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Nota di contenuto	Chapter 1. Hairy Roots Biotechnology Unzipped: A Journey of Reality and Promises -- Chapter 2. Hairy Roots as a Source of Tropane Alkaloids -- Chapter 3. Induction, Metabolite Analysis and Transgenesis of Hairy Roots From Coleus Forskohlii -- Chapter 4. Establishment of Hairy Roots of Endangered Himalayan Plantswertia chirata: A Sustainable Alternative to Extraction from Nature -- Chapter 5. A Protocol for the Selection of Spontaneous Variants From Established Catharanthus roseus Hairy Root Cultures -- Chapter 6. Strategies for the Optimization of Culture Conditions for Increasing Metabolite Production Through Hairy Root Cultures. Monoterpenoid Indole Alkaloid Production in Catharanthus Roseus Hairy Roots -- Chapter 7. Protocol for Enhanced Withaferin-a Production in Elicited Withania Somnifera (L.) Dunal Hairy Root Cultures -- Chapter 8. Establishment of Hairy Root Cultures of Pentalinonandrieuxii for the Production of Betulinic Acid -- Chapter 9. Tropane Alkaloid Production by the Establishment Of Hairy Root Cultures of Brugmansia Candida

and Elicitation -- Chapter 10. Elicitation as an Essential Strategy For Enhancing Anthraquinone Accumulation In Hairy Root Cultures of *Rubia Tinctorum* -- Chapter 11. Establishment of Hairy Root Cultures for the Production of Biopharmaceuticals and Optimization of Methods for Recombinant Protein Secretion In The Culture Medium -- Chapter 12. An Improved Protocol for *Agrobacterium Rhizogenes*-Mediated Transformation of Recalcitrant Plants for Root Biology Studies: A Case Study of Tea Plants (*Camellia Sinensis* Var. *Sinensis*) -- Chapter 13 Functional Analysis of Plant Genes Related to Arbuscular Mycorrhiza Symbiosis Using *Agrobacterium Rhizogenes*-Mediated Root Transformation and Hairy Root Production -- Chapter 14. Functional Characterization of Genes Involved in Legume Nodulation Using Hairy Root Cultures -- Chapter 15. Fluidigm Biomark Diagnostic Panel for Analysis of the Expression of *Nicotiana Tabacum* Genes, Associated with Alkaloid Synthesis. .

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#### Sommario/riassunto

The book discusses the various methods and protocols available in hairy root culture-based research. The utilization of *Agrobacterium* mediated genetic transformation and establishment of hairy root cultures has paved the way for large-scale secondary metabolite production in medicinal plants. Presenting recent research and offering insights from eminent research groups, the book covers a range of topics related to hairy root-based applications, including (i) establishment of hairy roots and native production of SM (ii) yield enhancement strategies for increased SM production, like elicitation (iii) hairy roots as a tool for value-added applications such as plant-microbe interaction, characterization of plant genes and root biology studies. As such it is an informative guide and experimental manual for researchers in diverse fields of plant biology.

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