

Indian meal moth larvae succumb to granulosis disease due to serious damage to one of their major organs for storage of nutrients.

The above-cited products are equivalent to a technical grade of IMMGV. They are prepared without isolation of IMMGV and, as such, the MPCA which is the subject of the present petition consists, therefore, of IMMGV occlusion bodies (viral particles) and Indian meal moth larval parts mixed into a production larval diet containing wheat bran, brewer's yeast, vitamins, methyl paraben, and sorbic acid.

#### B. Toxicological Profile

The mode of action for IMMGV in its host, the larval stage of *P. interpunctella*, is pathogenic in nature. IMMGV produces granulosis disease in the larvae of *P. interpunctella*.

"Granulosis" disease is so named because cells in infected tissue sections, when observed under light microscopy, are full of minute, refractile bodies termed "granules." The initial signs of granulosis disease occur several days after larval ingestion of the viral occlusion bodies and consist of sluggishness and loss of appetite. These initial signs are followed by a change in the appearance of the larvae. They are normally light brown and semiluculent but when infected become opaque and white. This change is the result of the massive accumulation of viral occlusion bodies in the fat body of the infected larva. The fat body is the site of intermediary metabolism in these larvae and it is in the fat body that fat, protein, and glycogen are primarily stored. The pathogenicity of IMMGV to the larva results from the mode of viral release from cells of the fat body. As discussed above, this occurs by rupture of the cells of the fat body, thereby leading to degeneration and necrosis of the fat body and, ultimately, death of the infected larva.

The above-cited mode of action is distinct from a toxicity based mode of action. That is, unlike some microbial pest control agents which produce endo- or exo-toxins which act to kill the target pest, IMMGV produces no toxins as part of its mode of action.

1. *Hazard potential to mammals.* IMMGV poses no hazard potential to mammals via ingestion, dermal contact, or inhalation. There is no baculovirus (the type of virus which IMMGV is) known to infect or replicate in any vertebrate host. Among invertebrates, IMMGV itself has no known host other than larvae of *P. interpunctella* and has been shown not to cross-infect

lepidopteran or other insects other than *P. interpunctella*.

A number of studies on the toxicity of baculoviruses, inclusive of granulosis viruses, to animals have shown that these agents are non-toxic by the oral, dermal, inhalation, and injection routes of exposure and that no effects on overall health, gross or micro pathology, hematology, clinical chemistry, and antibody stimulation occur in test animals. These studies have been published in the open literature and were submitted as part of AgriVir, LLC's petition.

Cell culture studies (submitted by AgriVir as part of its submission) have shown that IMMGV which is actively infective and pathogenic to IMM larva does not produce cytotoxicity nor does it replicate in or produce pathogenicity in the following mammalian cell lines:

WI-38 (ATTC CCL 75: human lung (embryonic))

WS1 (ATTC CRL 1502: human endothelium (embryonic skin))

CV-1 (ATTC CCL 70: African green monkey, renal)

These cell culture studies further support the already established fact that IMMGV poses no hazard to mammals.

Due to the physical properties of the final product and of the bran carrier, the technical MPCA does have a mild to moderate, reversible eye irritation potential.

2. *Hazard potential to the environment.* The only potential environmental effect of IMMGV is on the population of Indian meal moths. This is because, as discussed above, IMMGV has no hosts other than larvae of the Indian meal moth and acts by a pathogenicity mechanism rather than a toxicity mechanism (i.e., IMMGV does produce any specific toxin). Since IMMGV is a naturally occurring virus which has naturally infected Indian meal moth larvae for at least decades and probably longer, its use on Indian meal moth larvae which may infest dried fruits and nuts and other stored commodities cannot reasonably be expected to endanger the Indian meal moth population as a whole.

Therefore, there are no reasonably anticipated or likely environmental effects of use of IMMGV for protection of agricultural commodities from Indian meal moth damage.

3. *Hazard potential to non-target species.* There is no hazard potential to non-target species. As above-noted, there is no baculovirus known to infect or replicate in any vertebrate host. Among invertebrates, IMMGV itself has no known host other than larvae of *P. interpunctella* and has been shown not

to cross-infect lepidopteran or other insects other than *P. interpunctella*.

#### C. Aggregate Exposure

1. *Dietary exposure—i. Food.* The levels of residues in treated commodities will be very low. The application rates for IMMGV are from 1 to 5 ounces of formulated (i.e., technical) MPCA per ton of commodity to be treated. Therefore, dietary exposure is insignificant.

ii. *Drinking water.* The proposed use patterns for IMMGV are for indoor food and non-food uses. Therefore, there is no potential for drinking water exposure associated with the approval of this petition.

2. *Non-dietary exposure.* IMMGV only has any pest control utility in the treatment of various commodities for control of Indian meal moth. Therefore, the only potential for non-dietary exposure is to applicators and to mixer/loaders who will use product containing IMMGV. These non-dietary exposures are not covered within FQPA and they are expected to be low. Information already in EPA's data bases which had been cited by AgriVir, LLC indicates that workers involved with baculovirus production and use do not experience adverse effects as a result of these exposures.

#### D. Cumulative Effects

Due to its mechanism of action and extremely limited host specificity, it can be reliably stated that IMMGV does not share a common mechanism of action with any other conventional, biochemical, or microbial pesticide.

#### E. Endocrine Effects

There is no reliable information to indicate that IMMGV has a potential to produce endocrine effects. The available studies suggest that IMMGV is essentially biologically inactive in any organism other than its natural host, the larva of the Indian meal moth.

#### F. Safety Determination

1. *U.S. population.* Since the available information reliably supports that IMMGV will not produce adverse effects in humans of any age as a result of exposure by ingestion, dermal contact, or inhalation, AgriVir, LLC concludes that there is a reasonable certainty that no harm to the general adult population will result from dietary exposure to residues which could occur as a result of approval of this petition.

2. *Infants and children.* Since the available information reliably supports that IMMGV will not produce adverse effects in humans of any age as a result of exposure by ingestion, dermal