



Partial characterization of indigo (*Polygonum tinctorium* Ait.) plant seeds and leaves

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ARTICLE INFO

Article history:

Received 29 March 2012

Received in revised form 6 June 2012

Accepted 17 June 2012

Keywords:

Indigo

Prolipid

Bioactive compounds

Antioxidant and antiproliferative activities

ABSTRACT

The aim of this study was to assess the contents of indigo's bioactive compounds, its antioxidant and anticancer activities in acetone, hexane and DMSO extracts and to compare the overall bioactivity with another more used medicinal plant named prolipid. It was found that the contents of the bioactive compounds in the studied extracts from different parts of indigo plant varied ($P < 0.05$): the significantly highest content of polyphenols and flavonoids was in DMSO extract of prolipid, flavanols – in acetone extract of brown seeds ($P < 0.05$ in both cases) and tannins – in DMSO extract of green leaves, but not significantly ($P > 0.05$). Also the level of antioxidant activity was different: the highest antioxidant activity of all studied samples was in prolipid: according to ABTS, FRAP and CUPRAC tests in DMSO extract ($P < 0.05$ in all 3 cases), and only in acetone extract according to DPPH was not significant ($P > 0.05$). The correlations between polyphenol compounds and the antioxidant activities were relatively high. DPPH kinetic measurements were used to compare and distinguish the antiradical activity among indigo extracts by multivariate analysis. The FT-IR spectroscopy evaluated the presence of polyphenols. The interaction between DMSO polyphenol extracts of indigo plant and BSA showed that indigo has a strong ability as other medicinal plants such as prolipid to quench the intrinsic fluorescence of BSA by forming complexes and was measured by 3-dimensional fluorescence (3D-FL). The highest anticancer activity was in prolipid in concentrations of 800 $\mu\text{g/mL}$ against Calu-6, following by indigo brown leaves. In conclusion, organic extracts of indigo brown leaves were analyzed for their antioxidant and anticancer activities and compared with prolipid, using polyphenols composition, antioxidant activities and fluorescence properties. The indigo ability to quench the intrinsic fluorescence of BSA, relatively high content of phenolic compounds and anticancer properties can be used as medicinal plant.

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1. Introduction

Medicinal plants are sources of important therapeutic aids for alleviating human ailments. Medicinal herbs are known to contain a variety of antioxidants (Bener et al., 2010; Boo et al., 2012; Nirmaladevi et al., 2010). The successful clinical utilization of cancer chemotherapeutic agents from higher plants has been evident for about half a century (Lau et al., 2004; Pan et al., 2010). Indigo (*Polygonum tinctorium* Ait.) is less known as a natural healing and medicine (Hamburger, 2002). However, there is a scientific basis which can explain the successful use of indigo in traditional medicine (Wei et al., 2005). So, above cited authors isolated from

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¹ This article was written in memory of my dear brother Prof. Simon Trakhtenberg, who died in November 2011, who encouraged me and our research group during all his life.