Gamma aminobutyric acid (GABA) and L-Glutamic Acid (030802, 374350) Technical Document

Reason for Issuance: New Active Ingredient

Date Issued: August 1998

EPA Publication Number: EPA 730-F-98-019

1. Description of the Chemical

- **Generic Name(s)of the Active Ingredient(s):** Gamma aminobutyric Acid and L-Glutamic Acid
- **OPP Chemical Codes:** 030802 and 374350
- **Year of Initial Registration:** 1998
- **Pesticide Type:** Biochemical plant growth regulator
- **U.S. and Foreign Producers:** Auxein Corporation

2. Use Sites, Application Timing & Target Pests

Application of AuxiGro WP, the end-use product containing GABA and L-Glutamic Acid, enhances plant growth. AuxiGro WP may be used on beans, cole crops, green peppers, lettuce, peanuts, potatoes, spinach, tomatoes, lawn and turfgrasses, and ornamentals. Methods of application include both foliar and drench treatments.

3. Science Findings

A. Toxicololgy

Mammalian toxicology data requirements have been submitted and adequately satisfy requirements to support the unconditional registration of AuxiGro WP. The data which were submitted for this product indicated: an acute oral study (Tox Category IV), an acute dermal study (Tox Category IV), an acute inhalation study (Tox Category IV), a primary dermal irritation study (Tox Category IV), a primary eye irritation study (Tox Category III), and a dermal sensitization study (non-sensitizer). Data waivers accepted include mutagenicity, immunotoxicity, and genotoxicity.

B. Human Health Effects

a. **Acute and Chronic Dietary Risks for Sensitive Subpopulations, Particularly Infants and Children**

The two active ingredients of AuxiGro, L-Glutamic acid and gamma aminobutyric acid (GABA) are amino acids naturally present in plants and animals. Both compounds serve as brain neurotransmitters. L-Glutamatic acid is a major amino acid in most known plant and animal proteins; intake in a 70 kg human is estimated to be 10.4 g/day or 150 mg/kg/day. L-Glutamic acid is generally recognized as safe (GRAS) for human consumption. Mother's (human) milk contains small amounts of free L-Glutamic acid; one estimate of intake by newborns is 20.6 mg/kg/day of glutamate.

From the available acute, subchronic, and chronic studies in humans and animals, exposure to L-Glutamic acid and GABA would not provide any health risk. Based on the anticipated use of AuxiGro WP as a plant growth enhancer, exposure to its residues would not add significantly to the extent and variability from dietary intake of L-Glutamic acid and GABA from other sources. In addition, humans have the capacity to rapidly metabolize ingested L-glutamatic acid (the expected exposure route) to keep plasma levels constant. No adverse effects on neurological or hepatic function were observed in human adult males given up to 137 g of L-Glutamic acid daily for 14-41 days.

b. **Occupational Exposure and Risk Characterization**

Based on the application methods, the potential for dermal, eye, and inhalation exposure to AuxiGro WP exists for applicators and handlers. However, because of the low application rates and the lack of significant mammalian acute toxicity, no additional data are required at this time. Risks from occupational exposure will be mitigated by the appropriate precautionary labeling.

c. **Residential, School and Day Care Exposure and Risk Characterization**

There are no indoor residential, school or day care uses on the label. The proposed use pattern is for ornamental lawns and turf and for certain food crop uses. There is a potential for dermal exposure at these sites where children are present but the health risk is expected to be minimal to nonexistent based on evaluations of the toxicological data base, and the relatively low application rates.

d. **Drinking Water Exposure and Risk Characterization**

There is no expected increased human exposure to GABA and L-Glutamic acid in drinking water from the pesticidal use. It is possible that these natural materials could leach from the soil. When the end-use product is applied to plants, most of it is absorbed. But the potential exists for a minimal amount of it to enter ground water or other drinking water sources if, after application, weather patterns are such that significant rainfall and surface water runoff occur. However, the health risk to humans is considered negligible based on the summary of available toxicity studies, the low application rate of the active ingredient, and the prevalence of the active ingredients already in nature.

e. **Aggregate Exposure from Multiple Routes Including Dermal, Oral, and Inhalation**

Aggregate exposure is expected to occur in the mixer/loader/applicator subpopulations, via the dermal and inhalation routes. The risks that are associated with dermal and inhalation aggregate exposure are measured by the acute toxicity submitted to support registration. Because of the lack of significant adverse acute toxicity effects, the risks from aggregate exposure by the dermal and inhalation exposure are considered negligible.

f. **Cumulative Effects**

The active ingredients, GABA and L-Glutamic acid do not share any common mechanisms of toxicity (metabolic mechanisms) with other pesticidal compounds. The pesticidal use as a growth enhancer should not significantly increase exposure to naturally occurring sources of GABA and L-Glutamic acid. Therefore, no impact on the potential for toxic effects from the pesticidal use is expected.

g. **Effects on Immune and Endocrine Systems**

The Agency is not requiring information on the endocrine effects on these compounds at this time. Congress has allowed 3 years after August 3, 1996, for the Agency to implement a screening program with respect to endocrine effects. However, EPA has considered, among other relevant factors, available information concerning whether this biochemical compound may have an effect in humans similar to an effect produced by a naturally occurring estrogen or any other endocrine effects. The active ingredients have growth enhancement effects on plants, and their roles in humans are well established.

h. **Risks Posed by Occupational, Residential, School and Daycare Exposure**

There is no indoor residential, school or day care uses on the label. The proposed use pattern is for ornamental lawns and turf and for certain food crop uses. There is a potential for dermal exposure at these sites where children are present but the health risk is expected to be minimal to nonexistent based on evaluations of the toxicological data base, and the relatively low application rates.

C. Ecological Risks

Data have been submitted on freshwater fish and freshwater invertebrate for the end-use product. Data waivers were granted for avian acute oral toxicity, nontarget plant, avian dietary, and nontarget insects, based on the following rational: a) low acute toxicity in mammalian species, b) natural occurrence and lack of persistence in the environment, and c) natural occurrence in plants and ability to promote growth of numerous plant species. Additionally, L-Glutamic acid and GABA produced no toxic effects in terrestrial animals including humans, rats, and mice. The evidence suggests that doses of the compounds required to elicit toxicity would not likely be achieved by ingesting small amounts found in the environment from the end-use product.

Data were submitted on fresh-water fish and fresh-water invertebrates for the end-use product. These data suggest that AuxiGro WP is practically non-toxic to both freshwater fish and freshwater invertebrates (>100 mg/L).

4. Summary of Data Gaps

There are no data gaps.

5. Regulatory History

Exemptions from the requirement of a tolerances were approved for both GABA and L-Glutamic acid by the Director of the Office of Pesticide Programs on January 7,1998. The first, unconditional registration was issued on January 14,1998.

6. Registrant Information

7. Additional Contact Information

Ombudsman, Biopesticides and Pollution Prevention Division (7511P)
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