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HORIZONTAL GENE TRANFER FROM TRANSGENIC PLANTS TO BACTERIA IN SOIL MICROCOSMS

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Genetic modification of crops has enabled plant breeders to modify plants to overcome important problems of modern agriculture. Bacterial antibiotic resistance genes are still frequently used as markers in transgenic plants. Due to the problems caused by antibiotic-resistant pathogens, the use of antibiotic resistance genes in transgenic plants is under debate. In general, the use of GMO has raised concerns about the transfer of heterologous DNA to indigenous microorganisms. It is hypothesized that the introduction of bacterial genes into plant genomes leads to a higher probability of gene transfer from plant to bacteria due to the presence of homologous sequences.

Natural transformation is a mechanism capable of mediating such transfer in soil. Bacterial DNA adsorbed to soil particles was able to persist in soil and to transform competent bacteria; the persistence of plant DNA in soil has been observed. However, until now, there has been a lack of clear evidence that successful gene transfer from plants to bacteria can occur. Soil microcosms were used to study the transformation of *A. tumefaciens* and soil microorganisms. The transforming DNA, with an inserted gene cassette conferring resistance to CMV and to kanamicin, was obtained from tomato plants genetically modified via *Agrobacterium*. Transformation occurred in *Agrobacterium* competent cells, in sterile soil implemented with competent hosts and in non-sterile soil microcosm although at low frequencies (10^{-1}-10^{-1} cfu/? g DNA). Transformation was also detected in non-sterile soil by using plant homogenates or by letting roots rot for 2 years. The identification of transformants was based on growth on selective media; molecular confirmation by PCR and/or hybridization of randomly picked colonies is in progress.

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