Preface

Humans depend on plants not only for food and oxygen but also for medicines, energy, fiber, and building materials. Plant secondary metabolites, in particular, are at center stage as a major source of pharmaceuticals, products for the chemical and food industry, agrochemicals, and special biofuels. Proper manipulation of plant physiology and molecular biology, by means of an array of biotechnological strategies, can promote large gains in yield of desired products. In this book, up-to-date representative methods for improved production of secondary metabolites of economic interest are described in detail, along with tips to avoid common pitfalls in these approaches. An effort was made to include examples applied to the production of different secondary metabolite classes, using field and laboratory methods, whole-plant and cell/organ culture systems, as well as environmental and genetic transformation-based modulation of biochemical pathways. In agreement with current trends in plant secondary metabolism research, a focus was given on cell and tissue specific metabolism, metabolite transport, microRNA-based technology, heterologous systems expression of enzymes and pathways leading to products of interest, as well as applications using both model and non-model plant species. It is our expectation that this volume may aid scientists of interdisciplinary fields (plant science, plant physiology, pharmacy, molecular biology, biochemistry, bioengineering, and forestry) in reaching the major goal of producing fine plant biochemicals in sustainable and efficient fashion, in order to minimize impacts to the environment and provide the required quantities of these commodities to industry.

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