

Table of Content

1	Introduction	1
1.1	Short History of Plant-derived Drugs and Traditional Medicine	1
1.2	Natural Products in Modern Medicine	4
1.3	Recently Discovered Metabolites from <i>Streptomyces</i> spp.....	7
1.4	Natural Products from Endophytes	17
1.5	Scopes of the Present Research Work	20
2	Plant Metabolites	21
2.1	<i>Xanthium brasiliicum</i> Vell (Asteraceae)	21
2.1.1	Stigmasterol and β -Sitosterol.....	22
2.1.2	Zanthoxyl flavone	23
2.1.3	Xanthatin.....	27
2.1.4	4-Oxobedfordia acid	29
2.2	<i>Albizia zygia</i> (Leguminosae, subfamily Mimosoideae)	32
2.2.1	4',7-Dihydroxyflavanone	34
2.2.2	7,3',4'-Trihydroxyflavone	34
2.2.3	3-O-Methylfisetin	35
2.2.4	Lupeol (Lup-20(29)-en-3 β -ol)	36
2.2.5	Chondrillasterol	37
2.3	<i>Tephrosia apollinea</i> (Del.) Link (Leguminosae)	38
2.3.1	Pseudosemiglabrin	38
2.3.2	Semiglabrin	40
2.3.3	Lanceolatin A	42
2.3.4	Apollinine	44
2.3.5	3 β -O-Glucosylsitosterol.....	47
2.4	<i>Aristolochia bracteolata</i> Lam (Aristolochiaceae).....	48
2.4.1	Aristolochic acid A	49
2.4.2	Aristolochic acid B	52
3	General Techniques for Streptomycetes.....	54
3.1	Collection of Bacterial Strains.....	54
3.2	Strategic Procedure for Evaluating Bacterial Strains	54
3.3	Pre-screening.....	55

3.3.1	Biological Screening.....	56
3.3.2	Chemical Screening	58
3.4	Culturing Bacteria and Working up.....	58
3.5	Isolation Techniques	59
3.6	Dereplication.....	60
4	Investigation of the Selected Bacterial Strains.....	63
4.1	Terrestrial <i>Streptomyces</i> sp. ANK 210	63
4.1.1	<i>ent</i> -Homoabyssomicin A	64
4.1.2	<i>ent</i> -Homoabyssomicin B	68
4.1.3	2-Hydroxy-1-(4-hydroxy-3-methoxy-phenyl)-ethanone	74
4.1.4	Benadrostin	74
4.1.5	Polypropylenglycol.....	75
4.2	Terrestrial <i>Streptomyces</i> sp. ANK 313	75
4.2.1	Khatmiamycin.....	76
4.2.2	GTRI-02.....	81
4.2.3	Aloesaponarin II	83
4.2.4	LL-C10037 α	84
4.2.5	LL-C10037 β	86
4.2.6	Zoosporicidal Activity of the Isolated Compounds.....	88
4.2.7	Omdurmycin	91
4.3	Terrestrial <i>Streptomyces</i> sp. GW08/253	96
4.3.1	Cyclooctatin	97
4.3.2	Phenazine-1-carboxamide.....	101
4.3.3	Phenazine-1-carboxylic acid.....	101
4.3.4	6-[2-(1-Hydroxy-butyl)-4-methyl-phenyl]-hex-5-enoic acid	102
4.3.5	6-(2-But-1-enyl-4-methyl-pheny)-hex-5-enoic acid.....	104
4.3.6	4-Hydroxy-benzoic acid methyl ester.....	108
4.3.7	3-(Hydroxyacetyl)-indole	109
4.4	Terrestrial <i>Streptomyces</i> sp. Red 202	109
4.4.1	Nocardamine	110
4.4.2	Diastovaricin I	113
4.4.3	6-Hydroxy-5-methoxyisatine.....	117

4.4.4	Xanthosine	119
4.5	Terrestrial <i>Streptomyces</i> sp. WO 1004	119
4.5.1	Isomacrolactinic acid	120
4.5.2	Macrolactin A	123
4.5.3	Dihydromacrolactin F	126
4.6	Terrestrial <i>Streptomyces</i> sp. HO9.....	129
4.6.1	1-(4-Hydroxy-3-methoxy-phenyl)-ethanone	130
4.6.2	2,6-Dimethyl-oxepan-4-one.....	132
4.6.3	Indole-3-carboxylic acid methyl ester	134
4.7	<i>Bacillus</i> sp. M10.....	135
4.7.1	<i>Cis-cyclo</i> -(Tyr,Pro) and <i>cis-cyclo</i> -(Phe,Pro)	135
4.7.2	Macrolactin F	136
4.7.3	Macrolactin B	138
4.8	Terrestrial <i>Streptomyces</i> sp. WO 521	140
4.8.1	5-Methoxy-3-methyl-1H-pyrimidine-2,4-dione	141
4.8.2	Ferulic acid	142
4.9	The Marine Derived <i>Streptomyces</i> sp. B6219	143
4.9.1	Fujianmycin B	144
4.9.2	Fujianmycin A	146
4.9.3	Fujianmycin C	147
4.9.4	Ochromycinone.....	151
4.9.5	Ochromycinone methyl ether	151
4.9.6	Tetrangulol methyl ether.....	152
4.10	Marine derived <i>Streptomyces</i> sp. B5746	154
4.10.1	2-Hydroxy-5-methoxybenzamide	154
4.10.2	(Z)-1-Cyanomethylene-4(2R)-hydroxy-6(S)-(β-glucopyranosyloxy)-2-cyclohexene (Menisdaurin)	156
4.10.3	3-Acetamido-3-deoxy-β-D-glucopyranose.....	159
5	Metabolites from Endophytic Fungi.....	160
5.1	Tropical Endophytic Fungus <i>Gaeumannomyces amomi</i> BCC4066160	
5.1.1	Stemphol (2-butyl-1,3-dihydroxy-5-pentylbenzene).....	161
5.1.2	Stemphol galactoside (Stemphol 1- <i>O</i> -β-D-galactoside).....	162
5.2	Endophytic fungus LAF 12.....	166

5.2.1	Cerebroside A	167
5.2.2	<i>Cis-cyclo -(Alanyl-prolyl).....</i>	173
5.2.3	D-Sorbitol	173
6	Summary.....	175
7	Materials and Methods	186
7.1	General.....	186
7.2	Materials	186
7.3	Spray Reagents	187
7.4	Microbiological Materials	187
7.5	Recipes.....	188
7.6	Nutrients	189
7.7	Microbiological and Analytical Methods.....	192
7.7.1	Storage of Strains.....	192
7.7.2	Pre-screening	192
7.7.3	Biological Screening.....	192
7.7.4	Chemical and Pharmacological Screening	193
7.7.5	Brine Shrimp Microwell Cytotoxicity Assay	193
7.7.6	Production of Zoospores and Bioassay	194
7.7.7	Antitumor Test.....	194
7.7.8	Fermentation in 20 L Fermentor.....	194
7.8	Primary Screening of Results	195
7.8.1	Bases of Evaluation	195
8	Plant Metabolites	195
8.1	<i>Xanthium brasiliicum</i> Vell (Asteraceae)	195
8.2	<i>Albizia zygia</i> (Leguminosae subfamily Mimosoideae).....	197
8.3	<i>Tephrosia apollinea</i> (Del.) Link (Leguminosae)	199
8.4	<i>Aristolochia bracteolata</i> Lam (Aristolochiaceae)	201
9	Metabolites from Selected Bacterial Strains.....	202
9.1	Origin of the Investigated Strains.....	202
9.2	Terrestrial <i>Streptomyces</i> sp. ANK 210	202
9.2.1	Pre-screening	203

9.2.2	Fermentation and Isolation	203
9.3	Terrestrial <i>Streptomyces</i> sp. ANK 313	205
9.3.1	Pre-screening	205
9.3.2	Bacterial Culturing and Isolation.....	206
9.4	Terrestrial <i>Streptomyces</i> sp. GW08/253.....	208
9.4.1	Bacterial Culturing, Work up and Isolation.....	208
9.5	Terrestrial <i>Streptomyces</i> sp. Red 202	210
9.5.1	Pre-screening	210
9.5.2	Bacteria Culturing and Isolation	210
9.6	Terrestrial <i>Streptomyces</i> sp. WO 1004	212
9.6.1	Pre-screening	212
9.6.2	Bacterial Culturing and Isolation.....	213
9.7	Terrestrial <i>Streptomyces</i> sp. HO9.....	215
9.7.1	Pre-screening	215
9.7.2	Fermentation, Work-up and Isolation.....	216
9.8	<i>Bacillus</i> sp. M10 strain	218
9.8.1	Fermentation, Extraction and Isolation.....	218
9.9	Terrestrial <i>Streptomyces</i> sp. WO 521	219
9.9.1	Pre-screening	219
9.9.2	Fermentation, Work up and Isolation	219
9.10	Marine derived <i>Streptomyces</i> sp. B6219	220
9.10.1	Pre-screening	220
9.10.2	Fermentation and Isolation	221
9.11	Marine derived <i>Streptomyces</i> sp. B5746	223
9.11.1	Fermentation and Isolation	223
10	Metabolites from Endophytic Fungi	225
10.1	Tropical Endophytic Fungus <i>Gaeumannomyces amomi</i> BCC4066225	
10.1.1	Fermentation, Extraction and Isolation.....	225
10.2	Tropical Endophytic Fungus LAF.....	226
10.2.1	Pre-screening	226
10.2.2	Large Scale Fermentation, Extraction and Isolation.....	227
11	References.....	229

12 Spectra	242
------------------------------	------------