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Roots of *Rubia tinctorum* and *Morinda citrifolia* are used to study the role of cellular differentiation in anthraquinone biosynthesis. Root cultures of *Rubia* and *Morinda* transformed with *Agrobacterium rhizogenes* have been established and they provide a structured *in vitro* system that will be used to relate the biochemical events to processes in the intact plant. Anthraquinone accumulation was quantified and the distribution in the root tissue was studied. The localization of anthraquinones at the (sub)cellular level was determined with confocal laser scanning microscopy. Cell suspension cultures of *Rubia* and *Morinda* which are inducible by changes in the composition of the medium were studied for comparison. These cell cultures are also well suited to investigate the effects of rapid anthraquinone accumulation on cellular metabolism.

Future studies will focus on immunolocalization of the important key enzymes of the shikimate pathway and of anthraquinone biosynthesis, in an attempt to specify the cell types in which this biochemical process occurs.

**Effects of Glyphosate on Cell Suspensions of Morinda citrifolia**

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One important question in secondary metabolite research is how plants divide available resources over primary and secondary metabolic routes. Many biosynthetic routes have several branching points where precursor molecules are channelled either into secondary routes or remain in primary pathways. Secondary metabolites known as anthraquinones. In the Rubiaceae, anthraquinones are synthesized via the shikimate-o-succinylbenzoic acid pathway. One important step in this pathway is the conversion of chorismate into isochorismate, a reaction catalyzed by the enzyme isochorismate synthase. This reaction is the branch-point of anthraquinone biosynthesis and the primary shikimate pathway and is therefore a potential site for regulation of flow into secondary metabolism. We investigate whether this enzymatic conversion is indeed a rate-limiting step in the biosynthesis of anthraquinones.

Elicitation with a fungal extract resulted in a substantial increase in anthraquinone production, which is preceded by a large rise in isochorismate synthase activity. Application of inhibitors of translation or transcription annihilates the effect of elicitation on isochorismate activity and anthraquinone production. These results indicate that elicitation requires *de novo* RNA synthesis.

Partial purification revealed the presence of at least two isoenzymes. Native PAGE showed a molecular weight of about 95 kD for both enzymes. The