

# Amino Acid of the Granulosis Virus of Rice Brown Semi-Looper, *Mocis frugalis* (Fba.)

IM, D.J.,<sup>1</sup> B.M. SHEPARD<sup>2</sup> AND R.M. AGUDA<sup>2</sup>

任大準 · B.M. 셰파드 · R.M. 아구다 : Rice Brown Semi-looper 顆粒바이러스의 아미노酸造成

*Korean J. Plant.* 25(3) : 191—192(1986)

The granulosis virus(GV) of rice brown semi-looper, *Mocis frugalis* has been reported in the Philippines. Purification and morphological descriptions of this virus was reported by Im et al. (1986). The enveloped virions of this virus are occluded in a protein matrix which form the inclusion body, the capsule.

Identification of insect viruses are usually through morphological characteristics. However, progress has been made in the development of diagnostic techniques especially in the analysis of structural components particularly protein of the inclusion body. These studies have initiated understanding between different virus isolates in some of the major groups(Payne & Kelly, 1980).

Several studies have reported that virions of baculoviruses are very similar in their basic protein properties(Harrap et al., 1977 ; Brown et al., 1977; Payne, 1974) but showed different profiles in different isolates. Hence, the identity and characterization of the protein component of the inclusion body of a virus is deemed necessary. The study was done to determine the amino acid contents of the granulosis virus of *M. frugalis* for its identity.

Purification of granular capsules of *M. frugalis* was done using the method of Im et al., 1986.

The purified capsules of the GV were freeze

dried and hydrolyzed with constant boiling of aqueous 6N HCl in a 110°C mechanical forced draft recirculating for 23 hours. Amino acids content of the virus capsules were determined using LKB amino acid analyzer Model 4400 at Department of Cereal Chemistry of the International Rice Research Institute. Concentrations of amino acids were recorded as moles percent.

Eighteen amino acids including calculated tryptophan were analyzed from the composition of *M. frugalis* granular capsules(Table 1). The virus had a very low quantities of histidine, cystine methionine, alanine, tyrosine and tryptophan. The quantities of tryptophan was calculated in the mole % from other

**Table 1.** Amino Acid Analysis of the Protein Acid Hydrolysate of *Mocis frugalis* Granulosis Virus.

Amino Acid	Mole % <sup>a</sup>
Lysine	5.4%
Histidine	2.7
Arginine	6.5
Aspartic acid	12.3
Threonine	6.6
Serine	5.3
Glutamic acid	11.7
Proline	5.5
Glycine	5.4
Alanine	4.7
1/2 cystine	0
Valine	7.5
Methionine	1.5
Isoleucine	6.1
Leucine	8.6
Tyrosine	3.1
Phenylalanine	5.6

<sup>a</sup> In the calculation of mole %, it was assumed that the sample contains 1.57 mole % of tryptophan(from literature).

<sup>1</sup> Entomology Division, Agricultural Sciences Institute, RDA, Suwon, Korea (水原市 西屯洞 農業技術研究所 昆虫科)

<sup>2</sup> Entomologist and Senior Research Assistant, Entomology Department, The International Rice Research Institute, Manila, Philippines

virus. They have less than 5% molecular weight. Aspartic acid and glutamic acid were the most abundant amino acids in granular virus comprising ca. 24% of each molecular weight. Other amino acids in relatively large amount were leucine, valine, arginine, threonine and isoleucine.

A common characteristic of baculoviridae had very similar composition of amino acid (Vlak and Rohrmann, 1985). The amino acid components of *M. frugalis* granulosis virus were similar to above results. These are equally rich in both strong basic amino acids (lysine and arginine) and strong acidic amino acids (aspartic acid and glutamic acid). However, the protein has net of acid character as indicated by the pH of 5.3~6.50.

#### LITERATURES CITED

1. Brown, D.A., H.M. Bud, and D.C. Kelly. 1977. Biophysical properties of the structural components of a granulosis virus isolated from the cabbage white butterfly (*Pieris brassicae*). *Virology* 81 : 317~327.
2. Harrap, K.A., C.C. Payne, and J.S. Robertson. 1977. The properties of three baculoviruses from closely related hosts. *Virology* 79 : 14~31.
3. Im, D.J., R.M. Aguada, and B. M. Shepard. 1986. A granulosis virus of the rice brown semi-looper, *Mocis frugalis*(Fab.) (Lep.: Noctuidae). *International Rice Research Newsletter*. Vol. 11(4) : 33.
4. Payne, C.C., and D.C. Kelly. 1981. Identification of insect and mite viruses. in "Microbial Control of Pests and Plant diseases 1970~1980." ed. H.D. Burges. pp.61~91. Academic Press, New York.
5. Vlak, J.M., and G.F. Rohrmann. 1985. The nature of polyhedrosis. In "Viral Insecticides for Biological Control." ed. K. Maramorosch and K.E. Sherman. pp.489~542. Academic Press. New York.