

Seminar



Polyketide reductases in *Gerbera hybrida*

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The ornamental plant gerbera produces in all aerial parts of the plant abundant amounts of two bitter tasting glucosidic lactones, gerberin and parasorboside. Biosynthesis of these compounds takes place through the acetate-malonate pathway with acetyl-CoA acting as the starter, and catalyzed by the chalcone synthase-like polyketide synthase GERBERA 2-PYRONE SYNTHASE 1 (G2PS1). In vitro, the resulting triketide folds into triacetic acid lactone (TAL), from which gerberin and parasorboside aglycones could be derived after one and two reduction steps, respectively. Genes encoding putative reductases of the pathway were identified based on correlated expression with G2PS1. His-tagged enzymes were produced and purified in *Nicotiana benthamiana* after agroinfiltration. However, none of the reductase candidates, or a gerbera protein extract, could reduce TAL in the presence of NADPH. Based on 6-methylsalicylic acid biosynthesis in the fungus *Penicillium patulum*, we hypothesized that the substrate for the reductases might be the linear triketide CoA thioester, before it lactonizes. A key in identifying the reductases in the gerberin and parasorboside biosynthesis pathway was coming across with a substrate analog, a methyl ether of the triketide intermediate (methyl 3,5-dioxohexanoate), with which the reductase candidates readily reacted.

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SAN MICHELE ALL'ADIGE