The Possible Role of Hydroxylation in the Detoxification of Atrazine in Mature Vetiver (*Chrysopogon zizanioides* Nash) Grown in Hydroponics

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The resistance mechanism of vetiver (*Chrysopogon zizanioides*) to atrazine was investigated to evaluate its potential for phytoremediation of environment contaminated with the herbicide. Plants known to metabolise atrazine rely on hydroxylation mediated by benzoxazinones, conjugation catalyzed by glutathione-*S*-transferases and dealkylation probably mediated by cytochromes P450. All three possibilities were explored in mature vetiver grown in hydroponics during this research project. Here we report on the chemical role of benzoxazinones in the transformation of atrazine.

Fresh vetiver roots and leaves were cut to extract and study their content in benzoxazinones known to hydroxylate atrazine, such as 2,4-dihydroxy-2*H*-1,4-benzoxazin-3(4*H*)-one (DIBOA), 2,4-dihydroxy-7-methoxy-2*H*-1,4-benzoxazin-3(4*H*)-one (DIMBOA) and their mono- and di-glucosylated forms. Identification of benzoxazinones was performed by thin layer chromatography (TLC) and comparison of retention factors (Rf) and UV spectra with standards: although some products exhibited the same Rf as standards, UV spectra were different. Furthermore, *in vitro* hydroxylation of atrazine could not be detected in the presence of vetiver extracts. Finally, vetiver organs exposed to [^{14}C]-atrazine did not produce any significant amount of hydroxylated products, such as hydroxyatrazine (HATR), hydroxydeethylatrazine (HDEA), and hydroxy-deisopropylatrazine (HDIA). Altogether, these metabolic features suggest that hydroxylation was not a major metabolic pathway of atrazine in vetiver.

Key words: Vetiver, Benzoxazinones, Atrazine, Hydroxylation