

Biomass-Based Monitoring of Heavy Metals

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New developments in biotechnology provide for heavy metal removal and monitoring. Hyper-accumulating plants such as *Thlaspi caerulescens* express genes amplifying heavy metal absorption and detoxification. These small plants are not practical for large-scale remediation. Current technology allows gene transfer and expression into high-biomass plants such as *Populus*. This would be beneficial since *Populus* has silvicultural systems for establishment, culture, protection, and harvest. Furthermore, *Populus* can be transformed into a real-time monitoring system by fusing heavy metal proteins with fluorescent proteins (FP). Metal concentration would be detected through FP-produced light changes measured by an optical sensor. Subsequently geographical positioning (GPS)/ global system for mobile communication (GSM) technology can be used to transfer this information to a central location for monitoring.