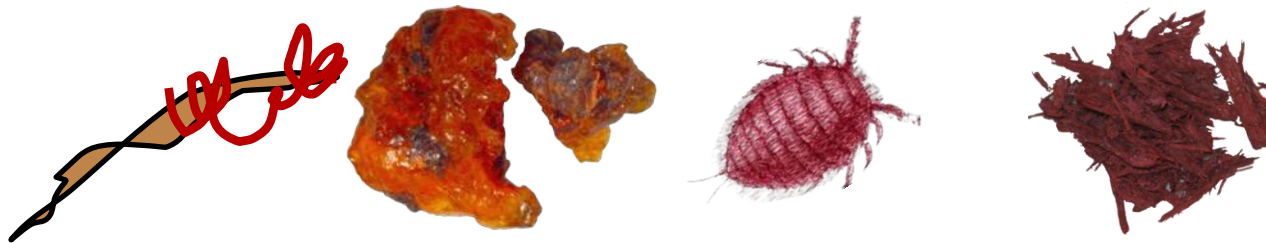




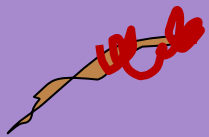
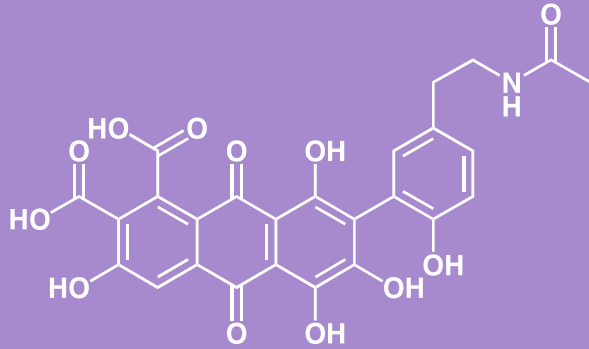
NA IDADE MÉDIA

usados para tingir têxteis
como pigmentos
como aquarelas
como cosméticos

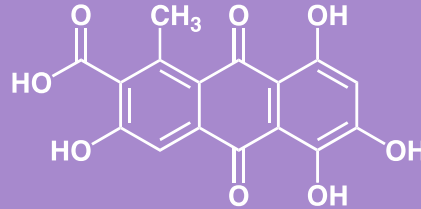
são corantes naturais
extraídos de uma grande variedade de fontes
animais (insectos parasitas) ou vegetais



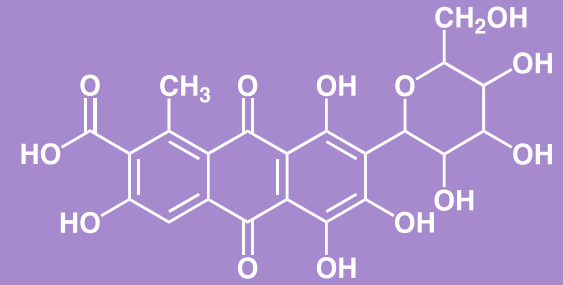
vermelhos de antraquinona



goma laca
Kerria lacca

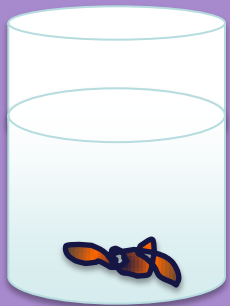


quermes
Kermes vermilio

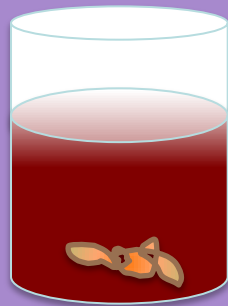
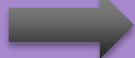


cochinilhas
Dactylopius coccus
Porphyrophora sp.

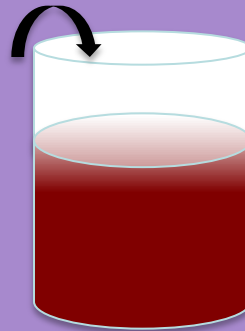
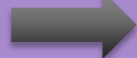
alumn $KAl(SO_4)_2$ + neutral pH



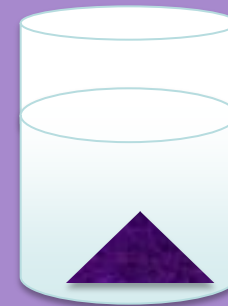
extracção



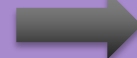
filtração

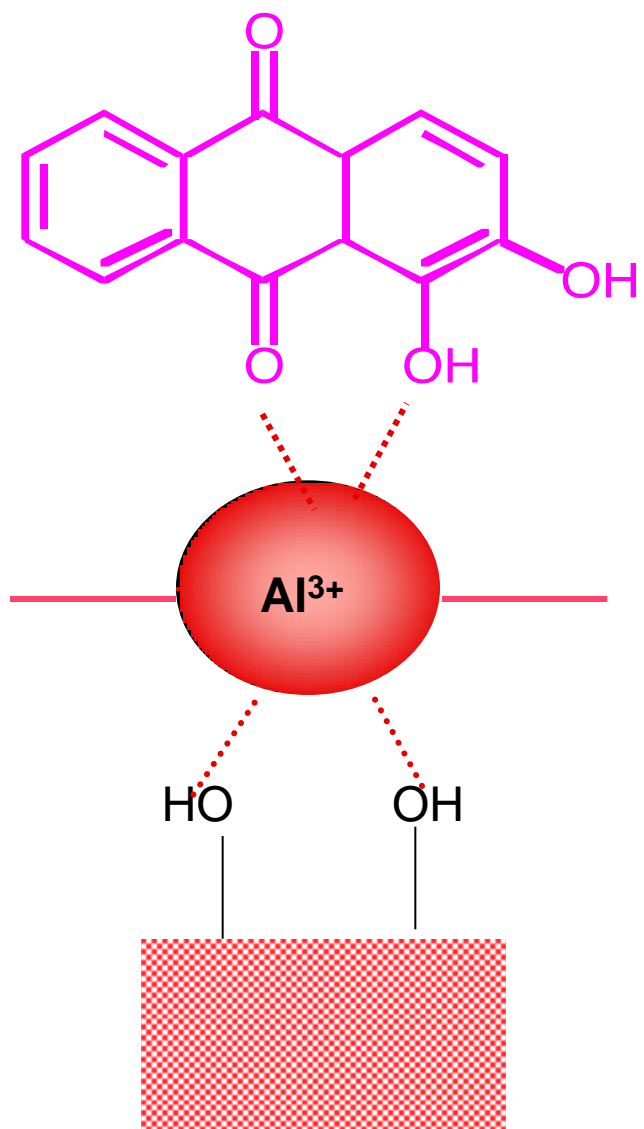


precipitação

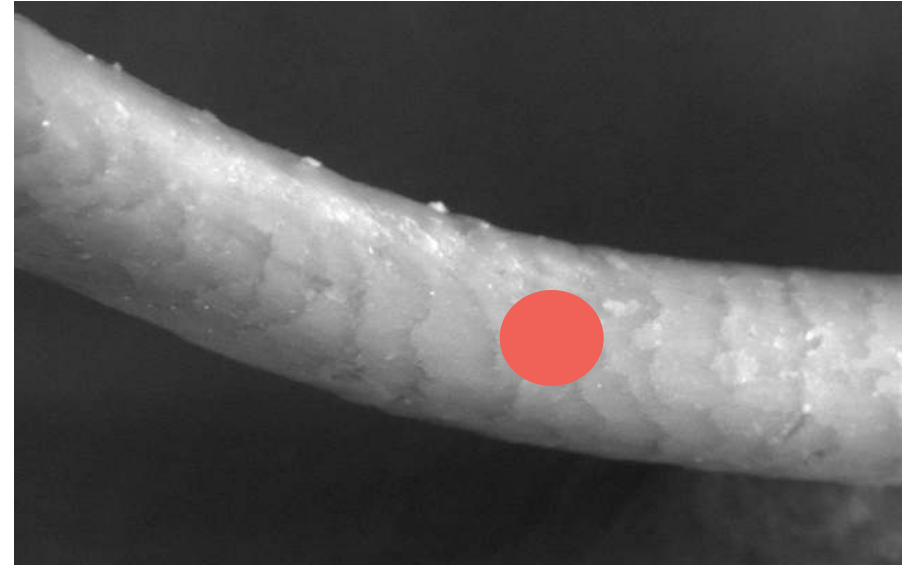


filtração

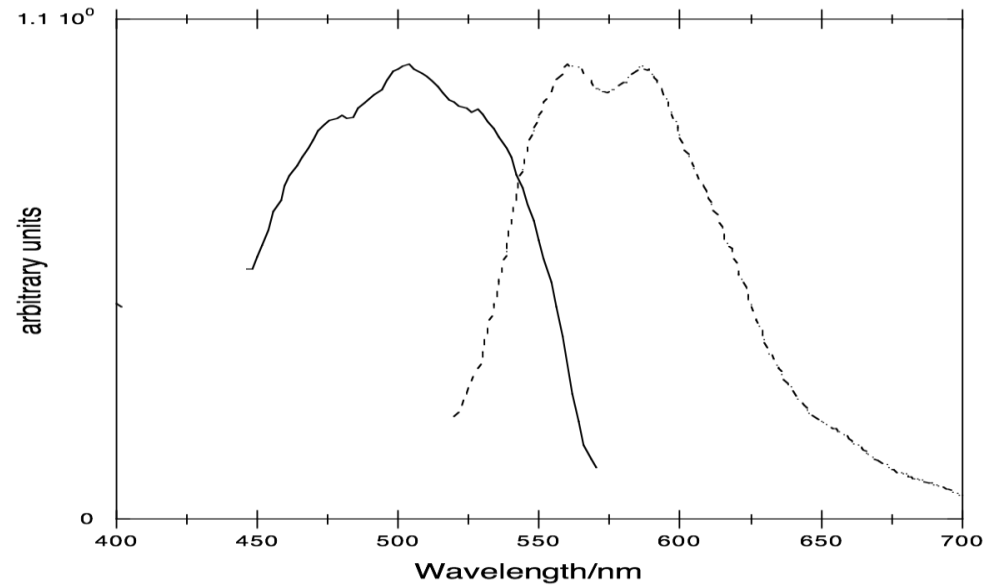




Case study- ancient textiles



man's poncho mfa31.496 100B.C.-0





raiz de garança
Rubbia tinctoria

Animal sources of red dye

Roman Jashenko

457-4 KamInstitute of Zoology
93 al-Farabi Ave, Almaty, 050060,
Kazakhstan

Mollusks

Phylum : Mollusca
Class: Gastropoda
Superfamily: Muricoidea

Purple

mollusks secrete from
hypobranchial glands
Used by ancients to produce
Tyrian purple

Purple dye murex
Spiny dye murex

Family: Muricidae
Genus: *Bolinus*
Species: *B. brandaris*

Synonymus: *Murex brandaris*,
M. brandariformes,
M. clavaherculis, *M. coronatus*,
M. trispinosus,
M. tuberculatus,
Haustellum clavatum,
H. brandaris,
Purpura fuliginosa
Aranea cinera



Purple-blue – *Hexaplex trunculus*

Lac

scarlet resinous secretion
Used for dyeing wool and silk,
cosmetic, and as a medicinal drug

Secreting lac scale insects

Family : Kerriidae
Genus: *Kerria*
Species: *K. lacca*
as well as *K. nagoliensis*,
K. chinensis and *K. communis*

Synonymus: generic -*Laccifer*,
Lakshadia, *Tachardia* and
Carteria



Scale insects

Phylum : Arthropoda
Class: Insects
Order: Hemiptera
Superfamily: Coccoidea

Kermes

Hemolymph of females which unlaid eggs

Kermes scale insects

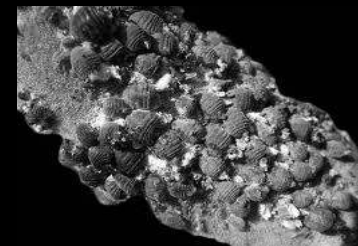
Family : Kermesidae
Genus: *Kermes*
Species: *K. vermilio*



Carmine

Cochineal

Family : Dactylopiidae
Genus: *Dactylopius*
Species: *D. coccus*
as well as 9 other species



Carmine scale insects

Family : Margarodidae
Genus: *Porphyrophora*
Species: more than 50
species



Species check-list of *Porphyrophora* Brandt 1833

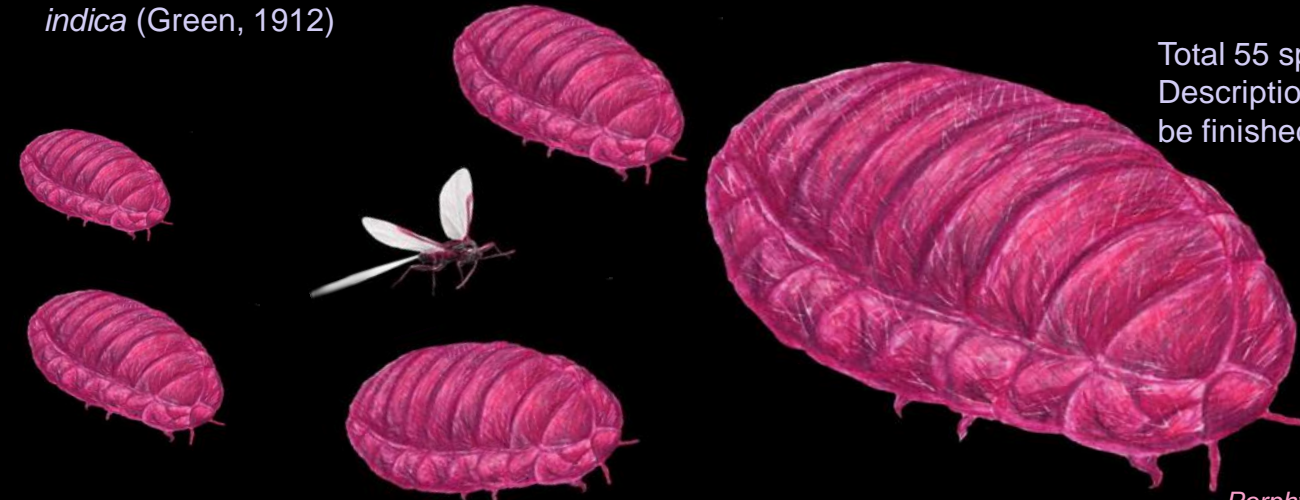
akirtobiensis Jashenko, 1989
altaiensis Jashenko, 1988
arnebiae (Archangelskaja, 1935)
bolivari Balachowsky, 1935
buxtoni (Newstead, 1917)
chelodonta Vahedi, 2007
crithmi (Goux, 1938)
cynodontis (Archangelskaja), 1935
elinae Jashenko, 1994
embiensis Jashenko, 1994
emilia Jashenko, in lit.
epigaea Danzig, 1983
eremospartonae Jashenko, 1989
erythrea Silvestri, 1938
gigantea Jashenko, 1990
hamelii Brandt, 1835
hirsutissima (Hall, 1924)
iliensis Matesova et Jashenko, 1988
indica (Green, 1912)

iranica Jashenko et Moghaddam, in lit
italica Goidanich, 1963
ivorontzovi Jashenko, 1994
jaapi Jakubski, 1965
jakubski Vahedi, 2007
jashenkoi Vahedi, 2007
kazakhstanica Matesova et Jashenko, 1988
ketmeniensis Jashenko, 1994
kiritshenkoi Jakubski, 1965
kubotai Jashenko, in lit.
lappulae Jashenko, 1990
libica Silvestri, 1938
madraguensis (Goux, 1946)
matesovae Jashenko, 1989
medicaginis Jashenko, 1994
minuta Borchsenius, 1949
mongolica Jashenko, 1994
monticola Borchsenius, 1949

ningxiana Yang, 1979
nuda (Archangelskaja, 1935)
nurmamatovi Jashenko, in lit.
odorata (Archangelskaja, 1935)
pamirica Jashenko, in lit.
parieli (Vayssière, 1920)
polonica (Linnaeus), 1758
rhodesiensis Hall, 1940
salsa Jashenko, 1994
sophorae (Archangelskaja, 1935)
tritici (Bodenheimer, 1941)
turaigiriensis Jashenko, 1989
turkmenica Jashenko, 1994
ussuriensis Borchsenius, 1949
victoriae Jashenko, 1994
villosa Danzig, 1965
violaceae Matesova et Jashenko, 1988
yemenica Yang, 1979

Total 55 species

Description of other 2 new species from Kazakhstan will be finished soon

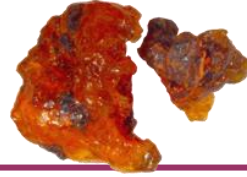


Porphyrophora sophorae Arch., (Picture by V. Timokhanov)



Building up a reference database of medieval colorants and paints

2012



2018

Tatiana Mendes Vitorino
Mestrado em Conservação e Restauro

A Closer Look at Brazilwood and its Lake Pigments

Cláudia de Camargo

Orientador: Professora Doutora Maria João Melo
Coorientador: Dra. Vanessa Otero
Assessor: Professora Doutora Leslie Carlyle

2012

Faculdade de Ciências e Tecnologia
Universidade Nova de Lisboa

Original research in *Journal of Cultural Heritage*
New insights into brazilwood lake pigments manufacture through the use of historically accurate reconstructions

Tatiana Mendes Vitorino, Maria João Melo, Leslie Carlyle, Vanessa Otero

Abstract
A laboratory-based reconstruction of the lake pigments derived from brazilwood (Brownea sp.) was undertaken to investigate the historical manufacturing process. The pigments were prepared and analyzed using a range of analytical techniques, including X-ray fluorescence (XRF), scanning electron microscopy (SEM), and Fourier transform infrared (FTIR) spectroscopy. The results of this study provide new insights into the manufacturing process of these pigments, which were used in medieval manuscript illumination. The study also highlights the importance of using historically accurate reconstructions in the study of medieval pigments.

Introduction
In the Middle Ages, Brazilwood (Brownea sp.) was used to produce lake pigments, which were used in medieval manuscript illumination. The pigments were prepared by combining the bark of the tree with a binding medium, such as egg yolk or animal glue. The resulting pigments were used to create a range of colors, including reds, oranges, and yellows. However, the exact manufacturing process of these pigments remains unclear. This study aims to reconstruct the historical process of lake pigment manufacture using historically accurate materials and techniques. The study also investigates the chemical composition and stability of these pigments, which can provide valuable information about their use in medieval manuscript illumination.

Rita Castro Sousa Oliveira
Mestrado em Conservação e Restauro, especialização em Documentação Científica

The book of birds in Portuguese scriptoria: preservation and access

Isabel Martins e Helena, Patrícia e Helena

Orientador: Prof. Doutora Maria João Soares de Melo, FCT-UL
Coorientador: Prof. Doutora Maria Adelaide Miranda, FCTM-UL
Doutor Maria Luísa, Metropolitan Museum of Art

2012

Faculdade de Ciências e Tecnologia
Universidade Nova de Lisboa

Research article
Heritage Science

Combining SERS and microspectrofluorimetry with historically accurate reconstructions of lac dye paints in medieval manuscript illuminations

Rita Castro, Federica Pozzi, Marco Leona and Maria João Melo

Abstract
A combined approach of surface-enhanced Raman spectroscopy (SERS) and microspectrofluorimetry (MSF) was used to study the lac dye paints in medieval manuscript illuminations. The study also includes a reconstruction of the lac dye paint using historically accurate materials and techniques. The results of this study provide new insights into the manufacturing process of these pigments, which were used in medieval manuscript illumination. The study also highlights the importance of using historically accurate reconstructions in the study of medieval pigments.

Introduction
Lac dye paints were used in medieval manuscript illumination to create a range of colors, including reds, oranges, and yellows. However, the exact manufacturing process of these pigments remains unclear. This study aims to reconstruct the historical process of lac dye paint manufacture using historically accurate materials and techniques. The study also investigates the chemical composition and stability of these pigments, which can provide valuable information about their use in medieval manuscript illumination.

RESEARCH ARTICLE
Open Access
Heritage Science

Microspectrofluorimetry and chemometrics for the identification of medieval lake pigments

Paula Nabais, Maria João Melo, João A. Lopes, Tatiana Vitorino, Artur Neves and Rita Castro

Abstract
Microspectrofluorimetry (MSF) and chemometrics were used to identify medieval lake pigments. The study also includes a reconstruction of the lake dye paint using historically accurate materials and techniques. The results of this study provide new insights into the manufacturing process of these pigments, which were used in medieval manuscript illumination. The study also highlights the importance of using historically accurate reconstructions in the study of medieval pigments.

Introduction
Medieval lake pigments were used in manuscript illumination to create a range of colors, including reds, oranges, and yellows. However, the exact manufacturing process of these pigments remains unclear. This study aims to reconstruct the historical process of lake pigment manufacture using historically accurate materials and techniques. The study also investigates the chemical composition and stability of these pigments, which can provide valuable information about their use in medieval manuscript illumination.

Review
Open Access
Heritage Science

The book on how to make all the colour paints for illuminating books: unravelling a Portuguese Hebrew illuminator's manual

Maria J. Melo, Rita Castro, Paula Nabais and Tatiana Vitorino

Abstract
A book on how to make all the colour paints for illuminating books was unraveled. The book provides a detailed account of the manufacturing process of these pigments, which were used in medieval manuscript illumination. The study also highlights the importance of using historically accurate reconstructions in the study of medieval pigments.

Introduction
A book on how to make all the colour paints for illuminating books was unraveled. The book provides a detailed account of the manufacturing process of these pigments, which were used in medieval manuscript illumination. The study also highlights the importance of using historically accurate reconstructions in the study of medieval pigments.



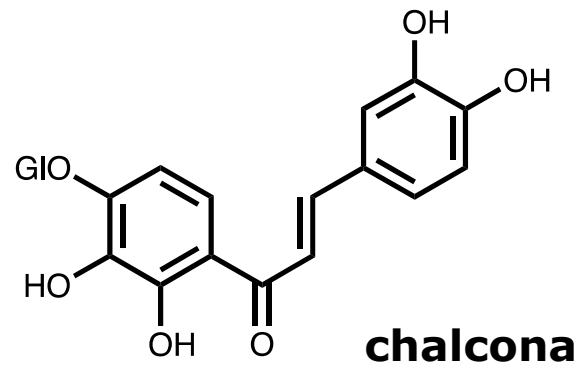
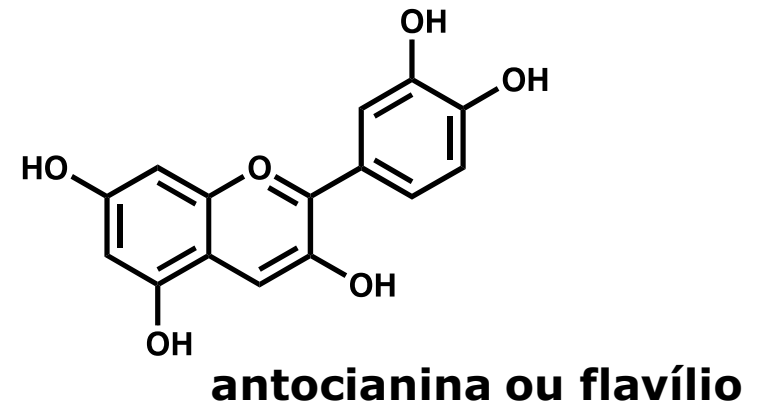
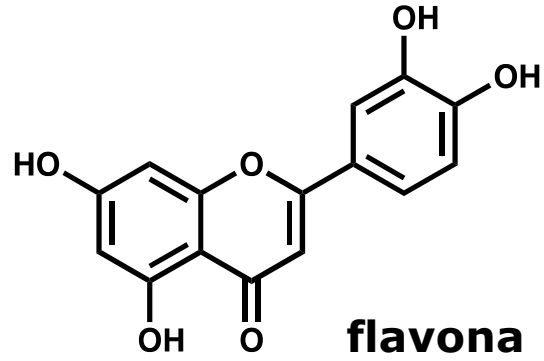
THE "Book on how to MAKE colours"

O livro de como se fazem as cores das tintas tódas

medieval colours practitioners

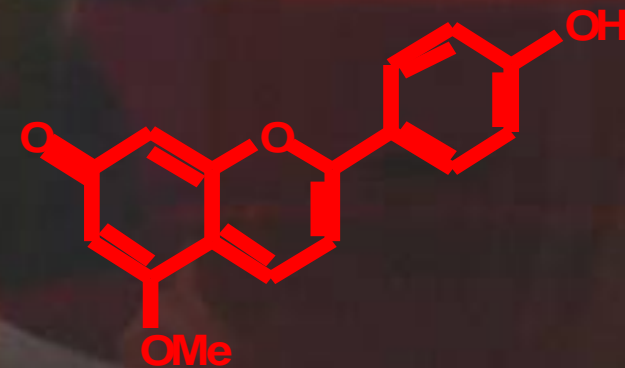
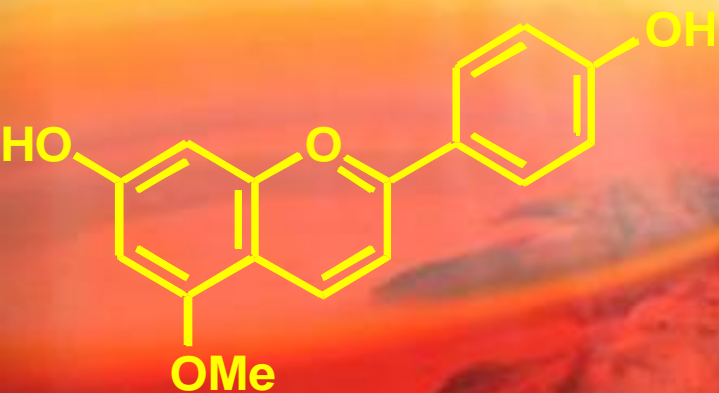
maria joão melo
rita castro
editors

flavonóides



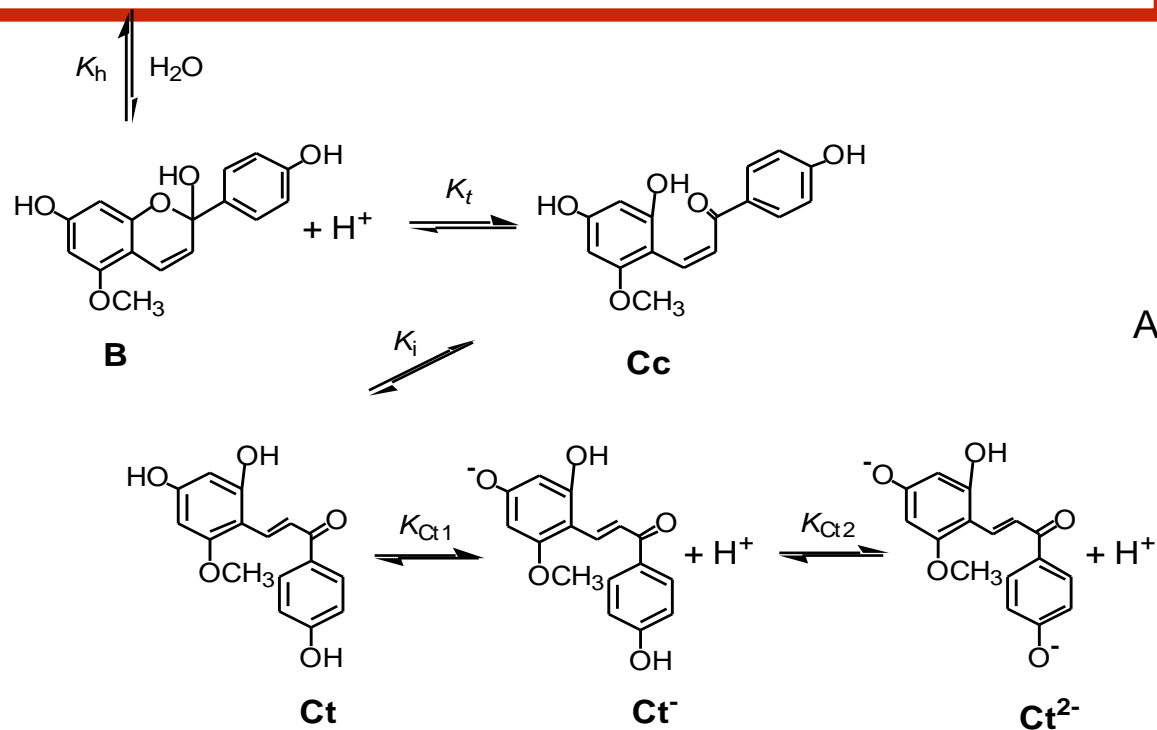
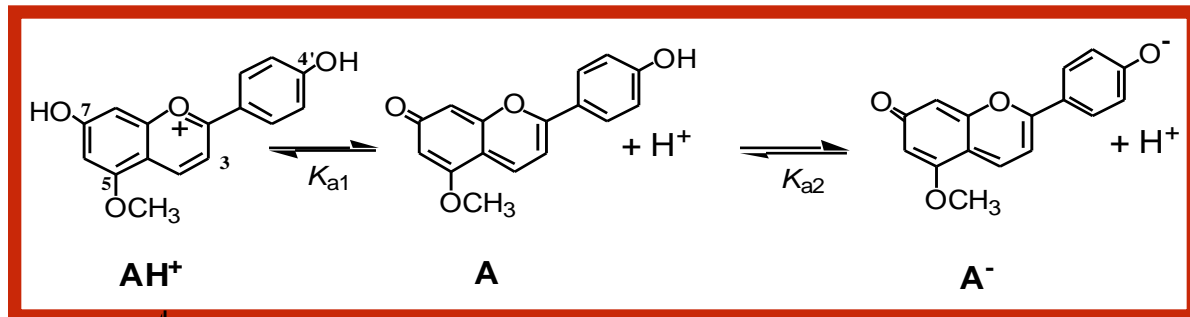


***To be or not to be an anthocyanin
the reds from *Dracaena draco****

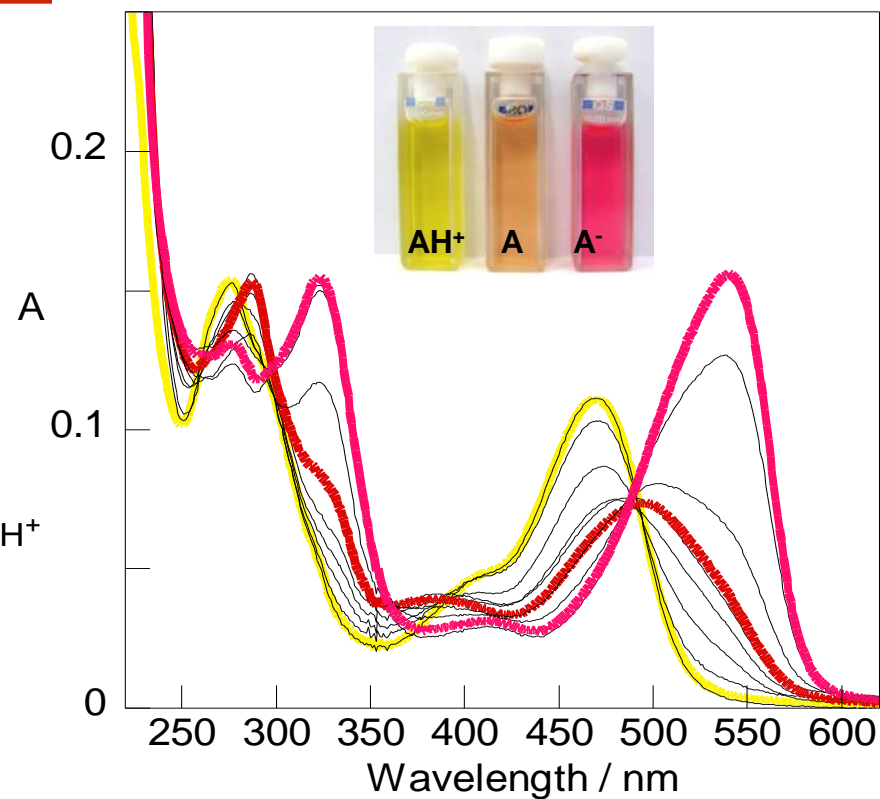


Dragon's Blood

Chem. Eur. J., 13 (2007) 1417 J. Chromatogr. A, 1209 (2008) 153



pH jump, from pH 1

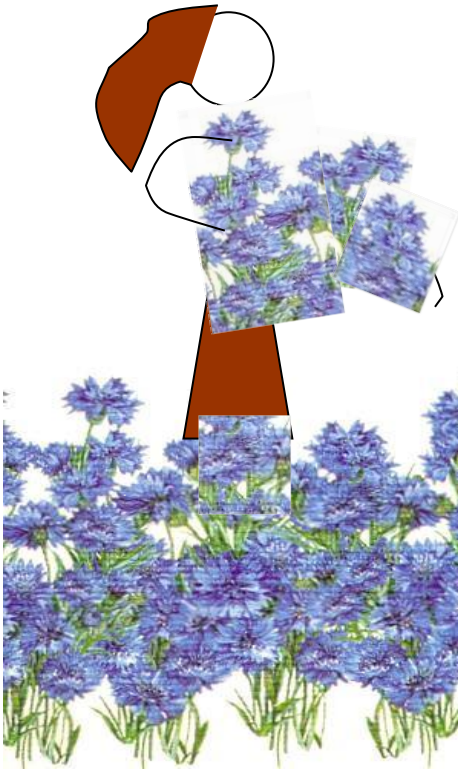


Chem. Eur. J., 14 (2008) 8507

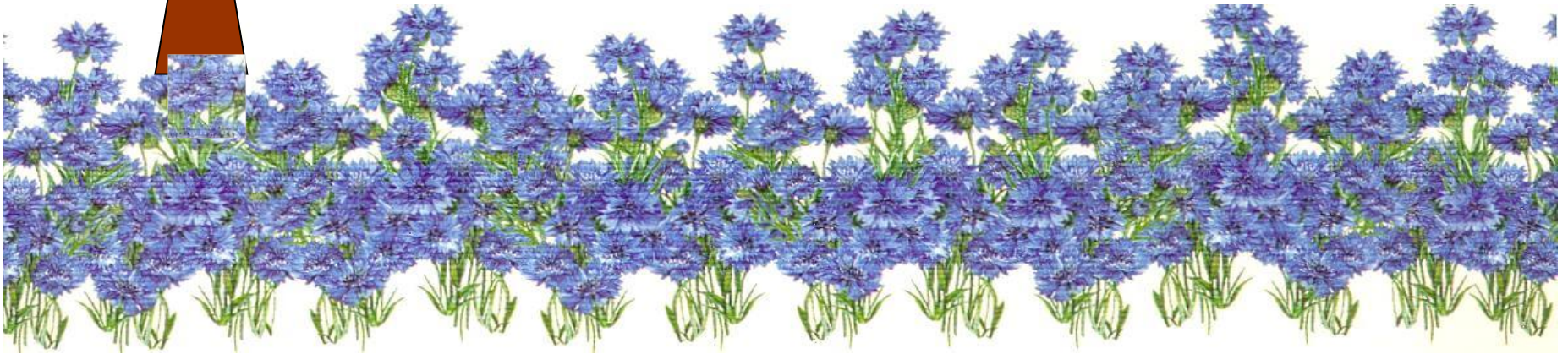


dragon's blood
Dracaena draco

Making clothlets: *missal blue*



If you want to make a bright rag colour, proceed as follows. During the first week after Whitsun pick a quantity of fully opened cornflowers-these should be gathered during the morning, that is, before midday.

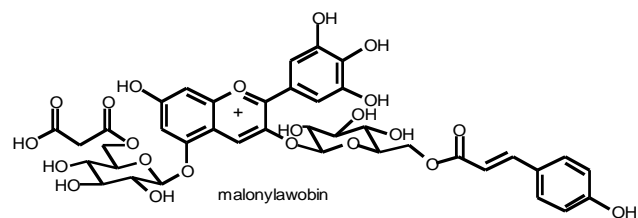


Dyes in History and Archaeology (2002), Archetype 2008

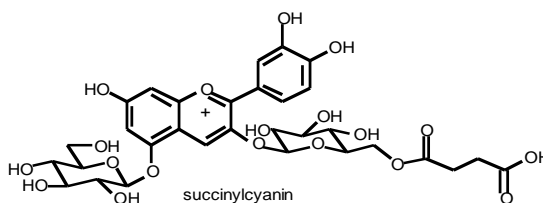
Metalloanthocyanins

Supramolecular metal complex pigments

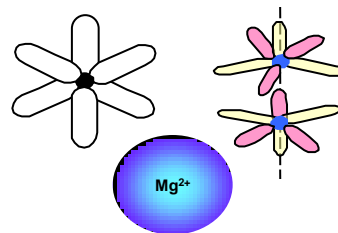
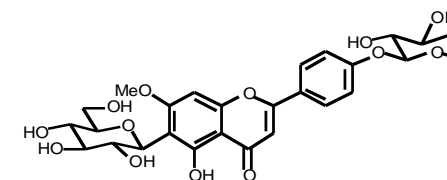
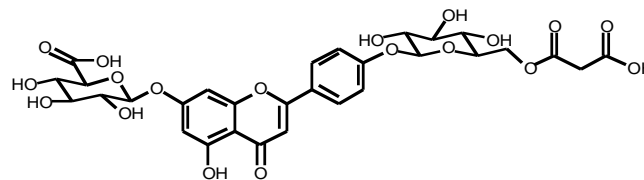
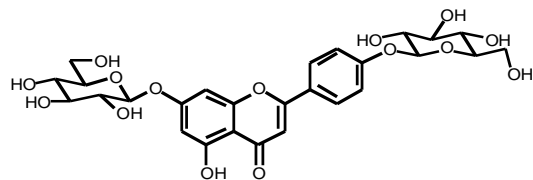
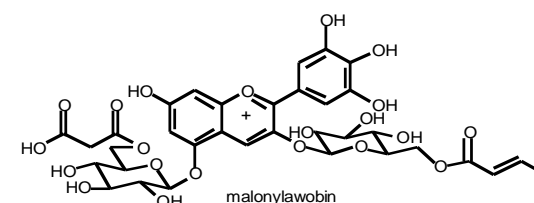
Salvia patens



Centaurea cyanus



Commelina communis

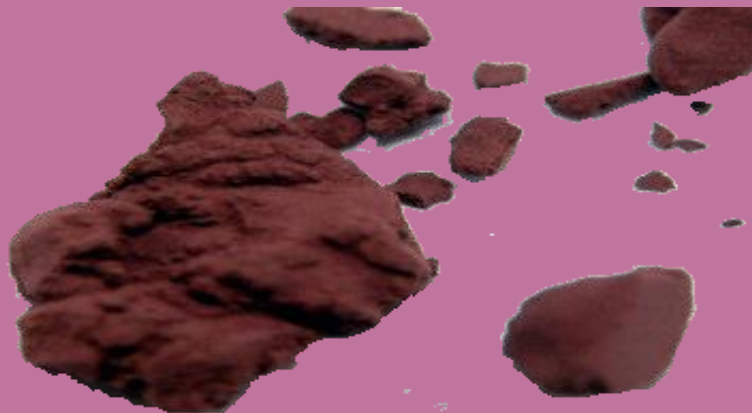


Vitruvio, *De Architectura*, Libro VII

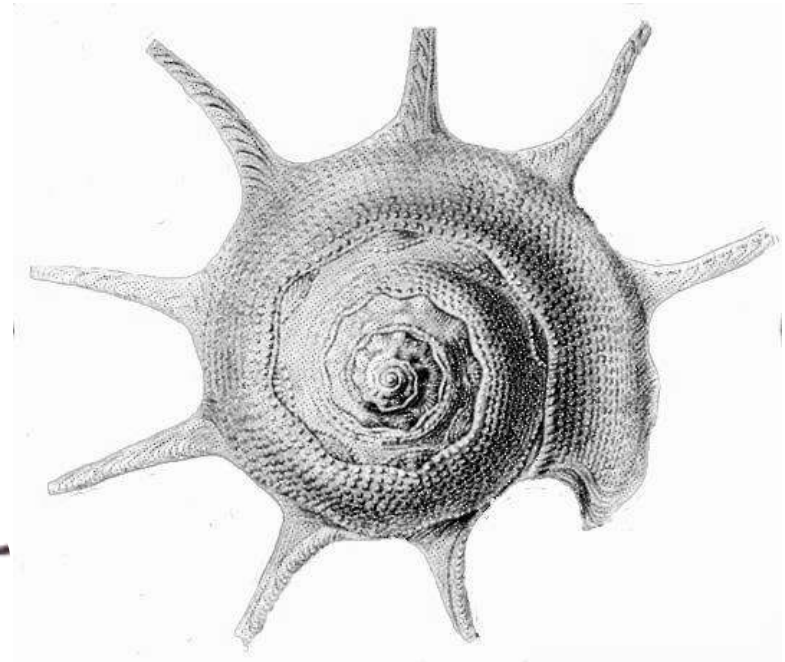
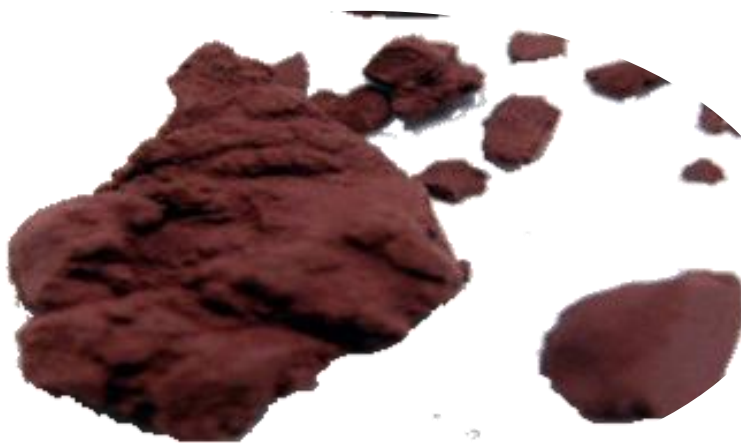
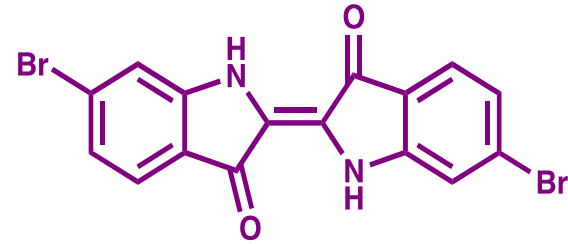
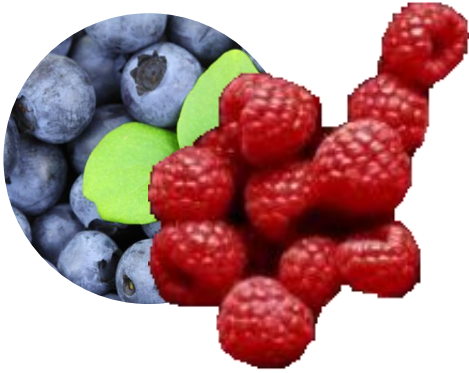
"Colori uguali alla porpora si ottengono anche artificialmente, **tingendo la creta** (...). Così, quando gli stuccatori vogliono fare un'imitazione del *sil attico*, **gettano viole secche** in un recipiente con acqua (...).

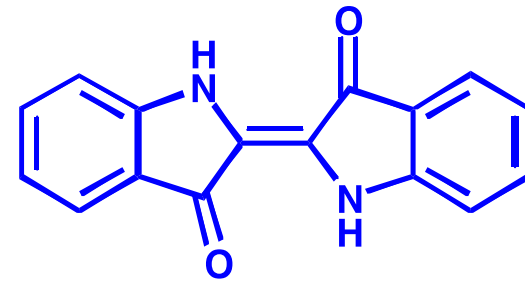
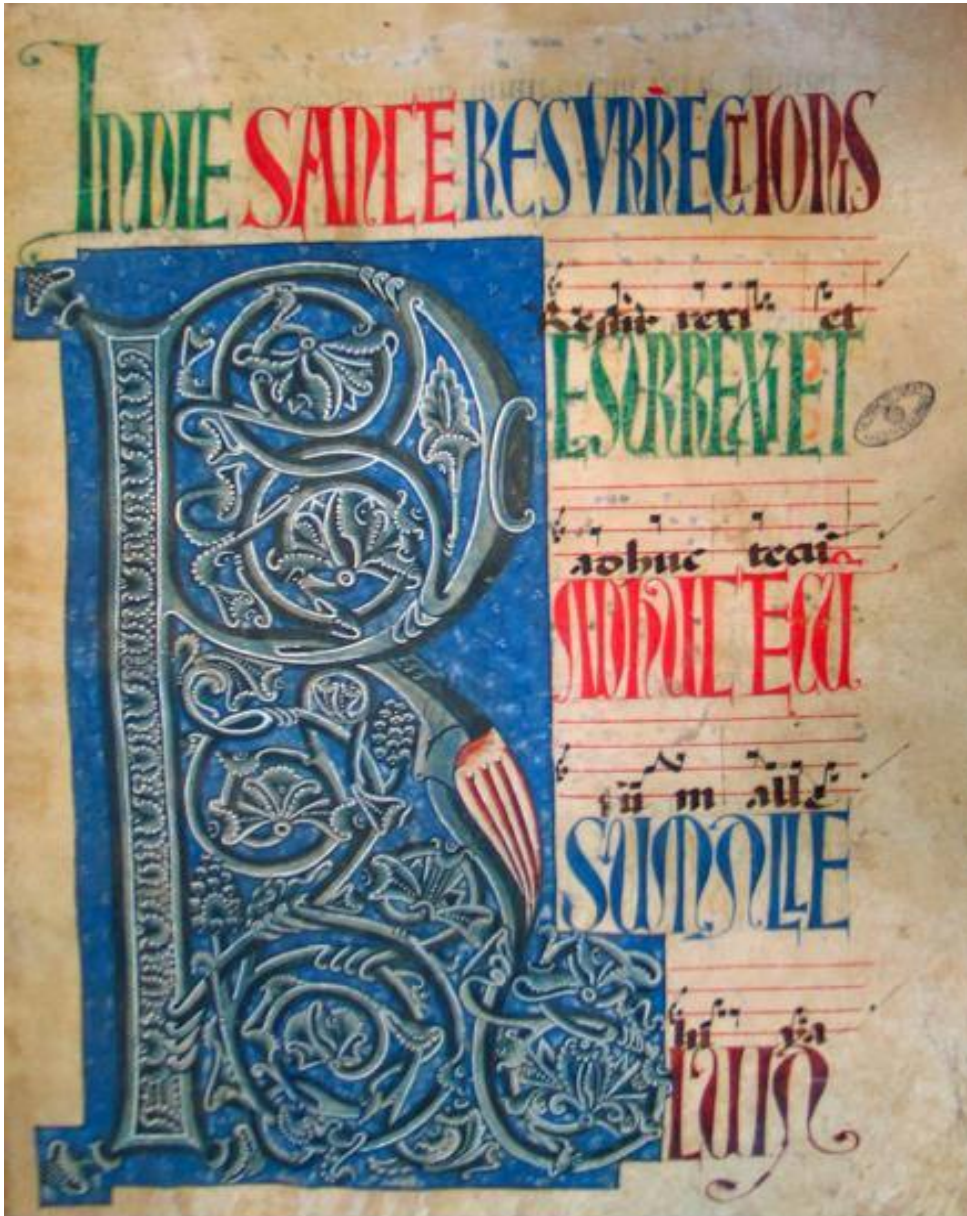
Con lo stesso procedimento preparano un infuso di **mirtillo**, lo mescolano con il latte e realizzano un elegante color porpora."

30-20 a.C.



Antocianinas vs Púrpura





Lorvão 15, fl. 50, Torre do Tombo

**Azuis escuros e cinza obtidos com
índigo
fundo pintado com lápis-lazúli**



blue nails

Índigo Anil

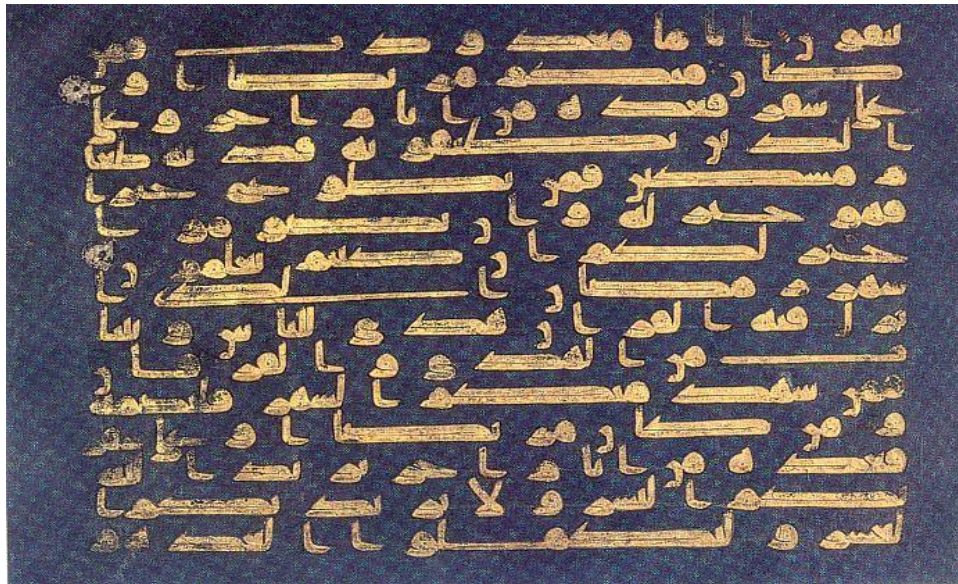
a história de um Azul



fragmento de um têxtil escavado em Deir el-Bahri, ca. 2000 AC

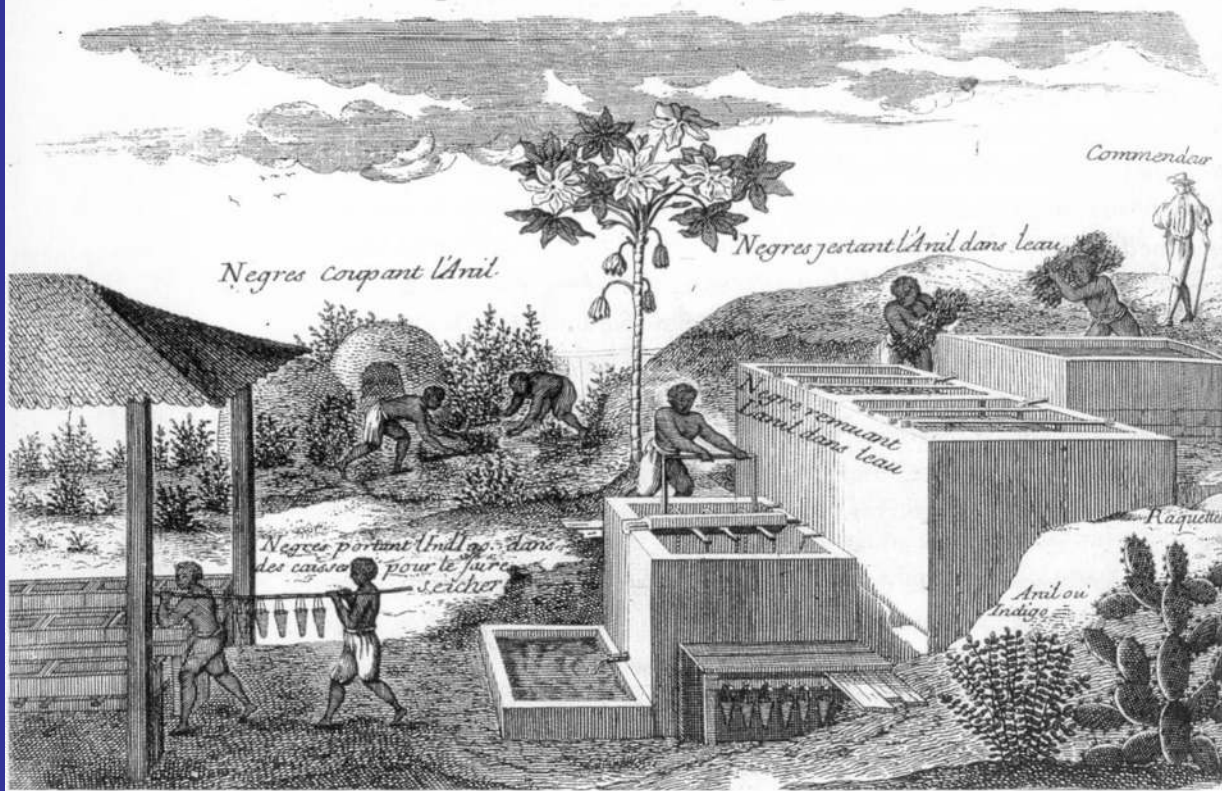


um par de calças de ganga, talvez o mais antigo existente, ca. 1890

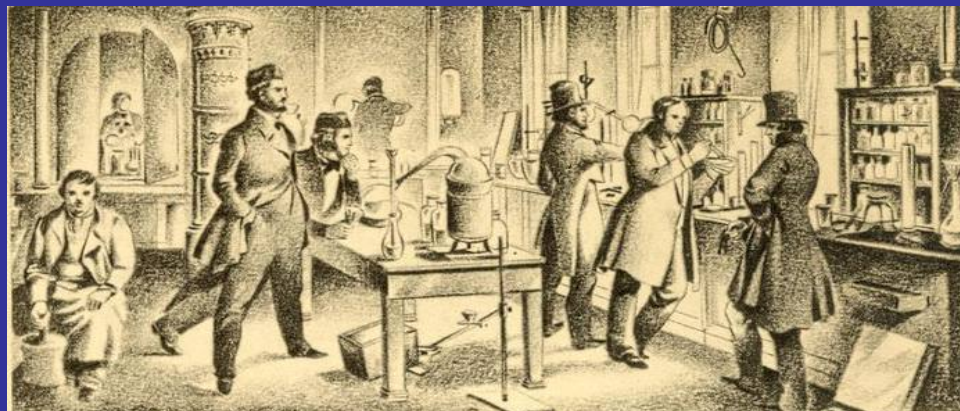


pergaminho, Grande Mesquita de Qairouan, Tunísia, sec X

De l'Inde & Indigo, & de la maniere qu'ils se fabriquent.

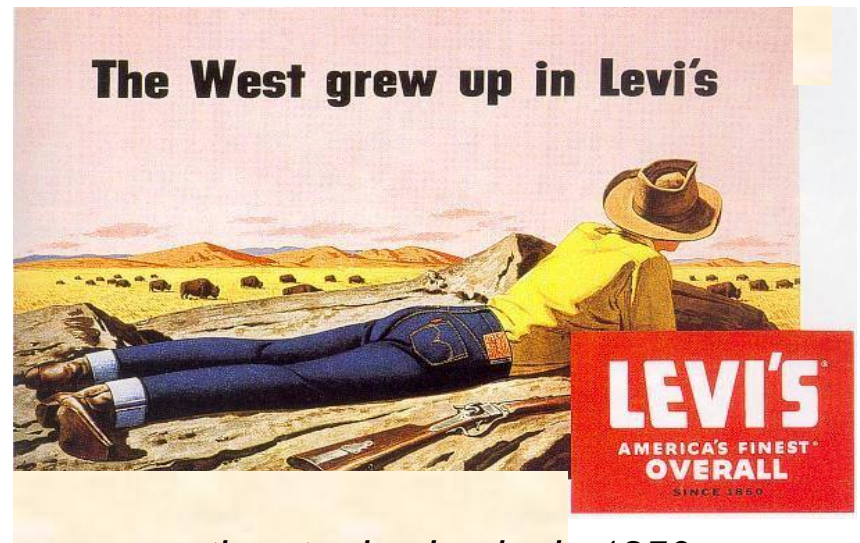


Adolf von Bayer





*etiqueta utilizada no índigo sintético
exportado para a China, 1903*



na etiqueta das Levis de 1950

“Tapetes de arraiolos”

D. José Pessanha

Separata d' "O Archeologo Português", XI, nºs 5 a 8 de 1906

Azul

Deita-se o anil (na proporção abaixo declarada) de molho, na vespera, numa tigela ou alguidarinho com agua. No dia seguinte áquelle, se urina num tacho, e vão-se juntando as differentes tachadas, depois de quentes, numa tarefa, asado, ou outro grande vaso de barro, tendo attenção a que seja liquido sufficiente para lhe caber folgadamente a lã que se quer tingir. Nesta urina assim junta e quente, se vae a pouco e pouco lançando a tinta acima, do anil, esmagando a pedra ou massa do anil no alguidarinho com uma mão de almofariz até de todo se desfazer, para o que se lhe vae accrescentando a agua, se tanto é preciso. Mexe-se todo o liquido até ficar nelle a tinta toda distribuida por igual, e conserva-se ao pé do lume, sempre morno. Mette-se-lhe a lã suja, e como vem da costa da ovelha, mas bem aberta e escolhida, a qual todos os dias se tira para fóra, se espreme, e se põe um pouco ao ar; aquece-se novamente a calda, e torna-se-lhe a metter a lã; e isto se repete por tantos dias, quantos sejam suficientes para a lã tomar aquelle azul que se quer. Tres dias são de ordinario suficientes; e, se o anil é bom, bastam dois. O bom anil é em pedra e côr de cobre, e tanto melhor quanto mais côr de cobre. Estando a lã tinta, espreme-se, lava-se em agua limpa, e põe-se a enxugar á sombra, porque o sol faz a lã aspera, e só o amarello e talvez o verde se não resentem da influencia do sol. E assim fica a lã pronta para se cardar¹, fiar, desengredar² e fabricar, etc.

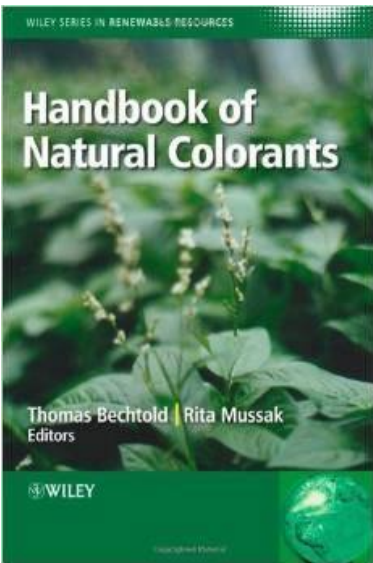
o anil

"The very technology of cloth production was central to (...) making sense of the world; so were the textiles themselves."

Heather Lechtman



in collab. MFA Boston



1

History of Natural Dyes in the Ancient Mediterranean World

Maria J. Melo

The colours used on textiles and artifacts, their social significance and the scope of their trade, are part and parcel of a people's overall history.

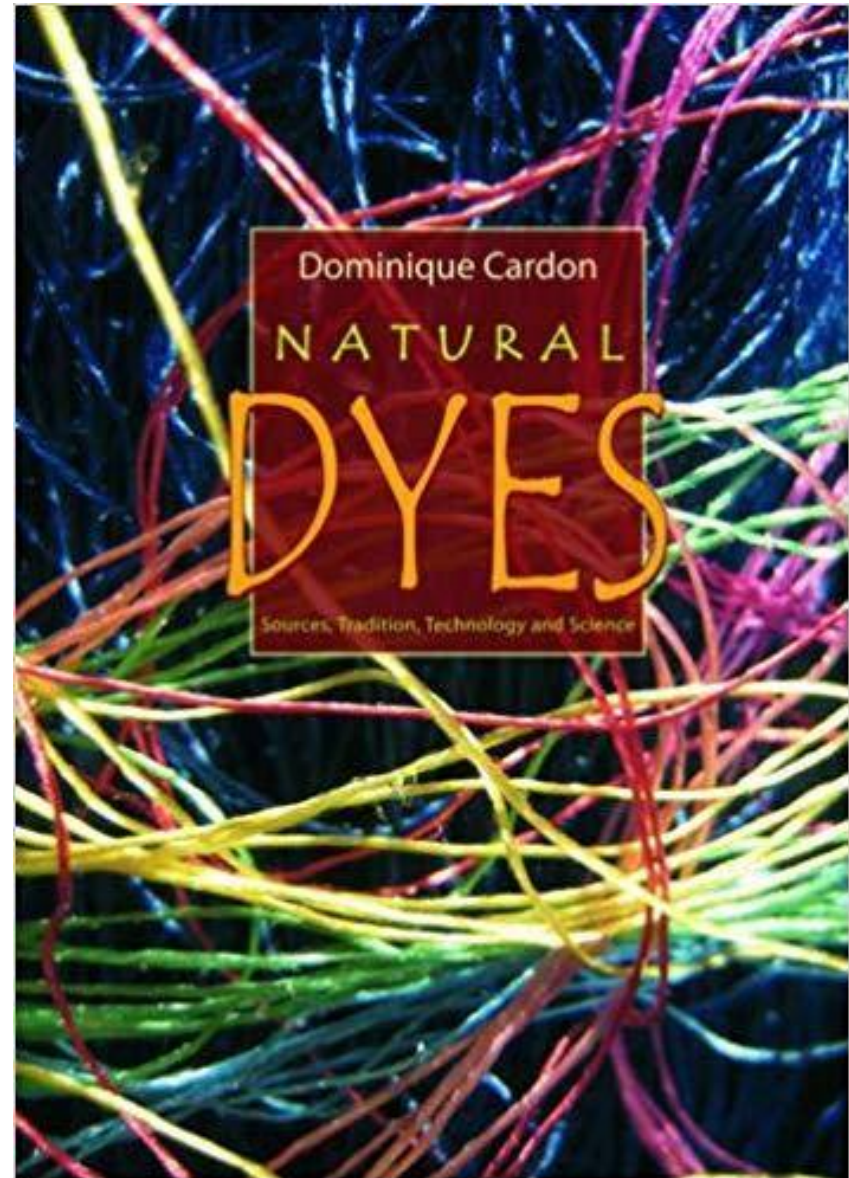
Jenny Balfour-Faulk in Indigo, British Museum Press, 2000

1.1 Introduction

1.1.1 Ancient Mediterranean World

The build-up of Mare Nostrum probably began much earlier than the 6th–5th millennium BC and there is material evidence pointing to such activity as early as the 12th–11th millennium BC [1]. Mare Nostrum, the Roman name for the Mediterranean Sea, was to become the home for a global market that expanded beyond its natural borders in the 1st millennium BC. The Phoenicians, the Etruscans, the Greeks and finally the Romans shaped Mare Nostrum, a geographic as well as a cultural domain. It was also home for the first global dye, Tyrian purple, which was traded by the ingenious and industrious Phoenicians. The purple of Tyre was famous, as were the textiles dyed and produced by the Phoenicians. It is said that the Greeks named the Phoenicians after Phoinikes, the ancient Greek word for 'red colour', probably as a result of their famous purple trade.

By the time of the founding of the Mediterranean civilizations, what we would consider the classical palette for natural dyes had already been established, and the most valued colours were indigo for the blues, anthraquinone-based chromophores for the reds and 6,6'-dibromoindigo for purple. These colours were traded all over the Mediterranean,



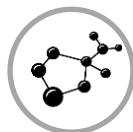
POLYPHENOLS IN ART: CHEMISTRY AND BIOLOGY HAND IN HAND WITH CONSERVATION OF CULTURAL HERITAGE



TASK 1 Polyphenolic characterization of selected natural extracts



TASK 3 Towards a model system for medieval inks based on historical accurate reproductions from Iberian technical sources



TASK 4 Iron gall ink metal-tannin complex characterization



TASK 5 Towards new treatments for iron gall inks in manuscripts



UNIVERSIDAD D CORDOBA



TASK 2 In search of "lost yellows": identification and occurrence of ancient polyphenol yellows in Portuguese plants



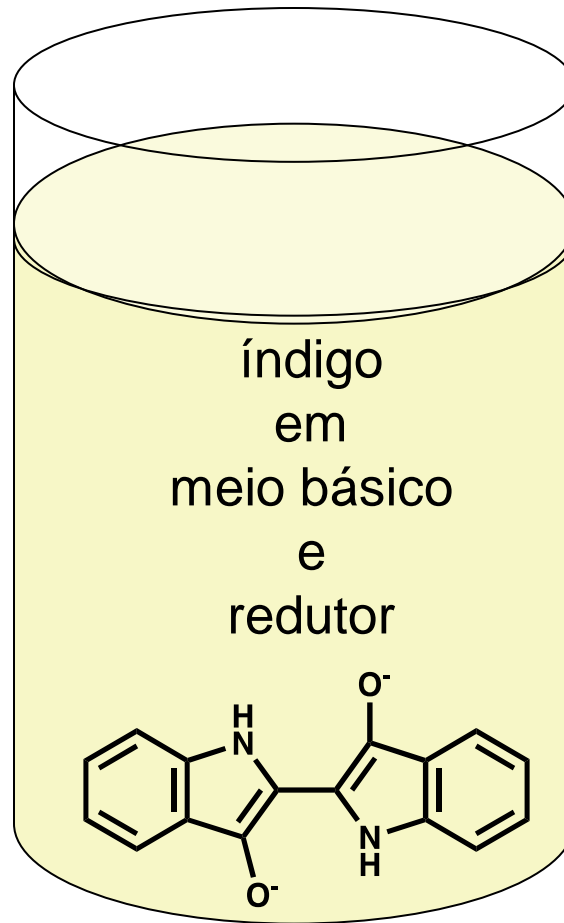
TASK 6 In search of "lost yellows": unravelling the secrets of yellow colour paints in medieval manuscripts with photochemistry



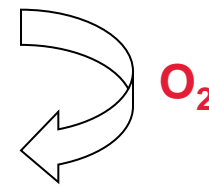
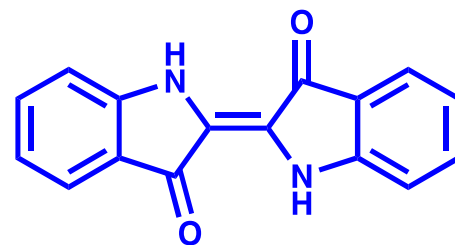
Polyphenols in Art



antes



depois



Plangil Tye-dye







índigo uma cor que conta a História