Supporting Information

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Chemical Composition and Pesticidal Activity of *Alpinia galanga* (L.) Willd. Essential Oils in Vietnam

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Table S1 : Collection and hydrodistillation details of *Alpinia galanga* from Vietnam

Plant part	Collection date and site	Mass of plant material	Essential oil yield (%)	Voucher number
Leaves	February, 2021. Phuoc Trung	1 kg	0.11	DNDAG 01L
Steams + Leaves	Village, Phuoc Dong	3 kg	0.12	DNDAG 02TL
Rhizomes	Commune, Nha Trang City,	3 kg	0.26	DNDAG 03Rh
Roots	Khanh Hoa Province (12°11′20″N, 109°9′40″E)	2 kg	0.13	DNDAG 04R

Table S2 : Essential oil compositions of *Alpinia galanga* from Vietnam.

RI_{calc}	RI_{db}	Compound	leaves	leaves & stems	rhizome	roots
924	923	Tricyclene	-	-	t	-
926	927	α-Thujene	-	-	0.2	t
933	933	α-Pinene	t	0.3	4.7	1.6
943	943	Thuja-2,4(10)-diene	-	-	t	-
948	948	α-Fenchene	-	-	t	-
950	950	Camphene	-	-	0.1	t
972	972	Sabinene	-	t	0.1	0.1
977	978	β-Pinene	t	0.1	0.6	9.0
984	986	6-Methylhept-5-en-2-one	0.1	0.1	t	-
986	986	*p*-Menth-3-ene	-	t	-	-
989	991	Myrcene	t	t	0.5	0.1
990	990	Dehydro-1,8-cineole	-	-	t	-
999	997	(*E*)-2,6-Dimethylocta-2,6-diene	t	0.1	-	-
1008	1007	α-Phellandrene	-	-	t	-
1018	1018	α-Terpinene	-	-	0.2	-
1024	1025	*p*-Cymene	0.1	t	0.4	0.3
1029	1030	Limonene	0.1	0.1	0.9	0.5
1031	1031	β-Phellandrene	-	-	-	tr
1032	1032	1,8-Cineole	-	0.1	42.5	0.6
1046	1045	(*E*)-β-Ocimene	-	-	t	-
1058	1058	γ-Terpinene	-	-	0.5	-
1085	1086	Terpinolene	-	-	0.1	-
1091	1093	*p*-Cymenene	t	-	0.1	-
1100	1101	Linalool	t	t	0.1	-
1107	1107	Nonanal	t	t	-	-
1113	1110	1,3,8-*p*-Menthatriene	-	-	t	-
1115	1113	(*E*)-4,8-Dimethylnona-1,3,7-triene	t	t	-	-
1119	1120	*endo*-Fenchol	-	-	t	-
1122	1121	*trans*-*p*-Mentha-2,8-dien-1-ol	-	-	0.1	-
1124	1124	*cis*-*p*-Menth-2-en-1-ol	-	-	t	-
1136	1138	*cis*-*p*-Mentha-2,8-dien-1-ol	-	-	0.1	-
1141	1141	*trans*-Pinocarveol	-	-	-	0.1
1142	1139	*trans*-*p*-Menth-2-en-1-ol	-	-	t	-
1155	1156	Camphene hydrate	-	-	t	-
1170	1170	δ-Terpineol	-	-	0.2	-
1171	1171	*p*-Mentha-1,5-dien-8-ol	-	-	0.1	-
1174	1174	2-Methylbenzofuran	-	-	t	-
1181	1180	Terpinen-4-ol	-	-	1.8	-
1186	1186	*p*-Cymen-8-ol	-	-	0.1	-
1195	1195	α-Terpineol	-	-	1.1	-
1195	1196	Myrtenal	-	-	-	0.2
1197	1197	Estragole (= Methyl chavicol)	-	-	0.1	-

1202	1206	*trans*-*iso*-Piperitenol	-	-	0.1	-
1219	1228	*cis*-*iso*-Piperitenol	-	-	t	-
1220	1223	*trans*-Carveol	-	-	t	-
1239	1239	Neral	-	-	t	-
1253	1252	Chavicol	-	-	0.9	-
1268	1268	Geranial	-	-	t	-
1285	1285	Bornyl acetate	t	0.1	0.4	0.1
1289	1292	1-Tridecene	t	t	-	-
1300	1300	Tridecane	0.2	0.1	-	-
1333	1332	*trans*-Carvyl acetate	-	-	0.1	-
1335	1335	δ-Elemene	0.1	0.1	-	-
1339	1341	Indan-5-ol	-	-	20.2	0.4
1347	1346	Thymyl acetate	-	-	t	-
1347	1348	α-Cubebene	t	tr	-	-
1351	1349	Citronellyl acetate	-	-	0.2	-
1353	1357	Eugenol	-	-	0.6	-
1353	1352	Dehydro-*ar*-ionene	0.4	0.1	-	-
1359	1357	*cis*-Carvyl acetate	-	-	0.1	-
1359	1361	Neryl acetate	-	t	-	-
1365	1365	Carvacryl acetate	-	-	0.1	-
1369	1371	α-Ylangene	-	-	-	0.1
1375	1375	α-Copaene	0.4	0.5	-	0.1
1379	1380	Geranyl acetate	0.2	0.3	1.3	0.2
1382	1383	*cis*-β-Elemene	0.2	0.4	t	t
1383	1382	β-Bourbonene	0.7	1.0	-	t
1388	1392	β-Cubebene	t	0.1	-	-
1390	1392	*trans*-β-Elemene	5.6	8.6	0.8	0.6
1400	1400	Tetradecane	0.1	t	-	-
1400	1403	Methyl eugenol	-	-	1.6	0.2
1404	1405	(*Z*)-β-Caryophyllene	-	t	-	-
1414	1416	*cis*-α-Bergamotene	-	-	t	-
1415	1414	α-Cedrene	0.1	t	-	-
1421	1424	(*E*)-β-Caryophyllene	15.8	20.0	1.9	5.7
1429	1433	β-Copaene	0.2	0.3	-	-
1431	1432	γ-Elemene	-	-	t	0.1
1433	1432	*trans*-α-Bergamotene	0.2	0.3	1.8	0.6
1435	1436	α-Guaiene	-	t	-	-
1444	1447	*iso*-Germacrene D	t	0.1	-	-
1447	1447	Geranyl acetone	0.1	0.1	-	-
1448	1446	*epi*-β-Santalene	-	-	t	-
1450	1451	Amorpha-4,11-diene	-	-	t	-
1453	1452	(*E*)-β-Farnesene	0.1	0.1	0.3	0.1
1455	1454	α-Humulene	1.5	1.9	0.2	1.0
1459	1458	*allo*-Aromadendrene	0.4	0.5	-	0.2

1460	1459	β-Santalene	-	-	t	-
1461	1464	9-*epi*-(*E*)-Caryophyllene	-	-	t	-
1462	1463	*cis*-Cadina-1(6),4-diene	t	t	-	-
1472	1475	Selina-4,11-diene	0.1	0.1	0.1	0.1
1476	1478	γ-Muurolene	0.4	0.3	0.1	0.2
1478	1482	γ-Curcumene	-	-	t	-
1479	1479	α-Amorphene	-	-	-	0.4
1480	1480	*ar*-Curcumene	-	-	-	0.5
1481	1480	Germacrene D	3.7	5.6	0.4	-
1483	-	Unidentified [a]	t	0.2	-	7.2
1485	1478	γ-Gurjunene	-	-	0.1	-
1487	1492	1-Pentadecene	0.8	0.4	-	-
1488	1491	10,11-Epoxycalamenene	-	-	0.1	-
1489	1492	β-Selinene	0.3	0.3	0.2	1.2
1491	1489	(*Z*,*E*)-α-Farnesene	0.2	0.4	-	-
1491	1492	Valencene	-	-	-	4.1
1492	1490	γ-Amorphene	0.1	-	0.1	-
1495	1494	α-Zingiberene	-	-	0.2	-
1495	1497	Bicyclogermacrene	-	0.6	-	-
1496	1497	α-Selinene	0.3	-	0.2	1.0
1499	1497	α-Muurolene	0.3	0.2	t	0.1
1500	1500	Pentadecane	2.0	0.6	0.2	0.3
1501	1503	(*Z*)-α-Bisabolene	-	-	0.2	-
1505	1504	(*E*,*E*)-α-Farnesene	2.7	4.9	0.2	-
1507	1511	Germacrene A	-	0.1	-	-
1508	1508	β-Bisabolene	0.4	0.3	2.7	1.0
1511	1511	(*Z*)-γ-Bisabolene	-	-	t	-
1513	1512	γ-Cadinene	0.4	0.2	-	0.4
1514	1515	Eugenyl acetate	-	0.3	2.2	0.4
1518	1518	δ-Cadinene	0.6	0.7	0.2	-
1519	1519	*trans*-Calamenene	0.1	tr	-	-
1519	1520	7-*epi*-α-Selinene	-	-	t	7.2
1524	1523	β-Sesquiphellandrene	0.1	0.1	1.8	0.4
1528	1528	(*E*)-γ-Bisabolene	-	-	1.2	-
1529	1529	(*Z*)-Nerolidol	0.1	0.2	-	-
1537	1539	α-Cadinene	0.1	0.1	-	-
1547	1547	Sesquirosefuran	0.3	0.1	-	-
1551	1546	*cis*-Sesquisabinene hydrate	0.6	0.5	-	0.7
1558	1557	Germacrene B	0.1	0.2	-	-
1562	1560	(*E*)-Nerolidol	0.8	1.0	-	-
1568	-	Unidentified [b]	-	-	-	1.1
1577	1576	Spathulenol	1.0	1.1	0.1	1.1
1582	1587	Caryophyllene oxide	7.4	5.3	0.1	20.3
1586	1590	Globulol	-	-	0.1	-

1606	1607	5-*epi*-7-*epi*-α-Eudesmol	-	-	0.1	-
1609	1613	Humulene epoxide II	0.4	0.3	-	2.3
1613	1615	Zingiberenol	-	-	0.1	-
1614	1618	1,10-di-*epi*-Cubenol	-	-	-	0.7
1625	1629	Eremoligenol	-	-	0.3	-
1627	1629	*iso*-Spathulenol	-	-	-	0.4
1628	1631	1-*epi*-Cubenol	-	-	0.1	-
1631	-	Unidentified [c]	-	-	0.3	1.5
1632	1629	*iso*-Spathulenol	-	0.2	-	-
1633	1634	*cis*-Cadin-4-en-7-ol	-	-	-	0.6
1636	1635	Caryophylla 4(12),8(13)-dien-5β-ol	-	0.1	-	1.6
1637	1638	Gossonorol	0.6	0.8	0.1	0.7
1641	1643	τ-Cadinol	0.2	0.2	-	0.2
1643	1645	τ-Muurolol	0.3	0.3	0.1	0.7
1646	1646	α-Muurolol (= δ-Cadinol)	0.1	0.1	0.1	0.5
1655	1655	α-Cadinol	0.6	0.8	0.4	2.7
1656	1653	Pogostol	-	-	-	0.7
1658	1660	Selin-11-en-4α-ol	0.1	0.3	0.4	4.7
1664	1668	Intermedeol	-	-	0.1	-
1665	1666	14-Hydroxy-9-*epi*-(E)-caryophyllene	-	-	-	2.1
1669	1674	β-Bisabolol	-	-	0.1	-
1669	1665	(*Z*)-Tetradec-9-en-1-ol	0.3	0.2	-	-
1678	1680	Tetradecanol	0.4	0.1	-	-
1680	1683	Germacra-4(15),5,10(14)-trien-1α-ol	-	-	-	0.6
1685	1679	*epi*-α-Bisabolol	-	-	0.1	-
1687	1688	α-Bisabolol	-	-	0.5	-
1687	1692	1-Heptadecene	0.7	0.2	-	-
1690	1688	(*Z*)-*trans*-α-Bergamotol	-	-	0.6	-
1690	-	Unidentified [d]	-	-	-	1.2
1701	1700	Heptadecane	0.1	-	-	-
1708	1706	(2*E*-6*Z*)-Farnesol	-	0.1	-	-
1750	1754	Dihydrobisabolone	-	-	-	0.3
1763	1765	15-Oxy-α-Muurolene	-	-	-	0.8
1792	1809	Ambrial	-	-	-	1.4
1833	-	(*Z*)-*trans*-α-Bergamotyl acetate	-	-	0.2	-
1834	1836	Neophytadiene	0.2	t	-	-
1834	1834	(*E*,*E*)-Farnesyl acetate	39.6	33.1	0.2	0.7
1836	-	*p*-Coumaroyl alcohol diacetate	-	-	0.4	-
1841	1841	Phytone	0.2	t	-	-
1860	1860	Platambin	-	0.1	-	-
1958	1958	Palmitic acid	-	0.2	-	-
2000	2000	Eicosane	-	-	-	0.2
2068	2062	Manool	-	-	-	0.2
2100	2100	Heneicosane	-	-	-	0.5

2105	2106	(*E*)-Phytol	4.5	2.5	-	-
2200	2200	Docosane	-	-	-	0.7
2210	2212	(*E*)-Phytyl acetate	0.3	0.2	-	-
2300	2300	Tricosane	-	-	-	0.7
2400	2400	Tetracosane	-	-	-	0.5
2500	2500	Pentacosane	-	-	-	0.4
2600	2600	Hexacosane	-	-	-	0.3
2700	2700	Heptacosane	-	-	-	0.2
		Monoterpene hydrocarbons	0.2	0.5	8.3	11.5
		Oxygenated monoterpenoids	0.2	0.5	48.2	1.2
		Sesquiterpene hydrocarbons	34.9	47.8	12.6	25.0
		Oxygenated sesquiterpenoids	52.3	44.5	3.7	43.4
		Diterpenoids	5.0	2.8	0.0	0.2
		Benzenoid aromatics	0.4	0.4	25.9	1.0
		Alkanes	2.3	0.7	0.2	3.6
		Others	2.7	1.3	tr	0.0
		Total identified	98.0	98.4	98.9	85.8

$RI_{calc.}$=Retention indices determined with reference to a homologous series of *n*-alkanes on a ZB-5ms column. RI_{db} = Retention indices from the databases. t = trace (<0.05%). - = not detected.

[a] MS(EI): 204(40%), 189(98%), 175(9%), 161(32%), 147(43%), 133(100%), 119(33%), 109(36%), 105(72%), 95(33%), 93(44%), 91(64%), 81(49%), 79(41%), 77(28%), 67(27%), 55(33%), 41(42%).

[b] MS(EI): 220(2%), 205(4%), 187(5%), 177(7%), 162(33%), 147(19%), 135(32%), 119(50%), 107(100%), 93(48%), 91(32%), 79(62%), 67(31%), 55(32%), 43(73%), 41(45%).

[c] MS(EI): 222(1%), 206(23%), 191(20%), 177(65%), 149(46%), 137(40%), 123(50%), 121(91%), 110(60%), 109(85%), 107(78%), 95(62%), 93(63%), 91(61%), 81(100%), 79(66%), 69(75%), 67(51%), 55(58%), 41(94%).

[d] MS(EI): 220(1%), 179(2%), 175(3%), 151(29%), 124(98%), 109(100%), 95(24%), 67(15%), 55(17%), 43(33%), 41(18%).

S1:Gas Chromatographic-Mass Spectral Analysis: Each of the *Alpinia galanga* essential oils was analyzed by GC-MS using a Shimadzu GCMS-QP2010 Ultra (Shimadzu Scientific Instruments, Columbia, MD, USA) operated in the electron impact (EI) mode (electron energy = 70 eV), scan range = 40–400 atomic mass units, scan rate = 3.0 scans/s, and GC-MS solution software. The GC column was a ZB-5 fused silica capillary column (Phenomenex, Torrance, CA, USA) (30 m length × 0.25 mm internal diameter) with a (5% phenyl)-polymethylsiloxane stationary phase and a film thickness of 0.25 μm. The carrier gas was helium with a column head pressure of 552 kPa and flow rate of 1.37 mL/min. Injector temperature was 250 °C and the ion source temperature was 200 °C. The GC oven temperature program was programmed for 50 °C initial temperature, temperature increased at a rate of 2 °C/min to 260 °C. A 5% *w*/*v* solution of the sample in CH_2Cl_2 was prepared and 0.1 μL was injected with a splitting mode (30:1).