

# Chloroacetamides Affect the Plasma Membrane

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In the present study membrane fatty acids were analyzed to find a link between the biosynthesis inhibition of very-long-chain fatty acids and the phytotoxic effects of herbicidal chloroacetamides. Accordingly, we have isolated membranes of cucumber seedlings (*Cucumis sativus*) by two-phase partitioning and analyzed their fatty acid content. Saturated VLCFAs ranging from C20 to C26 were found in high amounts (22%) in the plasma membrane fraction. Non-modified VLCFAs were predominantly present in phospholipids, while saturated 2-hydroxylated VLCFAs were identified in cerebrosides. Treatment of intact seedlings with chloroacetamides markedly reduced the VLCFA content in the plasma membrane. This result could be specified by fatty-acid labeling using [ $^{14}\text{C}$ ]malonate as a substrate for fatty acid elongation. *De novo* incorporation of VLCFAs into the plasma membrane and into microsomal membranes, respectively, was severely impaired by chloroacetamides with  $\text{I}_{50}$  values between 10 to 100 nM. These results confirm the previous finding that chloroacetamides inhibit VLCFA biosynthesis localized in the microsomes (Böger *et al.*, Pest Manage. Sci. **56**, 497–508, 2000). The direct consequence of this inhibition is a strong decrease of VLCFAs required as constituents of the plasma membrane and the substitution by shorter acyl chains. Apparently, physical properties and function of the plasma membrane are affected eventually leading to death of the plant.