

Chloroacetamide Mode of Action, II:

Inhibition of Very Long Chain Fatty Acid Synthesis in Higher Plants

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In short-term-experiments [¹⁴C]-labelled malonic acid, stearic acid and acetate have been incorporated into leaf fatty acids of seedlings of *Cucumis sativus*, *Hordeum vulgare* and *Zea mays*. The pattern of labelled fatty acids changed markedly by treatment with the chloroacetamide herbicides metazachlor, metolachlor or butachlor. During a 2-h incubation time, 1 µM chloroacetamide specifically inhibited up to 100% the formation of the saturated very long chain fatty acids (VLCFAs) with a carbon number of 20, 22 and 24. In cucumber and barley a 50% inhibition of VLCFA formation is achieved with 10 to 100 nM metazachlor representing the most sensitive effect of inhibitors on fatty acid elongation reported as yet. Sensitivity of fatty acid elongation depends on the amide structure present in the compound and on its stereochemistry. Inhibition of oleic acid incorporation correlates with growth inhibition by chloroacetamides of the intact cell (comp. Pestic. Sci. **52**, 381–387, 1998). The present study extends this correlation to inhibition of VLCFA synthesis in higher plants. Obviously the primary mode of action of chloroacetamides and related herbicidal substances is involved in the enzymic four-step fatty acid elongation system.

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