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**Maize Tricin-Oligolignol Metabolites and their Implications for Monocot Lignification**

Tricin-oligolignol maize metabolites validate combinatorial lignification and the incorporation of tricin into monocot lignins.

**The Science**

This study aimed to elucidate the incorporation pathways of tricin into maize lignin by applying liquid chromatography-mass spectrometry-based tools developed for oligolignol profiling. Twelve tricin-containing products (each with up to eight isomers) were observed and authenticated by comparisons with a set of synthetic tricin-oligolignol dimeric and trimeric compounds.

**The Impact**

The variety of structures extracted from maize and implicated by mass spectrometric analysis, and then in many cases authenticated via synthesis of genuine compounds, is not only evidence for tricin’s role in lignification but additionally provides compelling support for the combinatorial nature of the lignification process itself. Furthermore, incorporation of tricin into monocot lignins provides a new, extractable source of this valuable chemical, recognized for its antioxidant, antiaging, anticancer, and cardio-protective properties.

**Summary**

Lignin is an abundant aromatic plant cell wall polymer consisting of phenylpropanoid units in which the aromatic rings display varying degrees of methoxylation. A previously unknown lignin component, tricin, a phenolic from another pathway entirely, was recently established as a true lignin monomer in grasses. To elucidate the incorporation pathways of tricin into grass lignin, the metabolites of maize were extracted from lignifying tissues and profiled using a recently developed algorithm applied to Ultra-High-Performance Liquid Chromatography and Fourier Transform-Ion Cyclotron Resonance-Mass Spectrometry. Twelve tricin-containing products (each with up to eight isomers), including those derived from various monolignol acetate and *p*-coumarate conjugates, were observed and authenticated by comparison with a set of synthetic tricin-oligolignol dimeric and trimeric compounds. The identification of such compounds helps establish that tricin is an important monomer in the lignification of monocots, acting as a nucleation site for starting lignin chains. The array of tricin-containing products provides further evidence for the combinatorial coupling model of general lignification and supports evolving paradigms for the unique nature of lignification in monocots.

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**Publications**

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**Related Links**

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