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JARIYA SUKHAPAN : CHARACTERIZATION OF CASSAVA ROOT PROTEINS : ALBUMIN AND GLOBULIN. THESIS ADVISORS : MONTRI CHULAVATNATOL, Ph.D., JISNUSON SVASTI, Ph.D. 111 p. ISBN 974-662-906-9

Globulin, the major protein band from cortex of cassava root, was purified by using ammonium sulfate fractionation, gel filtration, and ion exchange chromatography. The subunit MW determined by SDS-PAGE of cassava globulin was 67 kDa, and its native MW estimated by gel filtration was larger than 1,500 kDa. It was glycoprotein containing 31.2% (w/w) neutral sugar. Under non-denaturing conditions, the globulin appeared as a ladder pattern consisting of more than 6 bands in PAGE. Globulin had pI values of 4.6. Electrophoresis of the globulin in triton-acid-urea gel showed a single band, suggesting that the globulin consisted of a single peptide chain. Its amino acid composition revealed that the sum of acidic amino acids (Asx and Glx) was about two times greater than the sum of basic amino acids, (Lys, Arg and His). Moreover, hydrophobic amino acids (Ala, Val, Leu, Ile, Pro, Phe and Tyr) made up close to 50% at the total amino acids of the globulin.

Among the activity tests performed, the globulin had only linamarase activity with Km values for linamarin, p-nitrophenyl-β-D-glucopyranoside and p-nitrophenyl-β-D-fucopyranoside similar to those of the cortex linamarase.

Albumin, the major protein band from cassava root parenchyma, was purified by using ammonium sulfate fractionation, hydrophobic interaction chromatography, and gel filtration chromatography. By hydrophobic interaction chromatography, the albumin was separated into albumin I and albumin II. The subunit MW determined by SDS-PAGE of both albumins was 22 kDa. The native MW of albumin I was 232 kDa and that of albumin II was 250 kDa, as estimated by gel filtration.

Both albumin I and II were glycoproteins containing 23% and 6.9% (w/w) neutral sugar, respectively. Under non-denaturing electrophoresis, albumin I and II each showed a single band. Each had pI value of 5.4. Analysis of the albumins by electrophoresis in Triton-acid-urea gel showed that albumin I and albumin II each gave two major bands and two minor bands. This result indicated that each albumin consisted of more than one type of subunits of different hydrophobicity. Both albumins showed similar amino acid compositions. Also, in each case, the sum of basic amino acids was about two-thirds of that of acidic amino acids and the sum of hydrophobic amino acids was approximately 40% of the total amino acids.

Each albumin showed no activity under the assays for lectin, linamarase, chitinase, proteinase, or trypsin inhibitor.