

## Spectrometric Analyses of the Indigo Pigment Produced from Some Plants

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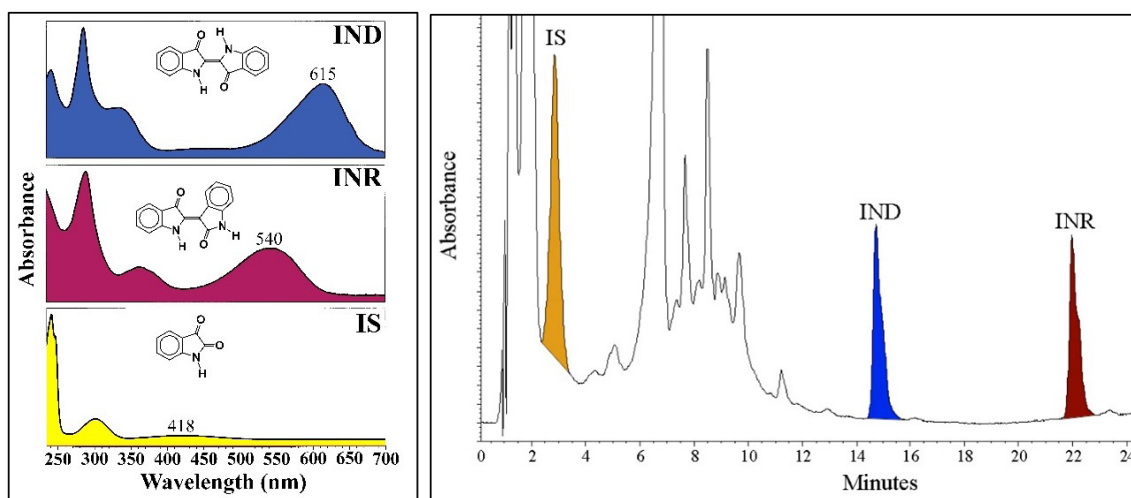
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### Abstract

In order to determine whether a natural colorant is sustainable, an important factor addressing that assessment is the determination of the relative content of the colorant within that plant. There needs to be a significant quantity of coloring material in order to make that source economically worthy of being utilized on an industrial (or semi-industrial) scale for the production of that colorant. This is especially true when there are a number of bio-sources for the same dye, such as, the indigo pigment, which is primarily used as a textile dye for the colors of "blue jeans".

The indigo pigment is produced from the precursors in the leaves of all indigo-producing plants. These precursors, are indoxyl derivatives with different attached sugar moieties (glycosylated forms of indoxyl). Hydrolysis of these precursors will cleave the sugar entities and leave the indoxyl derivatives to further react with oxygen and consequently to colored compounds. The main colorant product is typically, of course, the bluish-violet indigo ("IND") pigment (also known as "indigotin"), with usually some reddish indirubin ("INR") and yellowish isatin ("IS") also produced. Indirubin is an isomer of indigo, and the lesser-colored isatin is an oxidized form of a "half-indigo" molecule.

This talk will briefly describe the mechanisms by which the three above-mentioned colorants are produced, and the main emphasis of the presentation will be a quantitative comparison of the resulting ultraviolet and visible (UV/Vis) spectra obtained with various solvent extraction steps from the leaves. The high-performance liquid chromatography (HPLC) chromatogram and the UV/Vis spectra of solutions of the three colorants are shown in the figure below.



### Keywords

Indigo, indirubin, isatin, indoxyl precursors, UV / Vis spectrometry.