

Purification and physicochemical characterization of soyatoxin, a novel toxic protein isolated from soybeans (*Glycine max*)

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Abstract

Physicochemical characterization and [biological](#) properties of a new toxic protein isolated from soybeans (*Glycine max*) is reported. The purification procedure consisted basically of [ammonium](#) sulfate fractionation, ion exchange, and affinity chromatographies, the latter being used for the removal of the seed's lectin and of its trypsin inhibitor.

The highly purified protein, designated soyatoxin, is a single [chain](#) acidic protein (pI 4.4-4.6) of 21 kDa, dependent on reduced thiol groups to maintain its solubility and biological [activities](#). The toxin is a metalloprotein containing iron, calcium, zinc, and magnesium.

Soyatoxin is highly toxic to mice (LD50 7-8 mg/kg mouse body wt upon intraperitoneal injection). It produces dyspnoea, tonic-clonic convulsions, and flaccid paralysis prior to death of intraperitoneally injected mice.

Furthermore, soyatoxin is immunologically related to another toxic protein (canatoxin), isolated from *Canavalia ensiformis* seeds, which is distinct from soyatoxin in containing [18 x 10](#) kDa noncovalently bound subunits.

Some biological properties including acute intraperitoneal toxicity, canatoxin-like immunoreactivity, hemagglutination, trypsin inhibitory activity, induction of platelet release reaction, and [aggregation](#) displayed by soyatoxin were studied and used to differentiate soyatoxin from soybean lectin and trypsin inhibitors