

Development of a high-performance liquid chromatographic method for the separation of propiconazole stereoisomers

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Propiconazole is a systemic fungicide belonging to the triazole class, widely used in agriculture for the control of fungal diseases in plants, and is effective against rusts, powdery mildew, and leaf spot diseases. Its mechanism of action is based on the inhibition of ergosterol biosynthesis in fungal cells, leading to disruption of cell membrane integrity and suppression of pathogen growth.

Propiconazole is a chiral compound containing two asymmetric (chiral) carbon atoms and therefore exists in four stereoisomeric forms (two pairs of enantiomers). Technical-grade propiconazole is applied as a racemic mixture of these stereoisomers. Previous studies have shown that individual enantiomers may exhibit different biological activity, toxicity, and environmental behavior, making chirality an important factor in the evaluation of its effects.

In the present study, the stereoisomeric separation of propiconazole was investigated by high-performance liquid chromatography (HPLC). Using polysaccharide-based chiral stationary phases and various polar and nonpolar mobile phases, it was found that the best baseline separation of the stereoisomers was achieved on a Lux i-Amylose-3 (amylose tris(3-chloro-5-methylphenylcarbamate)) column with an ethanol–water mobile phase.

References

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