

LIST OF FIGURES/SCHEMES

Chapter 1 : Number of Figures -----61

Figure 1 – 61

Page 01 – 42

Figure No	Title of the Figure	Page No
Figure 1	Representation of dipoles	1
Figure 2	Representation of dipoles (propargyl – allenyl type)	1
Figure 3	Representation of dipoles (allyl type)	1
Figure 4	Representation of 1,3-dipoles	2
Figure 5	Representation of azide, nitrile oxide, diazoalkane etc	3
Figure 6	Representation of ozone, nitron, azomethine ylides etc	3
Figure 7	Reactivity profile of 1,3-dipoles	4
Figure 8	Representation of nitron	5
Figure 9	Geometrical isomerism of nitron	6
Figure 10	1,3-dipolar cycloaddition reaction between nitron and olefin	6
Figure 11	1,3-dipolar cycloaddition reaction between nitron and alkyne	7
Figure 12	Representation of nitron	7
Figure 13-20	Synthesis of nitrons	8-11
Figure 21	Representation of HOMO – LUMO	15
Figure 22	Selectivity in cycloaddition reactions	16
Figure 22a	<i>Exo, Endo</i> approach in cycloaddition reactions	17
Figure 23	Regioselectivity in cycloaddition reactions	18
Figure 24-27	Aqueous phase cycloaddition reactions	20-21
Figure 28-31	Microwave induced cycloaddition reactions	22-24
Figure 32-35	Ionic liquid mediated cycloaddition reactions	24-25
Figure 36-52	Recent reports on cycloaddition reactions	26-35
Figure 53-54	Kinugasa reaction for the synthesis of β -lactams	36-37

Figure 55	Flow chart of <i>Green Chemistry</i>	37
Figure 55-61	Reports on synthesis of nitrones and cycloadducts from our Laboratory	38-42

Chapter II : Number of Schemes ----- 18 (Pages 48-67)
Number of Figures-----47 (Pages 71-101)

Scheme No	Title of the Scheme	Page No
Scheme 1	Synthesis of <i>N</i> -phenyl/methyl- α -amino nitrone (<i>1a</i> & <i>1b</i>)	48
Scheme 2	Synthesis of <i>N</i> -methyl maleimide cycloadduct	49
Scheme 3	Synthesis of <i>N</i> -phenyl maleimide cycloadducts	50
Scheme 4	Synthesis of <i>N</i> -cyclohexyl maleimide cycloadducts	51
Scheme 5	Synthesis of acenaphthylene cycloadducts	52
Scheme 6	Synthesis of <i>p</i> -methoxy- <i>N</i> -phenyl maleimide cycloadducts	53
Scheme 7	Synthesis tetrachloroethylene cycloadduct	54
Scheme 8	Synthesis of methyl acrylate	55
Scheme 9	Synthesis of styrene cycloadduct	56
Scheme 10	Synthesis of methyl vinyl ketone cycloadduct	57
Scheme 11	Synthesis of phenyl methyl propiolate cycloadduct	58
Scheme 12	Synthesis of dimethyl acetylene dicarboxylate cycloadduct	59
Scheme 13	Synthesis of acetylene dicarboxylate cycloadduct	59
Scheme 14	Synthesis of propiolic acid cycloadduct	60
Scheme 15	Synthesis of diastereoselective spiro cycloadducts	61
Scheme 16	Synthesis of regioselective spiro cycloadducts	62
Scheme 17	Synthesis of peptide derivatives	64
Scheme 18	Atom efficient aldehyde synthesis	67

Figures 1 – 47		Page 71 – 101
Figure No	Title of the Figure	Page No
Figure 1	Effect of drug 2a on 3 various bacteria	71
Figure 2	Effect of drug 3a on various bacteria	72
Figure 3	Effect of drug 3b on various bacteria	72
Figure 4	Effect of drug 6b on various bacteria	73
Figure 5	Effect of drug 7 on invitro growth of two fungi at different concentrations	73
Figure 6	IR spectrum of <i>N</i> -cyclohexyl maleimide isoxazolidine	81
Figure 7	IR spectrum of <i>N</i> -phenyl maleimide isoxazolidine	81
Figure 8	IR spectrum of acenaphthylene cycloadduct	82
Figure 9	IR spectrum of <i>N</i> -methyl maleimide cycloadduct	82

Figure 10	IR spectrum of phenyl methyl propiolate cycloadduct	83
Figure 11	IR spectrum of dimethyl acetylene dicarboxylate cycloadduct	83
Figure 12	IR spectrum of methyl acrylate cycloadduct	84
Figure 13	IR spectrum of methyl vinyl ketone cycloadduct	84
Figure 14	IR spectrum of peptide derivative (glycine derived)	85
Figure 15	IR spectrum of spiro cycloadduct	85
Figure 16	¹ H NMR spectrum of <i>N</i> -phenyl- α -amino nitrone (1a)	86
Figure 17	¹ H NMR spectrum of <i>N</i> -methyl- α -amino nitrone (1b)	86
Figure 18	¹ H NMR spectrum of <i>N</i> -cyclohexyl maleimide cycloadduct	87
Figure 19	¹ H NMR spectrum of p-methoxy- <i>N</i> -phenyl maleimide cycloadduct	87
Figure 20	¹ H NMR spectrum of acenaphthylene cycloadduct	88
Figure 21	¹ H NMR spectrum of tetrachloro ethylene cycloadduct	88
Figure 22	¹ H NMR spectrum of phenyl methyl propiolate isoxazoline derivative	89
Figure 23	¹ H NMR spectrum of dimethyl acetylene dicarboxylate isoxazoline derivative	89
Figure 24	¹ H NMR spectrum of styrene cycloadduct	90
Figure 25	¹ H NMR spectrum of acetylene dicarboxylic acid isoxazoline derivative	90
Figure 26	¹ H NMR spectrum of peptide derivative (glycine derived)	91
Figure 27	¹ H NMR spectrum of spiro cycloadduct	91
Figure 28	¹ H NMR spectrum of enamine dipolarophile	92
Figure 29	¹ H NMR spectrum of benzaldehyde (synthesized)	92
Figure 30	¹³ C NMR spectrum of <i>N</i> -phenyl maleimide cycloadduct	93
Figure 31	¹³ C NMR spectrum of acenaphthylene cycloadduct	93
Figure 32	¹³ C NMR spectrum of spiro cycloadduct	94
Figure 33	¹³ C NMR spectrum of <i>N</i> -methyl maleimide cycloadduct	94
Figure 34	¹³ C NMR spectrum of methyl acrylate cycloadduct	95
Figure 35	¹³ C NMR spectrum of acetylene dicarboxylic acid cycloadduct	95
Figure 36	¹³ C NMR spectrum of methyl vinyl ketone cycloadduct	96
Figure 37	¹³ C NMR spectrum of dimethyl acetylene dicarboxylate cycloadduct	96

Figure 38	Mass spectrum of methyl vinyl ketone cycloadduct	97
Figure 39	Mass spectrum of tetrachloroethylene cycloadduct	97
Figure 40	Mass spectrum of phenyl methyl propiolate cycloadduct	98
Figure 41	Mass spectrum of <i>N</i> -methyl maleimide cycloadduct	98
Figure 42	Mass spectrum of styrene cycloadduct	99
Figure 43	Mass spectrum of <i>N</i> -cyclohexyl maleimide cycloadduct	99
Figure 44	Mass spectrum of dimethyl acetylene dicarboxylate cycloadduct	100
Figure 45	Mass spectrum of <i>p</i> -methoxy- <i>N</i> -phenyl maleimide cycloadduct	100
Figure 46	Mass spectrum of peptide (glycine derived)	101
Figure 47	Mass spectrum of methyl acrylate cycloadduct	101

Chapter III: Number of Schemes -----5
Number of Figures -----5

Scheme no	Title of scheme	Page no
Scheme 1	Synthesis of <i>N</i> -phenyl/methyl- α -amino nitrones (<i>1a</i> & <i>1b</i>)	103
Scheme 2	Synthesis of isoxazolidine & isoxazoline derivatives	104
Scheme 3	Synthesis of spiro isoxazolidines & atom efficient aldehyde synthesis	105
Scheme 4	Synthesis of peptides	114
Scheme 5	Atom efficient aldehyde synthesis	116

Figure no	Title of figure	Page no
Figure 1	<i>Exo-endo</i> approach of nitrones towards dipolarophiles	106
Figure 2	Major & minor conformations of isoxazolidine derivatives	107
Figure 3	Conformations of isoxazolidine & isoxazoline derivatives	110
Figure 4	Calculation of dihedral angles between C5 & C4 protons of isoxazolidine derivatives	126
Figure 5	Probable conformations of isoxazolidines	127

Chapter IV : Number of Schemes ----- 5

Scheme 1 – 5

Page 139 – 141

Scheme 1	Synthesis of spiro isoxazolidine derivatives & atom efficient aldehyde synthesis	139
Scheme 2	Synthesis of 1,3-amino alcohols	140
Scheme 3	Synthesis of peptides using isoxazoline derivatives	140
Scheme 4	Synthesis of dipeptides	140
Scheme 5	Atom efficient ketone synthesis	141
