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Biotransformation of ferulic acid to vanillin and capsaicin in suspension cell cultures of *Capsicum annuum*

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Objective

Vanillin is the major component of natural vanilla, which is one of the most widely used and important flavouring materials worldwide. Vanillin occurs as intermediate in the catabolism of eugenol, ferulic acid and lignin, these compounds are potential substrates for biotransformation processes. Since vanillin shares the same biosynthetic route involving phenylpropanoids in *C. annuum*, it was interesting to study the biotransformation of ferulic acid to vanillin. Therefore we investigated the biotransformation capability of ferulic acid to vanillin and capsaicin in suspension culture of *C. annuum*.

Material and Methods

The cell suspension cultures of *C. annuum* P1482 were performed by inoculating 1 g F.W callus into 30 ml MS liquid medium supplemented with sucrose (30 g/L) and 2,4-D (2 mg/L). The suspension cultures cultured for 2 weeks have treated with 0.6, 1.25 and 2.5 mM ferulic acid, respectively. The cells and cultured medium were extracted, the contents of these compounds were analyzed by HPLC.

Results and Discussion

The exogenously fed ferulic acid was converted to vanillin and vanillic acid in suspension cell culture of *Capsicum annuum*. Maximum accumulation of vanillin and vanillic acid were reached up to 6 times and 2 times compare to the control and in 0.6 mM ferulic acid fed cultures for four days, respectively. Also, the production of capsaicin, further metabolite from vanillin, increased up to 10 times in cultures fed with 0.6 mM ferulic acid. In cultured medium, accumulation of vanillin and capsaicin was maximal in 1.25 and 0.6 mM fed cultures, respectively, but lower than those in cell.

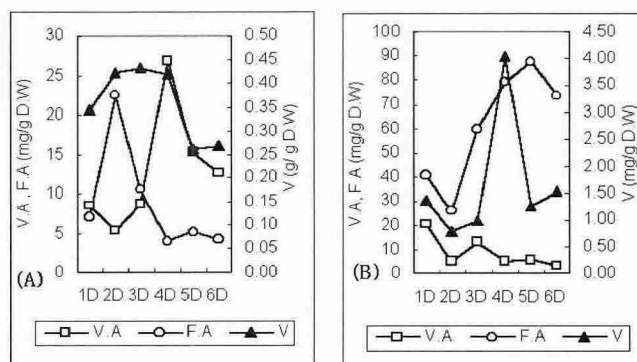


Fig. 1. Bioconversion of ferulic acid to vanillin and vanillic acid. (A):control, (B):0.6 mM ferulic acid feeding, V.A:vanillic acid, F.A: ferulic acid, V:vanillin

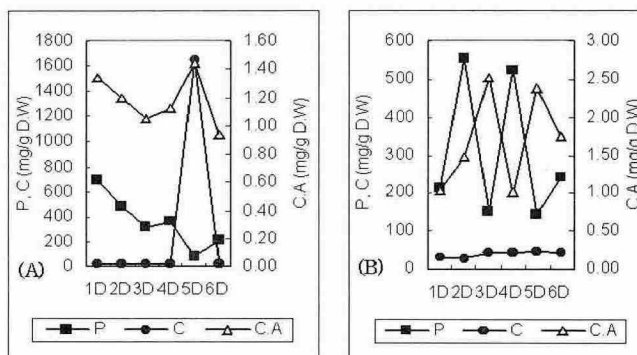


Fig. 2. Bioconversion of ferulic acid to capsaicin and the change pattern of intermediate. (A):control, (B):0.6 mM ferulic acid feeding C: capsaicin, C.A:cinnamic acid, P: phenylalanine

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