

Contents

Preface — V

List of contributing authors — XIII

Olusesan Ojo and Derek T. Ndinteh

1	Traditional uses, biological activities, and phytochemicals of <i>Lecaniodiscus cupanioides</i>: a review — 1
1.1	Introduction — 1
1.2	Botanical description of <i>L. cupanioides</i> — 2
1.3	Ethnomedicinal uses of <i>L. cupanioides</i> — 3
1.4	Biological activities of <i>L. cupanioides</i> — 4
1.4.1	Antibacterial activity — 4
1.4.2	Analgesic and ameliorative effects — 6
1.4.3	Antioxidant activity — 6
1.4.4	Anti-protozoal activity — 8
1.4.5	Anti-CNS depressant activity — 9
1.4.6	Antifungal activity — 9
1.4.7	Anticancer activity — 9
1.4.8	Toxicity activity — 10
1.4.9	Anti-diabetic activity — 10
1.4.10	Aphrodisiac effect — 11
1.4.11	Nutritional composition and values — 11
1.4.12	Other activity — 12
1.5	Phytochemicals reported from <i>L. cupanioides</i> — 12
1.6	Conclusion — 13
	References — 14

Emmanuel M. Halilu, Abdullahi M. Abdurrahman, Sylvester N. Mathias,
Chinenye J. Ugwah-Oguejiofor, Muntaka Abdulrahman and Saadu Abubakar

2	Phytochemical and antioxidant activity of <i>Cadaba farinosa</i> Forssk stem bark extracts — 19
2.1	Introduction — 20
2.2	Methodology — 21
2.2.1	Location, identification, collection, and preparation of plant sample — 21
2.2.2	Extraction of plant material — 21
2.2.3	Preliminary phytochemical screening of the extracts of <i>C. farinosa</i> — 22
2.2.4	Thin layer chromatographic studieschromatographic studies — 22
2.2.5	Determination of total phenolic content — 22
2.2.6	Qualitative TLC screening of antioxidant compounds — 22
2.2.7	Quantitative antioxidant studies — 23

2.2.8	Data analysis —	23
2.3	Results and discussion —	23
2.3.1	Extraction of plant material —	23
2.3.2	Preliminary phytochemical screening —	24
2.3.3	Thin layer chromatography —	24
2.3.4	Total phenolic content —	25
2.3.5	Qualitative and quantitative antioxidant studies —	26
2.4	Conclusion —	28
	References —	29

Katso Binang and David T. Takuwa

3	Development of reverse phase-high performance liquid chromatography (RP-HPLC) method for determination of selected antihypertensive active flavonoids (rutin, myricetin, quercetin, and kaempferol) in medicinal plants found in Botswana —	31
3.1	Introduction —	31
3.2	Experimental —	33
3.2.1	Instruments and apparatus —	33
3.2.2	Chemicals and reagents —	33
3.2.3	Preparation of flavonoid standards —	33
3.2.4	Preparation of medicinal plant samples —	34
3.2.5	HPLC-DAD-UV-Vis separation of flavonoid standards —	34
3.2.6	Statistical analysis —	34
3.3	Results and discussion —	34
3.3.1	Development of RP-HPLC method —	34
3.3.2	Fitness for purpose —	36
3.3.3	Application of the optimized method on the selected medicinal plants —	38
3.4	Conclusion —	41
	References —	42

Marthe Carine Djuidje Fotsing, Dieudonné Njamen, Zacharias Tanee Fomum and Derek Tantoh Ndinteh

4	Synthesis of biologically active heterocyclic compounds from allenic and acetylenic nitriles and related compounds —	45
4.1	Introduction —	45
4.2	Usefulness of heterocycles —	46
4.3	Heterocycles synthesis —	47
4.3.1	Double Michael addition —	47
4.3.2	Heterocyclic compounds by Michael addition to allenic nitriles —	47
4.3.3	Synthesis of heterocycles from acetylenic nitriles —	66

4.3.4	Synthesis of heterocycles from acetylenic acids —	73
4.3.5	Synthesis of heterocycles from acetylenic aldehydes —	73
4.4	Biological applications of heterocycles —	75
4.4.1	Pyrimidopyrimidines —	75
4.4.2	Pyrazolopyrimidines —	76
4.4.3	Aminopyridylpyrazoles —	76
4.4.4	Pyrimido(1,2a)benzimidazoles —	76
4.4.5	Oxazoles —	76
4.4.6	Pyrimidobenzothiazolones —	76
4.5	Current biological relevance of heterocycles —	76
4.6	Conclusion —	77
	References —	78

Djellouli Fayrouz, Dahmani Abdallah and Hassani Aicha

5	Experimental investigation of ternary mixture of diclofenac sodium with pharmaceutical excipients —	85
5.1	Introduction —	85
5.2	Materials and methods —	88
5.2.1	Materials —	88
5.2.2	Sample preparation —	88
5.2.3	Infrared spectroscopy —	88
5.2.4	Differential scanning calorimetry —	88
5.2.5	X-ray powder diffraction —	89
5.2.6	Scanning electron microscopy —	89
5.3	Discussion of experimental results —	89
5.3.1	DSC —	89
5.3.2	SEM —	93
5.4	Conclusions —	93
	References —	95

Thabile Lukhele, Denise Olivier, Marthe C. D. Fotsing, Charlotte M. Tata,
Monisola I. Ikhile, Rui W. M. Krause, Sandy Van Vuuren and Derek Tantoh Ndinteh

6	Ethnobotanical survey, phytoconstituents and antibacterial investigation of <i>Rapanea melanophloeos</i> (L.) Mez. bark, fruit and leaf extracts —	97
6.1	Introduction —	98
6.2	Materials and methods —	99
6.2.1	Ethnobotanical survey —	99
6.2.2	Plant material —	99
6.2.3	Preparation of plant extracts and alcohol precipitable solids (APS) —	99
6.2.4	TLC variation study —	101
6.2.5	GC-MS analyses of PE extract —	101

6.2.6	Amino acid extraction and analyses —	101
6.2.7	Antibacterial activity by microdilution assay —	102
6.3	Results and discussion —	104
6.3.1	Ethnobotanical knowledge —	104
6.3.2	Extract yields, APS content and TLC profiles —	105
6.3.3	Results of petroleum ether extract analysed by GC-MS —	107
6.3.4	Amino acid analysis by means of GC-MS —	109
6.3.5	Antibacterial properties by means of MIC determination —	111
6.4	Conclusions —	117
	References —	118

Enitan Omobolanle Adesanya, Mubo Adeola Sonibare, Edith Oriabure Ajaiyeoba and Samuel Ayodele Egieyeh

7	Compounds isolated from hexane fraction of <i>Alternanthera brasiliensis</i> show synergistic activity against methicillin resistant <i>Staphylococcus aureus</i> —	123
7.1	Introduction —	124
7.2	Materials and methods —	124
7.2.1	Plant material —	124
7.2.2	Plant extraction and fractionation —	124
7.2.3	Isolation of compounds from the <i>A. brasiliensis</i> —	125
7.2.4	High performance liquid chromatography (HPLC) analysis —	125
7.2.5	Gas Chromatography-Mass Spectrometry (GCMS) analysis —	125
7.2.6	Nuclear Magnetic Resonance (NMR) analysis —	126
7.2.7	Antibacterial assay —	126
7.2.8	Statistical analysis —	127
7.3	Results and discussion —	127
7.3.1	Identification of potential compounds in <i>A. brasiliensis</i> hexane fraction —	127
7.3.2	Isolation and structural elucidation of compounds from <i>A. brasiliensis</i> hexane fraction —	128
7.3.3	Antibacterial assay —	130
7.4	Conclusion —	134
7	Appendix —	135
	References —	144

Kafeelah Yusuf, Abdulrafiu Majolagbe and Sherifat Balogun

8	Evaluation of raw, treated and effluent water quality from selected water treatment plants: a case study of Lagos Water Corporation —	147
8.1	Introduction —	147
8.2	Materials and methods —	148

8.2.1	Sampling and sample preparation —	148
8.2.2	Description of the study area —	148
8.2.3	Analytical procedure —	149
8.3	Statistical analysis —	149
8.3.1	Correlation analysis (CA) —	149
8.3.2	Principal component analysis —	150
8.3.3	Water quality index —	150
8.3.4	Health risk assessment —	150
8.3.5	Non-carcinogenic risk assessment —	152
8.4	Results and discussion —	152
8.4.1	WQI analysis —	158
8.4.2	Principal component analysis —	159
8.4.3	Health risk assessment —	161
8.4.4	Correlation analysis of water quality parameters —	162
8.5	Conclusion —	166
	References —	166

Alfred F. Attah, Abobarin I. Omobola, Jones O. Moody, Mubo A. Sonibare,
Olubori M. Adebukola and Samuel A. Onasanwo

9	Detection of cysteine-rich peptides in <i>Tragia bentharii</i> Baker (Euphorbia- ceae) and <i>in vivo</i> antiinflammatory effect in a chick model —	169
9.1	Introduction —	170
9.2	Materials and method —	171
9.2.1	Plant material —	171
9.2.2	Extraction, SPE pre purification and preliminary MALDI TOF/TOF analysis —	172
9.2.3	RP-HPLC fractionation of C ₁₈ peptide positive fraction —	172
9.2.4	Reduction/alkylation of peptides and MALDI-MS analysis —	172
9.2.5	Derivatization of peptides and MALDI TOF/TOF analysis —	172
9.2.6	<i>In vivo</i> anti-inflammatory assay using the chick model —	173
9.2.7	Brine shrimp cytotoxicity (lethality assay) —	173
9.3	Results —	173
9.3.1	Extraction of cysteine-rich peptides and mass spectrometry experiment —	173
9.3.2	Effect of extract on carrageenan-induced foot edema in chicks and brine shrimp cytotoxicity —	174
9.4	Discussion —	176
9.5	Conclusions —	182
	References —	183

Maria, Zahid Khan and Aleksey E. Kuznetsov

10	Combinatorial library design and virtual screening of cryptolepine derivatives against topoisomerase IIA by molecular docking and DFT studies — 187
10.1	Introduction — 188
10.2	Computational methods — 189
10.2.1	Retrieval and refinement of crystal structure — 189
10.2.2	Combinatorial library designing — 189
10.2.3	Docking and virtual screening — 190
10.2.4	Docking protocol applied by MOE — 190
10.2.5	Docking analysis — 191
10.2.6	DFT studies — 191
10.3	Results and discussion — 195
10.3.1	Combinatorial library design and docking analysis — 195
10.3.2	Detailed interaction analysis of the docked ligands in the binding pocket of receptor TOP2A — 197
10.3.3	DFT studies — 203
10.4	Conclusions — 208
10.5	Supporting information — 209
	References — 210

Index — 213
