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Functional characterization of an invertase inhibitor gene involved in sucrose metabolism in tomato fruit

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Key words: Invertase inhibitor, Fruit development, Overexpression, Transient transformation system, *Solanum lycopersicum*

Research Summary

In this study, we produced tomato plants overexpressing an invertase inhibitor gene from tomato, Sly-*INH*, using a simple and efficient transient transformation system.

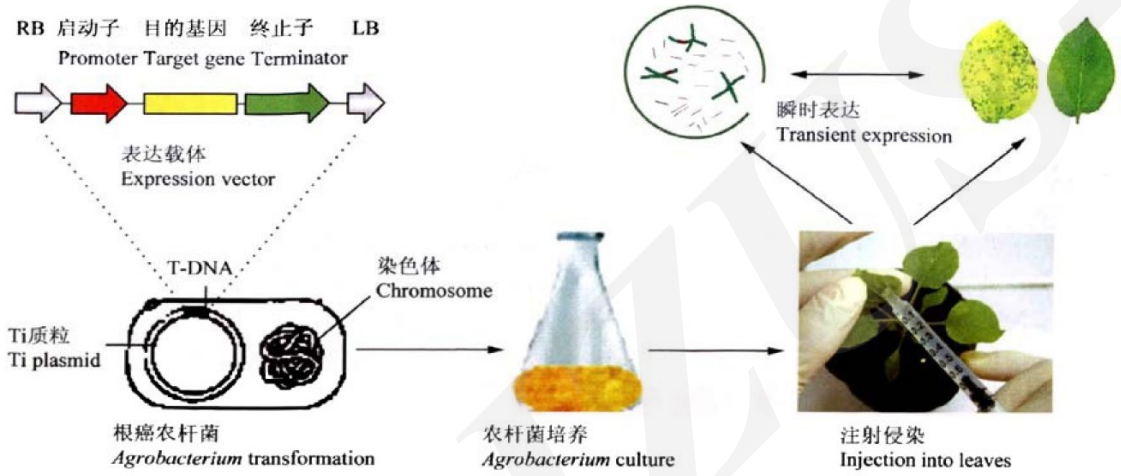


Figure. Scheme of agroinfiltration-mediated technique procedure



Figure. Injection of *Agrobacterium* cultures through the fruit stylar apex.

Innovation points

1、The expression of Sly-INH increased significantly at 3 d after injection; Sly-INH inhibited the activity of cell wall invertase (CWIN), which increased sugar accumulation in tomato fruit.

2、Sly-INH mediated sucrose metabolism by regulating CWIN activity.

3、Invertase activity is potentially regulated by the Sly-INH inhibitor at the post-translational level.

4、Transient transformation system is an effective method for determining the functions of genes in tomato.

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Innovation points

A series of comprehensive figures were generated to summarize the latest knowledge about Sly-*INH* gene.

- **Fig.1 Relative expression levels of Sly-*INH* in different parts of Micro-Tom tomato fruits**
- **Fig.2 Activities of invertase in different parts of Micro-Tom tomato fruits**
- **Fig.3 Activities of sucrose synthase (SS), and sucrose phosphate synthase (SPS) in different parts of Micro-Tom tomato fruits**
- **Fig.4 Relative expression levels of cell wall invertase gene families in different parts of Micro-Tom tomato fruits**
- **Fig.5 Relative expression levels of vacuolar invertase TIV1**
- **Fig.6 Carbohydrates content in different parts of Micro-Tom tomato fruits**