

Transgenic Carrots: Potential Source of Edible Vaccines

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Transgenic plants have a high scientific and economical potential for the production of foreign proteins of biomedical importance. Since the early 1990s it has been shown that transgenic plants could express viral and bacterial antigens with preservation of their immunogenic properties. Such plants could therefore serve as an inexpensive alternative for the production of vaccines against infectious diseases of world-wide importance, e.g. hepatitis B. Moreover, transgenic plants expressing sufficient levels of antigens bear the potential of oral delivery of antigenic proteins as edible vaccines, if the antigen is resistant against the gastric passage.

Recently we reported the production of small surface antigen of HBV (SHBs) in transgenic carrots (Imani et al. 2002). Production levels of SHBs antigen in carrot, tobacco, tomato, banana and other plants were compared. Expression of SHBs was reported to be rather low at 25 ng/g f.w. in carrot (Sunil Kumar et al., 2007).

Optimization of transformation and protein extraction techniques in our lab followed by screening of several transgenic cell lines revealed significant differences in expression levels of proteins of interest. This helped to increase the concentration of SHBs protein up to 15 µg/g in carrots (PhD thesis of H. Lorenz, 2006). Thus, transgenic carrots may have a high potential for the production of different oral vaccines.

References:

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