# Contents

*Preface* .......................................................... v
*Contributors* ..................................................... ix

## Part I  Analysis of Ethylene Biosynthesis

1. Gas Chromatography-Based Ethylene Measurement of Arabidopsis Seedlings ........................................... Gyeong Mee Yoon and Yi-Chun Chen 3
2. Plant Ethylene Detection Using Laser-Based Photo-Acoustic Spectroscopy .............................................. Bram Van de Poel and Dominique Van Der Straeten 11
3. Treatment of Plants with Gaseous Ethylene and Gaseous Inhibitors of Ethylene Action .......................... Mark L. Tucker, Joonyup Kim, and Chi-Kuang Wen 27
4. Analysis of 1-Aminocyclopropane-1-Carboxylic Acid Uptake Using a Protoplast System .................. Won-Yong Song, Sumin Lee, and Moon-Soo Soh 41
5. *Escherichia coli*-Based Expression and In Vitro Activity Assay of 1-Aminocyclopropane-1-Carboxylate (ACC) Synthase and ACC Oxidase .......................... Shigeru Satoh and Yusuke Kosugi 47
6. Assay Methods for ACS Activity and ACS Phosphorylation by MAP Kinases In Vitro and In Vivo .................. Xiaomin Han, Guojing Li, and Shuqun Zhang 59

## Part II  Analysis of the Ethylene Signaling Pathway

7. Analysis of Ethylene Receptors: Ethylene-Binding Assays .............................................................. Brad M. Binder and G. Eric Schaller 75
8. Analysis of Ethylene Receptors: Assay for Histidine Kinase Activity .................................................... G. Eric Schaller and Brad M. Binder 87
10. Localization of the Ethylene-Receptor Signaling Complex to the Endoplasmic Reticulum: Analysis by Two-Phase Partitioning and Density-Gradient Centrifugation .................................................. G. Eric Schaller 113
11. Kinase Assay for CONSTITUTIVE TRIPLE RESPONSE 1 (CTR1) in *Arabidopsis thaliana* ........................................ Han Yong Lee and Gyeong Mee Yoon 133
12 Circular Dichroism and Fluorescence Spectroscopy to Study Protein Structure and Protein–Protein Interactions in Ethylene Signaling ........... 141
Mareike Kessenbrock and Georg Groth

PART III ANALYSIS OF ETHYLENE RESPONSES

13 The Triple Response Assay and Its Use to Characterize Ethylene Mutants in Arabidopsis ........................................ 163
Catharina Merchante and Anna N. Stepanova

14 Time-Lapse Imaging to Examine the Growth Kinetics of Arabidopsis Seedlings in Response to Ethylene ............... 211
Brad M. Binder

15 Inhibitors of Ethylene Biosynthesis and Signaling .................. 223
G. Eric Schaller and Brad M. Binder

16 Analysis of Growth and Molecular Responses to Ethylene in Etiolated Rice Seedlings ...................................... 237
Biao Ma and Jin-Song Zhang

17 Love Me Not Meter: A Sensor Device for Detecting Petal Detachment Forces in Arabidopsis thaliana. ................................. 245
Andrew Maule, Graham Henning, and Sara Patterson

18 Effects of Ethylene on Seed Germination of Halophyte Plants Under Salt Stress. .................................................. 253
Weiqiang Li and Lam-Son Phan Tran

19 Assessing Attraction of Nematodes to Host Roots Using Pluronic Gel Medium ................................................... 261
Valerie M. Williamson and Rasa Čepulytė

Index ................................................................. 269
Ethylene Signaling
Methods and Protocols
Binder, B.M.; Schaller, G.E. (Eds.)
2017, X, 272 p. 38 illus., 16 illus. in color., Hardcover
ISBN: 978-1-4939-6852-7
A product of Humana Press