

# Kaurenolides and fujenoic acids are side products of the gibberellin P450-1 monooxygenase in *Gibberella fujikuroi*

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The steps involved in kaurenolide and fujenoic acids biosynthesis, from ent-kauradienoic acid and ent-6 $\beta$ ,7 $\beta$ -dihydroxykaurenoic acid, respectively, are demonstrated in the gibberellin (GA)-deficient *Gibberella fujikuroi* mutant SG139, which lacks the entire GA-biosynthesis gene cluster, complemented with the P450-1 gene of GA biosynthesis (SG139-P450-1). ent-[2H]Kauradienoic acid was efficiently converted into 7 $\beta$ -hydroxy[2H]kaurenolide and 7 $\beta$ ,18-dihydroxy[2H]kaurenolide by the cultures while 7 $\beta$ -hydroxy[2H]kaurenolide was transformed into 7 $\beta$ ,18-dihydroxy[2H]kaurenolide. The limiting step was found to be hydroxylation at C-18. In addition, SG139-P450-1 transformed ent-6 $\beta$ ,7 $\beta$ -dihydroxy[14C4]kaurenoic acid into [14C 4]fujenoic acid and [14C4]fujenoic triacid. Fujenal was also converted into the same products but was demonstrated not to be an intermediate in this sequence. All the above reactions were absent in the mutant SG139 and were suppressed in the wild-type strain ACC917 by disrupt