

Thesis Title Study on the Characterization of the Ecochemical in
Kidney Bean (*Phaseolus vulgaris L.*) Which Inhibits
the Larvar Growth of Bruchid Weevil (*Callosobruchus
chinensis L.*)

Name Vinai Pitiyont

Degree Master of Science
(Technology of Environmental Management)

Thesis Supervisory Committee

 Thanakorn Uan-on, D. Engr.
 Aurapin Eamsiri, Ph.D.
 Thammasak Sommartya, Ph.D.

Date of Graduation

 20 April B.E. 2535 (1992)

ABSTRACT

The ecochemical presence in kidney bean (*Phaseolus vulgaris L.*) which inhibits the larval growth of the bean weevil (*Callosobruchus chinensis L.*) was determined to be a glycoprotein having molecular weight 48,000 which contained two major bands on SDS-PAGE (molecular weight of 18,000-18,500 and 17,000-17,500) with positive both protein and carbohydrate staining and minor bands (molecular weight 14,400-15,000) positive only for protein, these subunit were not linked by disulfide bond. The inhibitor showed α -amylase inhibitory activity and isoelectric point was 4.46 (acidic

enzyme). The optimum inhibitory activity against porcine pancreatic α -amylase was at 37 °C pH 5.4 and was completely lost of inhibitory activity after 5 min at 100 °C. The inhibitor was also showed to inhibit human salivary amylase but was not effect to plant and microbial α -amylases. The carbohydrate contents was determined to be 8.5 % by phenol-sulfuric acid method and confirmed to be 15.2 % by GLC method. The carbohydrate composition was found to consist of 1 fucose, 2 xylose, 20 mannose and 15 N-acetylglucosamine residues per mole by GLC methods. The inhibitor was a N-glycosylprotein and its structure was supposed to be a high mannose type, containing xylose and fucose. The amino acids contained in the inhibitor were consisted of 16 different compounds and rich in aspartic acids, serines, threonines, valines and only one methionine.

The carbohydrate moieties resulted from periodate oxidation and enzymic cleavages of the inhibitor did not show the inhibitory activity. This may conclude that the inhibitor was a specific inhibitor and the overall structure seemed to be required for its inhibitory activity.
