Book Review

Biology and Biotechnology of the plant hormone ethylene II

A.K. Kanellis, C. Chang, H. Klee, A.B. Bleecker, J.C. Pech, D. Grierson (Eds.), Kluwer Academic Publishers, Dordrecht, The Netherlands; ISBN 0-7923-5941-0; Price: 177.00/US$ 207.00/GB£ 129.00

The major role the plant hormone ethylene plays in a variety of plant developmental processes has made it the focus of intense research during recent decades. Moreover, this simple gaseous molecule with great biological effect gained significant commercial importance because of its well-established role in triggering and controlling fruit ripening and flower senescence. These combined scientific and applied interests gave rise to intensive investigations making ethylene the best understood among all plant hormones. Indeed, genes encoding enzymes of the ethylene biosynthetic pathway have been well characterized and genetically engineered plants with altered expression of these genes are now being commercialized. More recently, spectacular progress has been made towards understanding the mechanism of ethylene perception and signal transduction. Thanks to molecular genetics approaches, ethylene is the first plant hormone for which a receptor has been isolated and a number of down-stream components of the ethylene signaling pathway have been now identified. The main steps that led to these major breakthrough, as well as main future prospects in this field, were presented at the last international ethylene symposium held in Santorini Greece (September 1998) and are now compiled in this book.

The book is organised in seven chapters covering all aspects of ethylene research from basic to technological and applied topics. Each chapter consists of selected contributions written by scientists that significantly contributed to the recent advances in the field. The first chapter deals with the biochemical aspects of ethylene production with a main focus on the mechanism of synthesis of the hormone precursor, 1-aminocyclopropane-1-carboxylic acid (ACC), by ACC synthase and its subsequent conversion into ethylene by ACC oxidase. The second chapter describes the latest advances in ethylene perception and signaling in higher plants. This exciting section provides in particular a detailed genetic and biochemical characterization of the ethylene receptor proteins which are encoded by a multigene family whose members are shown to display complex spatial and temporal patterns of expression. The following chapter is dedicated to the control mechanisms by which ethylene regulates fruit development and ripening. The use of ethylene-suppressed transgenic plants, enabled to discriminate between ethylene-dependent and independent aspects of the ripening processes of climacteric fruit. The molecular and genetic characterization of many tomato ripening-mutants brought new insights on the role of these loci in regulating fruit development. Moreover, the good progress achieved towards cloning the *rin* and *nor* genes is likely to represent an important breakthrough in the near future. The chapter on ethylene and senescence of plant organs addresses the role of ethylene in flower and fruit abscission. Stress ethylene is covered in an independent chapter that includes contributions on stresses caused by biotic (pathogenes) and abiotic (flooding, ozone, heavy metals…) factors. The two last chapters of this book are dedicated to the biotechnological control of ethylene and other applied aspects. Various examples are described of genetically engineered plants that show successful control of fruit ripening or flower senescence through the control of either ethylene synthesis or action.

In summary, this book gives a broad insight on our present knowledge of the biology and biotechnology of the plant hormone ethylene, as well as the main orientations for future research. Each contribution is enriched by a very helpful introduction and an impressive number of references related to the subject. Because it covers from basic research to applied technology and biotechnology, this book provides a valuable source of information for both scientists specialized in the field and graduate students interested in more general aspects of the plant hormone ethylene.

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Control of Ethylene Responses at the Receptor Level. Edward C Sisler, Margrethe Serek. Published: 1 January 1999. by Springer Science and Business Media LLC. in Biology and Biotechnology of the Plant Hormone Ethylene II. References: 11, Cited by 2. Biology and Biotechnology of the Plant Hormone Ethylene II pp 45-50; doi:10.1007/978-94-011-4453-7_10. Publisher Website. Full-Text.Â Ethylene as the Initiator of the Inter-Tissue Signalling and Gene Expression Cascades in Ripening and Abscission of Oil Palm Fruit. J. Henderson, D. J. Osborne. Published: 1 January 1999. by Springer Science and Business Media LLC. in Biology and Biotechnology of the Plant Hormone Ethylene II. References: 7. All the plant hormones including ethylene regulate ethylene production at the level of ethylene synthesis. Auxin promotes ethylene production by inducing the production of ACC synthase, resulting in an increased level of ACC, eventually leading to an increase in ethylene production.Â Ethylene exposure in plants causes downward growth of the petioles, termed epinasty which seems to result from a redistribution of auxin in response to ethylene treatment. Increased growth in the upper part of the petioles causes increased growth in that region resulting in a downward bending of the petiole.Â (ii) Ethylene and Regulation of Gene Expression: It has been observed that the expression of various target genes is altered by ethylene. Ethylene (CH2=CH2) is an unsaturated hydrocarbon gas (alkene) acting naturally as a plant hormone. It acts at trace levels throughout the life of the plant by stimulating or regulating the ripening of fruit, the opening of flowers, the abscission (or shedding) of leaves and, in aquatic and semi-aquatic species, promoting the 'escape' from submergence by means of rapid elongation of stems or leaves. This escape response is particularly important in rice farming. Commercial fruit-ripening rooms use Ethylene in Plant Biology, Second Edition provides a definitive survey of what is currently known about this structurally simplest of all plant growth regulators. This volume contains all new material plus a bibliographic guide to the complete literature of this field. Progress in molecular biology and biotechnology as well as biochemistry, plant physiology, development, regulation, and environmental aspects is covered in nine chapters co-authored by three eminent authorities in plant ethylene research. This volume is the modern text reference for all researchers and students of ethylene in pl...Â Ethylene Analysis and Properties of the Gas. The Biosynthesis of Ethylene. Start by marking â€œBiology and Biotechnology of the Plant Hormone Ethylene IIâ€ as Want to Read: Want to Read savingâ€¦ Want to Read.Â The inflorescence of the monoecious maize plant is unique among the Gramineae in the sharp separation of the male and female structures. The male tassel at the terminus of the plant most often sheds pollen before the visual appearance of the receptive silks of th the female ear at a lateral bud, normally at the 10 leaf [l]. Earlier studies examined the ontogeny of the grow The inflorescence of the monoecious maize plant is unique among the Gramineae in the sharp separation of the male.