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[Image PDF (2556K)] [References]

Synthesis and Herbicidal Activity of 4-Thiazolone Derivatives and Their Effect on Plant Secretory Pathway

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In the course of study to develop new herbicidal compounds, we found that some 4-thiazolone derivatives possessed herbicidal activity against several paddy weeds. As a result of a structure-activity relation study, 5-(2-chloroethyl)-5-methyl-2-(3-methyl-2,3-dihydro-1,4-benzoxazin-4-yl)-4-thiazolone (CMT) was selected as one of the potential herbicides for rice. CMT showed potent herbicidal activity against paddy weeds, especially barnyardgrass (*Echinochloa oryzicola*) and three-square grass (*Scirpus juncoides*). The herbicidal activity of CMT appeared to be caused by specific inhibition in the growing tissues. Electron microscopic observations of CMT-treated barnyardgrass revealed that exposure to 10 μM CMT for 4 hr caused swelling of the endoplasmic reticulum (ER) and Golgi apparatus, the separation of plasma membranes from cell walls, and an accumulation of small vesicles in the plasma membrane-cell wall interspace. These findings suggest that CMT acts primarily as an inhibitor of the secretory pathway, resulting in a dysfunction of cell wall biosynthesis.

Keywords:
thiazolone derivatives, secretory system, herbicide, barnyardgrass, *Echinochloa oryzicola*

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