

An inhibitive determination method for heavy metals using tomato crude proteases

ABSTRACT

A new inhibitive heavy metals determination method using extract from *Lycopersicon esculentum* or tomato from has been developed. The enzyme was assayed using the casein-Coomassie-dye-binding method. In the absence of inhibitors, casein was hydrolysed to completion and the Coomassie-dye was unable to stain the protein and the solution became brown. In the presence of metals, the hydrolysis of casein was inhibited and the solution remained blue. The inhibitions shown by lead, chromium and zinc were, 67.9, 53.1 and 53 %, respectively. The IC₅₀ (concentration causing 50% inhibition) values were 1.407, 0.835 and 0.707 mg/l, respectively. The limits of quantitation (LOQ), for zinc, chromium and lead were 0.729, 0.506 and 0.541 mg/l, respectively. The limits of detection (LOD) for zinc, chromium and lead were 0.032, 0.0317 and 0.0317 mg/l, respectively. The IC₅₀ value for zinc was much lower than the IC₅₀ values for papain and Rainbow trout assays. The IC₅₀ value for zinc was lower than the immobilized urease assay. Other toxic heavy metals, such as silver, arsenic, copper, mercury and cadmium, did not inhibit the crude proteolytic enzyme activity. Based on the characteristics, crude protease enzyme from *L. esculentum* (tomato) can be used to detect heavy metals in various samples in conjunction with the dye-binding assay.

Keyword: *Lycopersicon esculentum*; Protease; Inhibitive determination method