

BioSciences have been reviewed by the Biopesticides and Pollution Prevention Division ("BPPD").

Toxicology data in support of the exemption from the requirement of a tolerance for *Bacillus subtilis* var. *amyloliquefaciens* strain FZB24 included studies with spores (technical) and with the formulated product (water dispersible powder) as follows:

1. *Acute toxicity and/or pathogenicity*—i. *Bacillus subtilis* var. *amyloliquefaciens* strain FZB24 Spores (Technical):

- *Acute oral toxicity/pathogenicity in rats*. "... does not appear to be toxic and/or pathogenic in rats when dosed at  $1.3 \times 10^8$  cfu." BPPD Review of Product Chemistry and Toxicity/Pathogenicity Data Submitted by Taensa, Inc., for the Registration of TAE-022 and TAE-022 WDG, which contains *Bacillus subtilis* var. *amyloliquefaciens* strain FZB24 (Submission No.: S559221; DP Barcode: 254584; Master Record Identification (MRID) No's.: 447581-01 through 447581-20) (hereinafter referred to as "BPPD Review - December 20, 1999").

- *Acute dermal toxicity/pathogenicity in rabbits*. "The severity of irritation persisted 72 hours, and slight irritation persisted for 10 days, and all resolved by day 11. No deaths observed. The acute lethal dose ( $LD_{50}$ ) is greater than 2,000 mg/kg ... Dermal Toxicity = Toxicity III." (BPPD Review - December 20, 1999).

- *Acute inhalation toxicity in rats*. "The inhalation  $LC_{50}$  for males, females, and combined was  $> 0.93$  mg/L. Toxicity Category III." (Submission No.: S616797; DP Barcode: 283473; MRID No's.: 456725-01 and 456725-02) (hereinafter referred to as "BPPD Review - April 25, 2002")

- *Acute pulmonary toxicity/pathogenicity in rats*. "... does not appear to be toxic and/or pathogenic in rats, when dosed at  $1.3 \times 10^8$  cfu/animal. No total clearance is seen from the lungs of treated test animals ... showed a distinct pattern of clearance from kidney, liver, and spleen." (BPPD Review - December 20, 1999).

- *Acute intravenous toxicity/pathogenicity in rats*. "... does not appear to be toxic and/or pathogenic in rats, when dosed at  $1.7 \times 10^8$  cfu/animal." (BPPD Review - December 20, 1999).

- *Primary eye irritation*. "... showed no signs of persistent irritation into day 21, when dosed at  $4.7 \times 10^{10}$  cfu/right eye/animal." (BPPD Review - December 20, 1999.) The December 20, 1999 BPPD review indicated Toxicity Category I, but was amended in a March 7, 2000 review to Toxicity Category II based on a comparison of test animals showing

similar recovery trends and leading to reversibility within 21 days. Addendum to Toxicity Category for TAE-022, which contains *Bacillus subtilis* var. *amyloliquefaciens* Strain FZB24 (Submission No.: S559221; DP Barcode: 254584; MRID No.: 447581-14).

- *Primary dermal irritation*. "... severity of irritations persisted  $> 72$  hours, but resolved by day 11. Dermal irritation = Toxicity II." (BPPD Review - December 20, 1999).

- *Hypersensitivity testing*. "Based on the submitted data ... does not appear to be a sensitizer when dosed at  $3.6 \times 10^{10}$  cfu." (BPPD Review - December 20, 1999).

- *Hypersensitivity incident reporting*. "No recorded or reported hypersensitivity reaction ... based on handling MCPA in lab control setting, equating to 55 person years. ..." (BPPD Review - December 20, 1999).

- *Immune response*. "There is no information to suggest that *Bacillus subtilis* var. *amyloliquefaciens* strain FZB24 has an effect on the immune system. The submitted toxicity/pathogenicity studies in rodents indicated that following several routes of exposure, the immune system is still intact and able to process and clear the active ingredient." (BPPD Review - December 20, 1999).

- *Potential health effects*. "Based on information given, there are no apparent negative effects ... Cited literature on *B. subtilis* indicate and/or support the development as a biological control. ..." (BPPD Review - December 20, 1999).

- *Growth parameters*. "... is shown to grow at all tested temperatures (e.g., 30, 34, 37, and 50 °C). The enumeration shows a low  $4.2 \times 10^{11}$  cfu/g at 37 °C to a high  $6.0 \times 10^{11}$  cfu/g at 34 °C." (BPPD Review - December 20, 1999).

- ii. *Bacillus subtilis* var. *amyloliquefaciens* strain FZB24 WDG (Formulation):

- *Acute oral  $LD_{50}$  toxicity in rats*. "Toxic/limit dose ... is greater than 2.8 g/kg body weight ( $6.7 \times 10^{10}$  cfu/kg). ... Toxicity Category III." (BPPD Review - December 20, 1999).

- *Acute dermal  $LD_{50}$  toxicity in rats*. "The severity of irritation persisted  $> 72$  hours, but resolved by day 11. No deaths observed. The acute dose ( $LD_{50}$ ) is greater than 2,000 mg/kg. ... Dermal irritation = Toxicity Category II; Dermal Toxicity = Toxicity Category III." (BPPD Review - December 20, 1999).

- *Acute inhalation lethal concentration ( $LC_{50}$ ) toxicity in rats (Formulation)*. "... an acute inhalation medium ( $LC_{50}$ ) in male and female rats is greater than 0.93 mg/L ... Toxicity Category III." (BPPD Review - April 25, 2002)

- *Primary eye irritation*. "No corneal opacity, and no signs of irritation by day 7, when dosed ... at  $3.6 \times 10^{10}$  cfu/right eye/animal. ... Toxicity Category III." (BPPD Review - December 20, 1999).

- *Hypersensitivity*. "Not a sensitizer when dosed at  $3.6 \times 10^{10}$  cfu. No hypersensitivity incidents have been reported." (BPPD Review - December 20, 1999).

Based on the data generated in accordance with the Tier I data requirements set forth in 40 CFR 158.740(c), the Tier II and Tier III data requirements were not triggered and, therefore, not required in connection with this action.

#### IV. Aggregate Exposures

In examining aggregate exposure, section 408 of the FFDCA directs EPA to consider available information concerning exposures from the pesticide residue in food and all other non-occupational exposures, including drinking water from ground water or surface water and exposure through pesticide use in gardens, lawns, or buildings (residential and other indoor uses).

##### A. Dietary Exposure

*Bacillus subtilis* var. *amyloliquefaciens* strain FZB24 is a naturally-occurring microorganism and widespread in the environment. The low toxicity and non-pathogenicity/infectivity of *Bacillus subtilis* var. *amyloliquefaciens* strain FZB24 is demonstrated by the data summarized in this action. The end-use (formulated) product will be applied to all agricultural commodities as a seed treatment and via incorporation, drenching, spraying, dipping, chemigation and hydroponics.

1. *Food*. While the proposed use pattern may result in dietary exposure with possible residues on all agricultural commodities, negligible risk is expected for the general population, as well as for infants and children. Submitted acute toxicology tests (MRID Numbers 447581-08, 447581-09, 447581-10, 447581-11, 447581-12, 447581-13, 447581-14, 447581-16, and 456725-02) demonstrate that based upon the use sites, use patterns, application method, use rates, low exposure, and minimal risk of toxicity, the potential risks from dietary exposure for both the general population and infants and children are considered low.

2. *Drinking water exposure*. Although *Bacillus subtilis* var. *amyloliquefaciens* strain FZB24 spores may be found naturally in water, it is not known as an aquatic bacterium, and therefore is not expected to proliferate in aquatic