

# Contents

<b>1</b>	<b>Molecular Decay of Plant Biopolymers.....</b>	<b>1</b>
	Introduction.....	2
	Natural Decay .....	2
	Experimental Heating (Maturation).....	3
	Fossils .....	3
	Analysis .....	3
	Chemistry of Modern Plant Tissue and Decay Series Samples .....	4
	Microscopy of Modern and Fossil Material .....	7
	Chemistry of Fossil Tissue.....	9
	Experimental Heating .....	10
	References.....	14
<b>2</b>	<b>Distribution of Cutan in Modern Leaves .....</b>	<b>17</b>
	Introduction.....	17
	Samples and Preparation.....	19
	Analytical Results .....	22
	The Occurrence of Cutan in Modern Leaves .....	27
	Cutan and the Leaf Fossil Record.....	33
	Explanations for the Aliphatic Component in Fossils .....	34
	The Ecology and Physiology of Plants with Cutan-Containing Leaves .....	36
	References.....	37
<b>3</b>	<b>Organic Preservation of Biopolymers in Fossil Leaves .....</b>	<b>43</b>
	Introduction.....	43
	Samples.....	45
	Microscopic Analyses .....	46
	Organic Geochemical Analyses .....	46
	Microscopic Investigations .....	48
	Gross Morphology .....	48
	Internal Organisation.....	48
	Surface Structures .....	52

Chemistry of Modern Leaves .....	54
Chemistry of the Diatomite .....	56
Chemistry of Fossil Leaves .....	57
Spectroscopic Studies .....	62
Saponification .....	64
Aliphatic Composition of Modern Plants .....	64
Composition of the Ardèche Fossil Leaves .....	67
Possible Origin of the Aliphatic Macromolecule in the Ardèche Fossil Leaves.....	69
Implications .....	70
References.....	71
<b>4 Migration of Organic Molecules from Sediment to Fossils.....</b>	<b>75</b>
Introduction.....	76
Materials and Method .....	76
Analytical Protocol .....	78
Analytical Results .....	79
Ultrastructural Preservation of Fossils .....	79
Molecular Preservation of Fossils and Associated Sediment.....	81
Structural and Molecular Preservation .....	88
Comparison Between Sediment and Fossil .....	90
References.....	91
<b>5 Molecular Transformation of Plant Biopolymers in High P-T Conditions.....</b>	<b>95</b>
Introduction.....	95
Materials and Methods .....	96
Preparing the Gold Cell .....	97
Autoclave Experiment .....	97
Implications .....	98
References.....	105
<b>6 Lipid Incorporation During Experimental Decay of Arthropods .....</b>	<b>107</b>
Introduction.....	107
Materials and Methods .....	108
Chemical Analysis .....	109
<sup>13</sup> C NMR Analysis .....	109
Changes in Gross Morphology During Decay.....	110
Changes in Ultrastructure During Decay.....	110
Changes in Macromolecular Chemistry During Decay.....	111
References.....	116
<b>7 Molecular Preservation of Eurypterids .....</b>	<b>119</b>
Introduction.....	119
Material .....	121

Biopolymers

A molecular paleontology approach

Gupta, N.S.

2014, XXV, 174 p. 62 illus., 3 illus. in color., Hardcover

ISBN: 978-94-007-7935-8