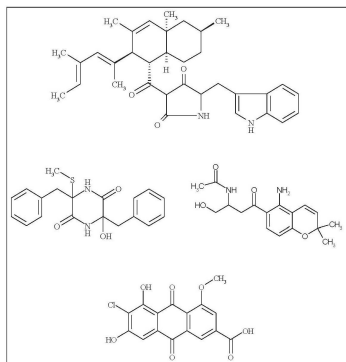




Michel Deffer Kongue Tatong (Autor)
**Bangangstatin A and B, Two New Tryptophan-polyketide
Hybrids, Kamerchalsin, a Novel Isoindole Alkaloid and Further
New Secondary Metabolites from Cameroonian Medicinal
Plant-associated Fungi**

Michel Deffer Kongue Tatong

Bangangstatin A and B, Two New Tryptophan-polyketide
Hybrids, Kamerchalsin, a Novel Isoindole Alkaloid and
Further New Secondary Metabolites from Cameroonian
Medicinal Plant-associated Fungi



Dissertation



Cuvillier Verlag Göttingen
Internationaler wissenschaftlicher Fachverlag

<https://cuvillier.de/de/shop/publications/6516>

Copyright:

Cuvillier Verlag, Inhaberin Annette Jentzsch-Cuvillier, Nonnenstieg 8, 37075 Göttingen, Germany
Telefon: +49 (0)551 54724-0, E-Mail: info@cuvillier.de, Website: <https://cuvillier.de>

Table of Contents

1	Introduction.....	1
1.1	Brief history of natural products	1
1.2	Fungi as sources of bioactive products	2
1.3	Endophytic fungi as a sources of bioactive natural products.....	5
1.3.1	Secondary metabolites from endophytic fungi as antimycotic agents.....	6
1.3.2	Secondary metabolites from endophytic fungi as antiviral agents	7
1.3.3	Secondary metabolites from endophytic fungi as antibiotics	8
1.3.4	Secondary metabolites from endophytic fungi as anticancer agents	10
1.3.5	Potential secondary metabolites from endophytic fungi in agriculture ...	12
1.3.6	Selection of promising sources for the isolation of endophytic fungi	14
2	Aim of the Investigation	16
3	General Techniques	17
3.1	Collection of the strains	17
3.1.1	Plant material	17
3.1.2	Pure fungal strains isolated from the collected plants	17
3.2	Work up procedure of selected fungal strains.....	18
3.3	Pre-screening.....	19
3.4	Biological screening.....	20
3.5	Chemical screening	21
3.6	Cultivation and scale-up	22
3.7	Isolation methods	23
3.8	Dereplication.....	23
4	Investigation of selected endophytic fungal strains	25
4.1	Endophytic fungal strain CAMKT24b1.....	25
4.1.1	Ergosterol	26
4.1.2	Fusaproliferin.....	27
4.1.3	Bangangchromene.....	28
4.1.4	Beauvericin	32
4.1.5	Poly-(3-hydroxybutyric acid), PHB.....	36
4.1.6	Mixture of two isochromene derivatives	37
4.1.7	Radicinin	38



4.1.8	Zoosporicidal Activity of the Isolated Compounds	39
4.2	Endophytic fungal strain CAMKT12a	41
4.2.1	Ergosta-4,6,8(14),22-tetraen-3-one	42
4.2.2	2,6-Dibenzyl-2,5-piperazinedione.....	43
4.2.3	Bahamdiketopiperazine	44
4.2.4	16- α -D-Mannopyranosyloxyisopimar-7-en-19-oic acid.....	48
4.2.5	Paxillamide.....	50
4.2.6	Indole-3-carboxylic acid methyl ester.....	51
4.3	Endophytic fungal strain CAMKT28b.....	51
4.3.1	Aspernigrin A.....	52
4.3.2	Tyovillenic acid.....	53
4.3.3	Tyovillepyrone	57
4.3.4	Methyl 3,5-dioxo-6-phenylhexanoate	61
4.4	Endophytic fungal strain CAMKT2b2.....	64
4.4.1	Betulinic acid	66
4.4.2	Cerevisterol	67
4.4.3	Alternariol-9-methyl ether	67
4.4.4	5-Methyldeoxycytidine	68
4.4.5	Bassianolide	69
4.4.6	Kotanin.....	70
4.4.7	Cerebroside C.....	72
4.5	Endophytic fungal strain CAMKT3a	74
4.5.1	(2 <i>E</i> , 4 <i>Z</i>)-Decadienoic acid	75
4.5.2	3-Methyl-4,8-dihydroxy-3,4-dihydroisocoumarin.....	76
4.5.3	3-Methyl-5-carboxy-8-hydroxyisocoumarin.....	77
4.5.4	2,6-Dimethoxy-1,4-benzoquinone	78
4.5.5	4-Oxo-4 <i>H</i> -pyran-3-yl)-acetic acid methyl ester.....	80
4.5.6	Triethylamine	81
4.5.7	5-Nonadecylresorcinol	81
4.6	Endophytic fungal strain CAMK8c	82
4.6.1	7-Hydroxy-4-methoxy-5-methylcoumarin.....	83
4.6.2	4-Methoxy-5-methylcoumarin-7-sulphate	85

4.6.3	Asperxanthone	87
4.6.4	Fonsecinone A	87
4.6.5	1-(2-Chloro-1,3,4,5-tetrahydroxypentyl)-1 <i>H</i> -pyrimidine-2,4-dione	89
4.7	Endophytic fungal strain CAMKT44b.....	93
4.7.1	Rubrofusarin	94
4.7.2	Integracide E	95
4.7.3	2-Deoxyintegracide B	102
4.7.4	2-Deoxyintegracide B 3-sulphate	103
4.7.5	12 β -Acetoxy-4,4-dimethyl-24-methyl-24-methylene-5 α -cholesta-8-ene- 3 β , 11 α -diol.....	104
4.7.6	Polypropylenglycol (Niax)	105
4.7.7	Penicillic acid.....	106
4.8	Endophytic fungal strain CAMKT29a1	107
4.8.1	Mycophenolic acid.....	108
4.8.2	3-Hydroxymycophenolic acid.....	110
4.8.3	6-Chloro-4- <i>O</i> -methylemodic acid.....	111
4.8.4	Shearinine D.....	116
4.8.5	CJ-14,445	119
4.9	Endophytic fungus strain CAMK45b3	120
4.9.1	Curvulin	121
4.9.2	Xylariol B.....	122
4.9.3	Sordariol.....	123
4.9.4	3-Deoxyisoochracinic acid.....	124
4.9.5	Vitamin B ₂	125
4.10	Endophytic fungal strain CAMKT54C1	126
4.10.1	Ergosterol epoxide	127
4.10.2	3 β - <i>O</i> -Glucosylsitosterol.....	129
4.10.3	1,3-Dihydroxy-6-hydroxymethyl-7-methoxyanthraquinone	129
4.10.4	Questin	131
4.10.5	Bostrycoidin-8-methyl ether	132
4.10.6	Verticillin D	133
4.10.7	Allantoin	135
4.11	Endophytic fungal strain CAMKT55a.....	136



4.11.1	Bahamisocoumarin A.....	137
4.11.2	Bahamisocoumarin B.....	141
4.11.3	Bahamisocoumarin C.....	143
4.11.4	Bahamisochromene.....	147
4.12	Endophytic fungal strain CAMKT48b2.....	152
4.12.1	1,4-Dihydroxy-2-methylpentan-3-one.....	153
4.12.2	2-Methylpentane-1,3,4-triol.....	156
4.12.3	2-Methoxy-2,4-dimethyltetrahydrofuran-3-ol.....	159
4.12.4	4,5-Dihydroxy-3-methoxy-5-methylcyclohex-2-enone.....	163
4.12.5	Ascladiol.....	164
4.13	Endophytic fungal strain CAMKT42a.....	165
4.13.1	19-O-Acetylchaetoglobosin-A.....	166
4.13.2	Kamerchalsin.....	171
4.13.3	Bangangstatin A.....	182
4.13.4	Bangangstatin B.....	190
4.14	Endophytic fungal strain CAMKT52a.....	198
4.14.1	Sterigmatocystin.....	199
4.14.2	Alteichin.....	200
4.14.3	3-(2-Hydroxyethyl) indole.....	201
4.14.4	Cytochalasin R.....	202
4.14.5	Indole-3-carboxylic acid.....	203
4.14.6	α -Cyclopiazonic acid.....	203
4.14.7	Indole-3-acetic acid.....	205
4.15	Endophytic fungus strain CMU-Mam 004.....	205
4.15.1	2,4-Dihydroxy-3,5-dimethylacetophenone.....	207
4.15.2	2-Hydroxy-3,5-dimethylacetophenone-4-sulphate.....	208
5	Summary.....	211
6	Materials and Methods.....	224
6.1	General.....	224
6.2	Materials.....	225
6.3	Spray Reagents.....	225
6.4	Microbiological Materials.....	226



6.5	Recipes	226
6.6	Microbiological and analytical methods	230
6.6.1	Collection of plant parts	230
6.6.2	Isolation of endophytic fungi	230
6.6.3	Storage of strains.....	231
6.6.4	Pre-screening.....	231
6.6.5	Biological screening.....	231
6.6.6	Chemical and pharmacological screening	232
6.6.7	Brine shrimp microwell cytotoxicity assay.....	232
6.6.8	Production of zoospores and bioassay	233
6.6.9	Antitumor Test	233
6.7	Primary Screening.....	234
6.7.1	Bases of Evaluation.....	234
7	Metabolites from selected strains	235
7.1	Endophytic fungal strain CAMKT24b1.....	235
7.1.1	Pre-screening.....	235
7.1.2	Fermentation, extraction and isolation.....	235
7.2	Endophytic fungal strain CAMKT12a.....	240
7.2.1	Pre-screening.....	240
7.2.2	Fermentation, extraction and isolation.....	241
7.3	Endophytic fungal strain CAMKT28b.....	244
7.3.1	Pre-screening.....	244
7.3.2	Fermentation, extraction and isolation.....	245
7.4	Endophytic fungal strain CAMKT2b2.....	247
7.4.1	Pre-screening.....	247
7.4.2	Fermentation, extraction and isolation.....	248
7.5	Endophytic fungal strain CAMKT3a.....	252
7.5.1	Pre-screening.....	252
7.5.2	Fermentation, extraction and isolation.....	252
7.6	Endophytic fungal strain CAMKT8C.....	256
7.6.1	Pre-screening.....	256
7.6.2	Fermentation, extraction and isolation.....	256
7.7	Endophytic fungal strain CAMKT44b.....	259



7.7.1	Pre-screening.....	259
7.7.2	Fermentation, extraction and isolation.....	259
7.8	Endophytic fungal strain CAMKT29a1	264
7.8.1	Pre-screening.....	265
7.8.2	Fermentation, extraction and isolation.....	265
7.9	Endophytic fungal strain CAMKT45b3.....	268
7.9.1	Pre-screening.....	268
7.9.2	Fermentation, extraction and isolation.....	268
7.10	Endophytic fungal strain CAMKT54C1	271
7.10.1	Pre-screening.....	271
7.10.2	Fermentation, extraction and isolation.....	272
7.11	Endophytic fungal strain CAMKT55a.....	276
7.11.1	Pre-screening.....	276
7.11.2	Fermentation, extraction and isolation.....	277
7.12	Endophytic fungal strain CAMKT48b2.....	278
7.12.1	Pre-screening.....	279
7.12.2	Fermentation, extraction and isolation.....	279
7.13	Endophytic fungal strain CAMKT42a.....	281
7.13.1	Pre-screening.....	282
7.13.2	Fermentation, extraction and isolation.....	282
7.14	Endophytic fungal strain CAMKT52a.....	284
7.14.1	Pre-screening.....	284
7.14.2	Fermentation, extraction and isolation.....	285
7.15	Endophytic fungal strain CMU-004.....	288
7.15.1	Pre-screening.....	288
7.15.2	Fermentation, extraction and Isolation.....	288
References		290
8	Spectra.....	304