Detoxification of Herbicides in Phragmites australis

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Unintentional loss of herbicides into drainage ditches, shores or other waterbodies may cause large problems in farmland. Therefore strategies for the phytoremediation of agrochemicals and especially herbicides have become a topic of great interest in many agricultural areas. However, in order to establish effective biological pollution control, information on the detoxification capacity of riparian plants and aquatic macrophytes (e.g., Phragmites australis) is important to build up effective buffer stripes. We determined the detoxification capacity of Phragmites australis roots and leaves for the conjugation of agrochemicals to glutathione by assaying the model substrate CDNB as well as the herbicides fenoxaprop-P, propachlor, pethoxamid and terbuthylazine. Specific GST activities were always higher in the rhizomes (6.78 ± 0.88 µkat/mg protein for CDNB) than in leaves (1.08 ± 0.21 µkat/mg protein). The detoxification capacity is distributed across an array of GST isoforms. In summary, Phragmites australis seems to be efficient in herbicide detoxification and a good candidate for phytoremediation of effluents from agricultural sites.

Key words: Glutathione Conjugation, Phytoremediation, Enzyme Induction