

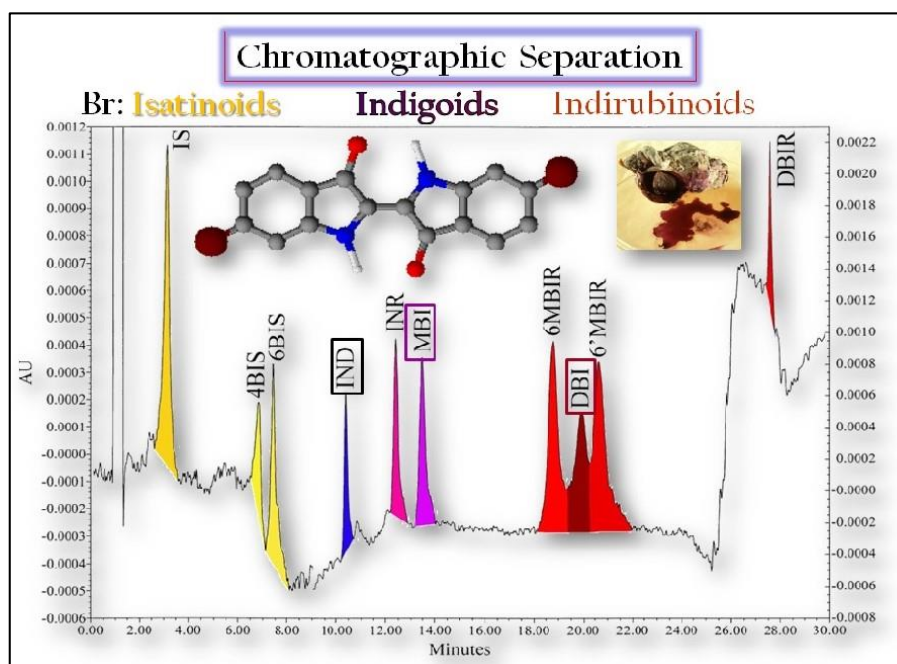
Green chemistry of the ancient dyer investigated via analytical chromatography

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The ancient dyer was an advanced green chemist. While inorganic pigments produced magnificent colors, the most elaborate chemical processing of natural colorants in antiquity – from the source to the final product – involved organic dyes from flora and fauna sources. For these processes to succeed the dyer was required to apply his – or her – practical chemical knowledge to botany, entomology, and malacology. By controlling the temperature and the alkaline or acidic pH of the dye bath, the dyers were able to create colorful textile dyeings, with some surviving even after six millennia. In order to produce such long-lasting products, the ancient dyer mastered the methods that are based on advanced chemical topics, such as, ionic, covalent, and intermolecular bonding, coordinate complexation, enzymatic hydrolysis, photochemical chromogenic precursor oxidation, anaerobic bacterial fermentative reduction, and redox reactions. From the various natural chemical processes, the dyer was able to extract yellow flavonoids, red anthraquinones, and blue and purple indigoids. The dyer's mastery can be understood from the various instrumental analyses performed by the speaker on colored archaeological materials, mostly textiles, by means of the high-performance liquid chromatography (HPLC) methodology, which will be discussed in the presentation.



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