ECOLOGICAL AND ENVIRONMENTALLY-FRIENDLY INDIGO: CHROMATOGRAPHIC DYE ANALYSES OF INDIGO-PRODUCING PLANTS

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Abstract - In order to accomplish an optimal renewal of ecological indigo dyeing, a quantitative determination of indigo and its by-products (reddish indirubin and yellowish isatin) in various plant species must be performed. High-Performance Liquid Chromatography (HPLC) analyses allowed a comparison of the respective indigoid contents produced from these plant materials. The talk will present these results and the mechanism for the formation of indigo in the plant leaves.
In the present global state of the world, it is evident that with the accelerated depletion of resources, the survival of humankind requires better knowledge and intensified research into the sustainability of natural, potentially renewable, resources. The production and uses of natural colorants are a part of this major issue of our time, particularly as obvious sources of colorants for textiles, cosmetics, and food.
This talk will emphasize one of the more fascinating – historically and chemically – of all natural plant dyes, indigo, which is used as an environmentally friendly textile dye. The allure of this dye emanates from various factors. From the chemical standpoint, while indigo is not present in the live leaves of certain plant species, it is produced via enzymatic hydrolysis of the indoxyl glycosidic derivatives, which are the precursors present in these leaves. This dye formation begins as soon as the fresh leaves are cut from the plant, and its quantity increases when the leaves are further naturally processed by a method known as "couching". Further chemical wonderment regarding this dye is the fact that to dye with this water-insoluble pigment requires its dissolution via alkalinic reduction followed by air-oxidation. From a historical perspective, the indigo pigment has been widely used for woolen dyeing from the Roman Period, and four millennia previously in linen dyeings in Pharaonic Egypt, and reports have even dated its use in South America from six millennia ago.

Keywords - Indigo, Indirubin, Isatin, Precursors.