

Fatty Acid Alteration of Plastidic and Extra-Plastidic Membrane Lipids in Metribuzin-Resistant Photoautotrophic *Chenopodium rubrum* Cells as Compared to Wild-Type Cells

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The fatty acid compositions of plastidic and extra-plastidic membrane lipids of two metribuzin-resistant cell lines L4 and L7 of *Chenopodium rubrum* were determined after growth in the absence and in the presence of the herbicide and compared with those of wild type cells. Fatty acid biosynthesis was markedly affected in all cell lines by metribuzin treatment. In the absence and in the presence of metribuzin alterations of the fatty acid composition of the various lipid classes were, as compared to wild type cells, generally lower in the highly resistant L4 cells than in the less resistant L7 cells. The two resistant cell lines demonstrated a higher degree of unsaturation within the plastidic monogalactosyldiacylglycerols (L4 cells also within plastidic digalactosyldiacylglycerols) and, particularly, within the predominantly extra-plastidic phosphatidylcholines (L7 cells also within the predominantly extra-plastidic phosphatidylethanolamines), whereas the degree of unsaturation was slightly altered in the plastidic phosphatidylglycerols. Within the two metribuzin-resistant cell lines, the highly resistant L4 cells differed from the less resistant L7 cells by increased α -linolenic acid/palmitic acid ratios in both the plastidic and extra-plastidic membrane lipids suggesting that particularly in L4 cells higher proportions of linolenate are formed as a result of selection pressure. On the other hand, the proportion of linoleate was increased predominantly in extra-plastidic membrane lipids of both L4 and L7 cells which explains a raise in linoleic acid/palmitic acid ratios in both cell lines as compared to wild-type cells. Moreover, in the absence of metribuzin decreased proportions of *trans*-3-hexadecenoic acid were found in phosphatidylglycerols of L4 and, particularly, of L7 cells as compared to the wild type cells. It is suggested that L4 and L7 cells – having multiple mutations in the *psbA* gene as observed earlier – are additionally characterized by increased degree of unsaturation of acyl moieties in various polar lipids, e.g. linoleoyl moieties in L4 and L7 cells as well as linolenoyl moieties particularly in highly resistant L4 cells. This increase gives rise to a change in membrane fluidity and may finally lead to increased metribuzin resistance.