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Yeast transcriptional activator MSN1 promotes sulfur uptake and Cr tolerance in transgenic tobacco

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Objective

To augment higher plant metal accumulation, the yeast MSN1 was introduced into tobacco plants. The *MSN1* gene expression, sulfur and Cr accumulation and Cr tolerance were determined.

Materials and Methods

1. Plant materials: *Nicotiana tabacum* (SR1)
2. Methods: Agrobacterium-mediated transformation, northern blot, metal tolerance and accumulation test

Results and Discussion

MSN1 is a transcriptional activator that promotes chromium (Cr) accumulation in yeast. To augment higher plant metal accumulation, the yeast MSN1 was introduced into tobacco plants. The *MSN1* gene expression, sulfur and Cr accumulation and Cr tolerance were determined. To confirm transformation, kanamycin-resistant plants were subjected to northern blot analysis. In accordance with high mRNA levels of *MSN1*, transformants accumulated up to three times more sulfur in transgenic versus non-transgenic tobacco plants. But, transgenic plants grown in medium applied with Cr contained as the Cr content as that of the control plants except for the case of pJD301-*MSN1*-6 line. Unlike previous reports featuring *MSN1* over-expression in yeast, *MSN1* transgenic plants displayed tolerance to Cr. Using this transgenic approach, yeast *MSN1* expression contributed to sulfur accumulation and Cr tolerance. This strategy could be incorporated into plants designed for enhanced accumulation of selenium.

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