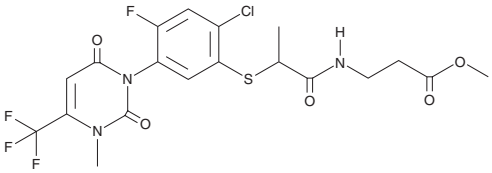
PRODUCT INFORMATION

Tiafenacil

Item No. 42290

CAS Registry No.: 1220411-29-9
Formal Name: N-[2-[[2-chloro-5-[3,6-dihydro-3-methyl-2,6-dioxo-4-(trifluoromethyl)-1(2H)-pyrimidinyl]-4-fluorophenyl]thio]-1-oxopropyl]-β-alanine, methyl ester
MF: $C_{19}H_{18}ClF_4N_3O_5S$
FW: 511.9
Purity: ≥98%
Supplied as: A solid
Storage: -20°C
Stability: ≥4 years



Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

Laboratory Procedures

Tiafenacil is supplied as a solid. A stock solution may be made by dissolving the tiafenacil in the solvent of choice, which should be purged with an inert gas. Tiafenacil is soluble (≥10 mg/ml) in ethanol. Tiafenacil is sparingly soluble (1-10 mg/ml) in DMSO.

Description

Tiafenacil is an herbicide.[1] It inhibits protoporphyrinogen IX oxidase (PPO; IC_{50} = 28 nM for the *A. thaliana* enzyme). Foliar application of tiafenacil (1 µM per day for seven days) induces death in velvetleaf (*A. theophrasti*), amaranth (*A. cruentus*), soybean (*G. max*), and rapeseed (*B. napus*) seedlings. It induces death in common lambsquarters (*C. giganteum*), kochia (*K. scoparia*), redroot pigweed (*A. retroflexus*), and green foxtail (*S. viridis*) in pre-plant field studies when applied at a concentration of 49.6 g/ha.[2] Tiafenacil is toxic to zebrafish (EC_{50} = 821.7 µg/L).[3] It induces hypoactivity, increases reactive oxygen species (ROS) levels, and decreases heart rate in zebrafish when used at a concentration of 10 µg/L. Formulations containing tiafenacil have been used for weed control in residential and agricultural areas.

References

1. Park, J., Ahn, Y.O., Nam, J.-W., *et al.* Biochemical and physiological mode of action of tiafenacil, a new protoporphyrinogen IX oxidase-inhibiting herbicide. *Pestic. Biochem. Physiol.* **152**, 38-44 (2018).
2. Montgomery, C.L.-M., Spackman, J.A., Schroeder, K.L., *et al.* Efficacy, crop response, and economics of alternatives to glyphosate for pre-plant weed control in small grains. *Agrosyst. Geosci. Environ.* **7(3)**, e20551 (2024).
3. Ivantsova, E., Konig, I., Lopez-Scarim, V., *et al.* Molecular and behavioral toxicity assessment of tiafenacil, a novel PPO-inhibiting herbicide, in zebrafish embryos/larvae. *Environ. Toxicol. Pharmacol.* **98:104084**, (2023).

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