

Indigo carmine: favored but fading

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Abstract

Around 1850 textiles were mostly dyed with natural organic dyes. Their use changed in the second half of the 19th century, due to the introduction of synthetic organics. Before that time pigments and half synthetic organics, like Prussian blue, indigo carmine, picric acid, pittaecal and murexide, were used in the textile industry.

For the ICN-project 'early synthetic organic dyestuffs', an intense study on indigo carmine has been undertaken; the lecture will focus on this acid blue dye. The history, chemical constitution, names, production and the analysis will be discussed. In addition, dyeing recipes and the use as a textile dye will be presented.

The history is studied by the original historical sources, included the patent literature. The lawyer Johann Christian Barth (* around 1700, † 1759) at Großenhain in Saxony, Germany, discovered a blue dye by treating natural indigo with concentrated sulphuric acid in 1743. He named it 'Sächsisch Blau' after his native region. For this invention he received the title Kurfürstlich-Sächsischer Bergrat (Counsellor) in 1746. The wool-dyers of Norwich bought the secret and it was patented in England in 1748. In 1754 it was renamed in indigo carmine. Other synonyms and obsolete names are indigo extract, intense blue, murabba, Saxe blue, Saxon blue, Chymick and chemick blue. In the last quarter of the 18th century and the first half of the 19th century the use as a dye is often mentioned in dye books. A new episode for indigo carmine starts with the discovery and industrial production of synthetic indigo in the last decades of the 19th century. German patents from 1890 till 1903 prove that it was produced and even in sample books from one German dye factory, dated 1922, indigo carmine was used for dyeing wool, silk and leather. Indigo carmine is still used as a colorant for food, pharmaceuticals, and cosmetics.

Indigo carmine is an acid dye and will dye wool and silk directly from an aqueous solution producing bluish-green colours. The dyestuff is dissolved in water to which alum and cream of tartar might be added and wool is dyed at boiling temperature. The properties of indigo carmine are poor: the fastness to light compared to indigo is much reduced and the colour changes from blue to green to yellowish. Also the fastness to washing is low; it is soluble in water.

Indigo carmine belongs to the class of acid dyes. Analysis can be done by means of HPLC-PDA using a gradient of water, methanol and tertiary butyl ammonium hydroxide, a technique especially developed for the analysis of acid dyes.

Analysis on many textile objects from the last quarter of the 18th century till the first quarter of the 20th century shows that indigo carmine was used for nearly two centuries after its invention.

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10 november 2011, Amsterdam, Nederland, Picture Meeting, *Indigo carmine: favored but fading*, (Matthijs de Keijzer, Maarten R. van Bommel, Regina Hofmann-de Keijzer en Regina Knaller).

10-15 september 2012. Wenen, Oostenrijk, Congres: I.I.C Decorative, *Indigo Carmine: Understanding of a problematic blue dye* (Matthijs de Keijzer, Maarten R. van Bommel, Regina Hofmann-de Keijzer, Regina Knaller en Edith Oberhumer).

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