Purification, characterization and toxicity of a mannose-binding lectin from the seeds of *Treculia africana* plant

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Abstract

In this study, a mannose-specific, homodimeric lectin from the seeds of *Treculia africana* was purified, characterized and its adverse effects were investigated in mice. The purification protocol involved anionic exchange chromatography on DEAE-Cellulose followed by gel filtration on Sephadex G-100. The hemagglutinating activity of lectin towards human erythrocytes was sensitive to inhibition by D-mannose. Treatment of the protein with EDTA exerted no inhibitory effect; however, analysis of metal content by atomic absorption spectroscopy revealed the presence of Cu^{2+}, Fe^{3+}, and Mg^{2+}. The results obtained showed that the lectin possesses maximum hemagglutinating activity towards human erythrocytes activity over the pH range 3–7.2 and is relatively thermostable up to 50°C. Periodic acid Schiff's (PAS) reagent staining showed that the protein was non-glycosylated while its amino acid composition analysis revealed that the protein contained 155 residues per subunit. The subunit had a minimal molecular weight of 22,139 Daltons, while the native molecular weight was estimated to be 41,000 Daltons. The lectin was found to be moderately toxic to mice with an LD_{50} of 47.21 µg g^{-1} body weight while, histopathological analysis showed no treatment related effects in any of the organs examined.

Keywords: Lectin, Seeds, Toxicity, Histopathology, *Treculia Africana*

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