Phytochemical Screening and Antibacterial Activity of *Taxus baccata* L. against *Pectobacterium* spp. and *Dickeya chrysanthemi*

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SUPPLEMENTARY MATERIAL

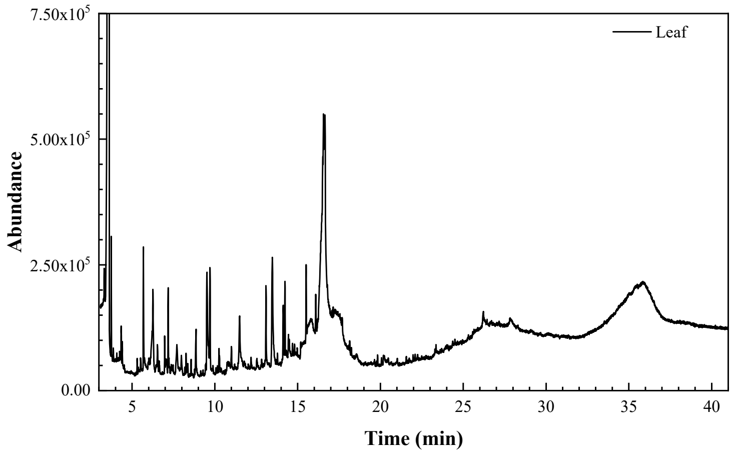

Figure S1. GC-MS chromatogram of *Taxus baccata* leaf aqueous ammonia extract.

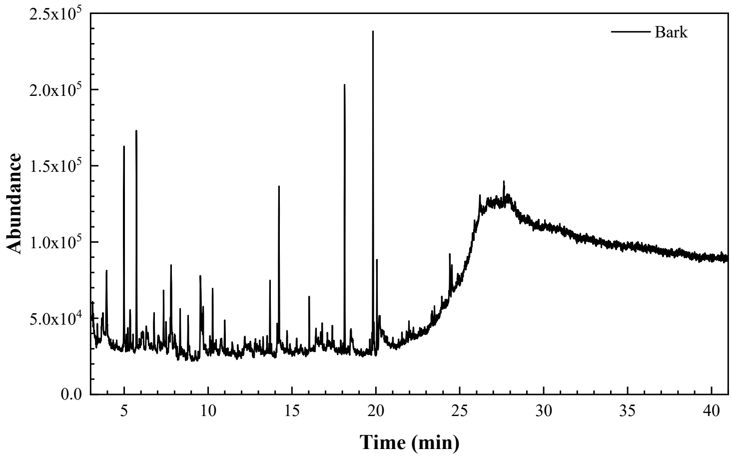

Figure S2. GC-MS chromatogram of *Taxus baccata* bark aqueous ammonia extract.

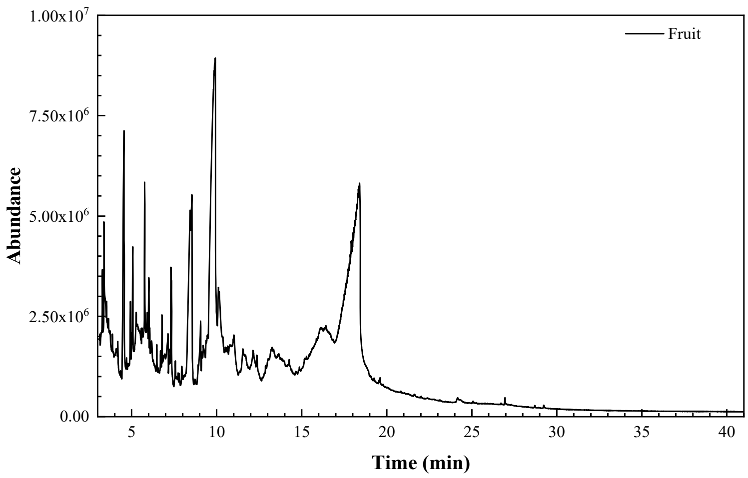

Figure S3. GC-MS chromatogram of *Taxus baccata* fruit hydromethanolic extract.

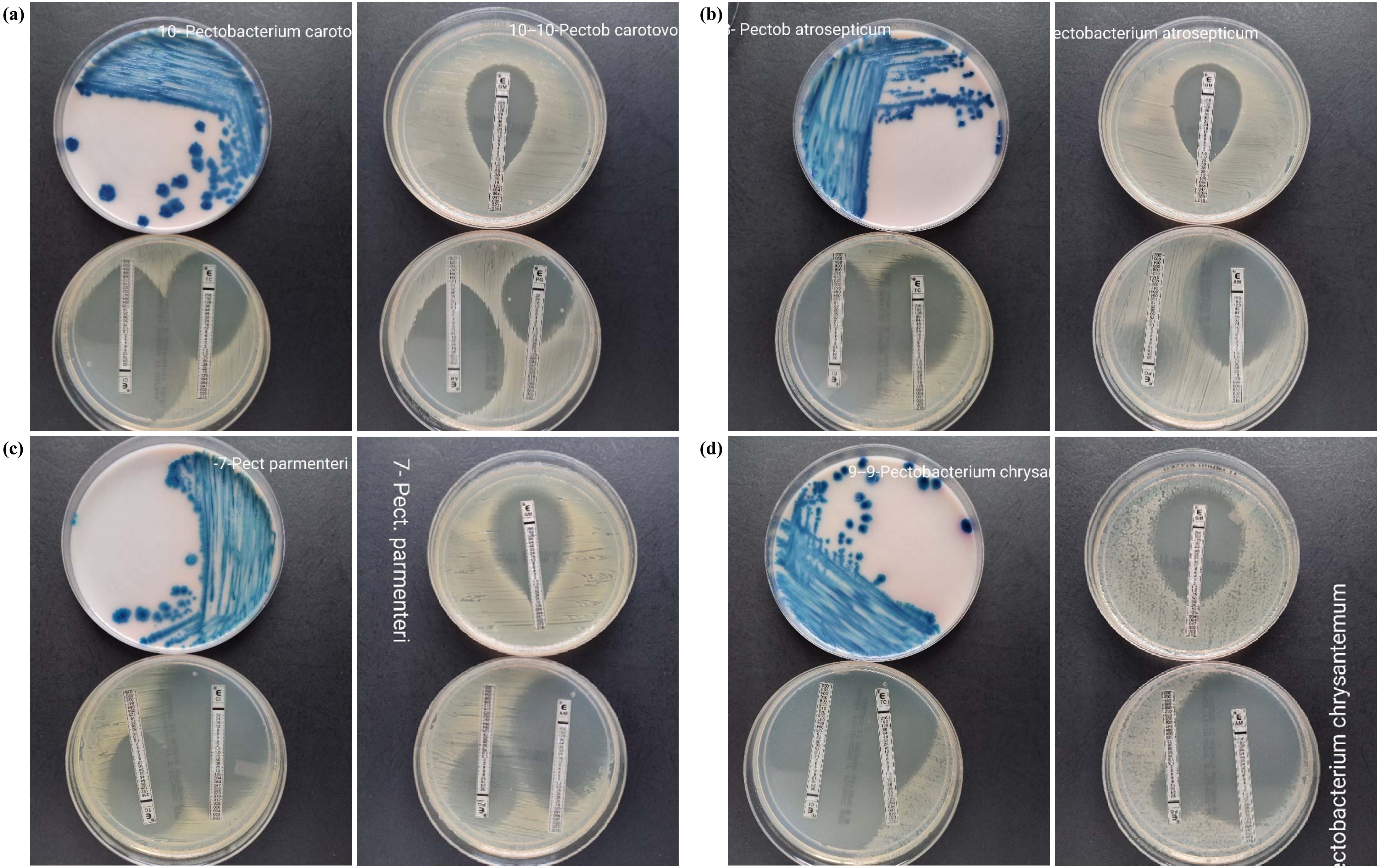

Figure S4. Examples of determination of minimum inhibitory concentrations of conventional antibiotics (for clinical use) against (**a**) *P. carotovorum* subsp. *carotovorum*; (**b**) *P. atrosepticum*; (**c**) *P. parmentieri*; and (**d**) *D. chrysanthemi* using ETEST® gradient MIC strips.

Table S1. Phytochemicals identified by GC-MS in *Taxus baccata* leaf aqueous ammonia extract.

RT (min)	Area (%)	Assignment	Qual
3.3242	0.666	Acetic acid	43
3.7456	1.455	2-Propanone, 1-hydroxy-	59
4.3450	0.912	Formic acid, 1-methylethyl ester	47
4.4103	0.534	2,3-Butanediol	50
5.3125	0.302	Oxime-, methoxy-phenyl-_	81
5.6924	2.633	2-Cyclopenten-1-one, 2-hydroxy- // 1,2-Cyclopentanedione	83 // 64
6.2147	2.968	Phenol	95
6.2681	3.918	Phenol	55
6.5411	1.239	But-3-en-1-ynyl ethyl sulfide	27
6.9744	0.912	2-Cyclopenten-1-one, 2-hydroxy-3-methyl-	95
7.0575	1.073	Benzeneacetaldehyde	70
7.1821	1.686	Pyrollidine, 2,5-bis(imino)-	59
7.7104	2.366	Phenol, 2-methoxy-	94
7.9834	0.926	N-(3,5-Dinitropyridin-2-yl)-L-aspartic acid	43
8.2683	0.534	2-Cyclopenten-1-one, 3-ethyl-2-hydroxy-	91
8.5710	0.609	Oxalic acid, isohexyl neopentyl ester	35
8.8618	1.935	Benzoic acid	97
9.5206	6.201	Catechol	97
9.7106	3.373	Benzofuran, 2,3-dihydro-	62
10.2566	0.571	3-Furylmethyl acetate	43
10.2804	0.393	Benzene, 1-methyl-4-(1-methylpropyl)-	94
11.0045	1.057	2-Methoxy-4-vinylphenol	70
11.5030	4.052	1,3-Cyclohexanedione, 2-methyl- // Cyclohexanone, 2-ethyl-	45 // 38
13.0937	2.335	Phenol, 3,5-dimethoxy-	94
13.4735	7.683	2,3-Dimethyl-cyclohexa-1,3-diene // 2-Acetyl-1-phenylhydrazine	42 // 38
14.1324	2.290	2-Butanone, 4-(4-hydroxyphenyl)-	94
14.2392	2.150	2-n-Propyladamantane	80
14.4469	0.739	Benzenepropanoic acid, 4-hydroxy-, methyl ester	68
14.4944	0.920	2,6-Dimethyl-3-aminobenzoquinone	70
15.1889	0.180	Naphthalene, 2-butyldecahydro-	60
15.5153	1.825	2-Cyclohexen-1-one, 3,5,5-trimethyl-4-(3-oxobutyl)-	98
15.6340	0.489	Card-20(22)-enolide, 3-[(2,6-dideoxy-4-O-.beta.-D-glucopyranosyl-3-O-methyl-.beta.-D-ribo-hexopyranosyl)oxy]-5,14-dihydroxy-19-oxo-, (3.beta.,5.beta.)-	53
15.6577	0.138	3-Ethyl-4-methyl-3-heptanol	43
15.8061	0.503	.alpha.-Methyl 4-O-methyl-D-mannoside	50
16.0970	1.020	Benzeneacetic acid, 4-hydroxy-3-methoxy-, methyl ester	70
16.5243	16.276	Thiophene, hexyl-	43
16.5599	6.132	Thiophene, hexyl-	35
16.6549	16.128	D-Fructose, 3-O-methyl-	50
26.2166	0.663	Benzo[h]quinoline, 2,4-dimethyl-	43

Table S2. Main phytochemicals identified by GC-MS in *Taxus baccata* bark aqueous ammonia extract.

RT (min)	Area (%)	Assignment	Qual
4.9920	11.292	Oxime-, methoxy-phenyl-_	87
5.7399	11.657	4-Acetamidobenzofuroxane // Benzoic acid, 3-(acetylamino)-, methyl ester	53 // 50
7.7994	12.174	Undecane	93
8.3455	3.184	1-Cyclohexene-1-carboxylic acid	96
8.8144	2.627	Benzoic acid	93
9.5503	6.411	Catechol	94
10.2745	4.188	Benzene, 1-methyl-4-(1-methylpropyl)-	81
13.6991	3.503	Dodecanoic acid, methyl ester	96
14.2274	8.136	3,4-Methylenedioxyphenyl acetone	72
16.0317	2.844	Methyl tetradecanoate	96
18.1447	13.524	Hexadecanoic acid, methyl ester	98
19.8303	15.679	9-Octadecenoic acid (Z)-, methyl ester	99
20.0677	4.781	Methyl stearate	99

Table S3. Phytochemicals identified by GC-MS in *Taxus baccata* fruit hydromethanolic extract.

RT (min)	Area (%)	Assignment	Qual
3.1342	0.012	1-Butanol, 2-nitro-	35
3.2826	0.393	4-Pentenoic acid ethyl ester	23
3.3776	1.245	4-Penten-2-one, 4-methyl-	14
3.5260	0.382	Furfural	60
3.6031	0.146	Furfural	76
3.6387	0.339	Furfural	60
3.7337	0.266	Furfural	46
3.8405	0.044	1H-Imidazole, 2,4-dimethyl-	47
3.8762	0.131	1,6:2,3-Dianhydro-4-O-acetyl-.beta.-d-allopyranose	14
3.9296	0.066	2-Furanmethanol	89
4.1136	0.419	2-Furanmethanol	55
4.1848	0.165	2-Furanmethanol	96
4.3450	0.019	1,2,5-Oxadiazole-3-carboxamide, 4-amino-N-(2-aminoethyl)-	28
4.5468	2.420	Butanoic acid, 2,2-dimethyl-3-oxo-, methyl ester	40
4.7012	0.134	2-Butanone, 4-methoxy-	38
4.7843	0.088	Acetic acid, hydroxy-, ethyl ester	59
4.8436	0.100	L-Talose, 6-deoxy-3-C-methyl-2-O-methyl-	42
4.9326	0.464	2-Pyrrolidinecarboxamide, 5-oxo-, (S)-	45
5.0038	0.265	1-Butanol	38
5.0691	0.730	2-Cyclopenten-1-one, 2-hydroxy-	86
5.1285	0.125	Dihydroxyacetone	50
5.2709	1.000	Hexafluoro-1,5-pentanediol	37
5.3422	0.873	1,3-Dihydroxyacetone dimer	50
5.4668	0.527	Dihydroxyacetone	59
5.5618	0.253	Dihydroxyacetone	50
5.6033	0.294	1,3-Dihydroxyacetone dimer	45
5.6449	0.219	Dihydroxyacetone	64
5.7695	1.501	2,4-Dihydroxy-2,5-dimethyl-3(2H)-furan-3-one	64
5.9238	0.975	Dihydroxyacetone	55
6.0129	0.621	2H-Pyran-2,6(3H)-dione	43
6.0663	0.347	dl-Glyceraldehyde dimer	50
6.1791	0.540	Methyl-4-azido-4-desoxy.beta.l-arabinopyranoside	72
6.2681	0.406	L-Mannose	64
6.4817	0.242	1,2-Cyclopentanedione, 3-methyl-	94
6.5530	0.141	Glyceraldehyde	64
6.6242	0.056	L-Mannose	56
6.7013	0.193	1,2-Ethanediol, monoacetate	38
6.7370	0.122	Isosorbide Dinitrate	37
6.7904	0.320	Propanal, 2,3-dihydroxy-, (S)-	25
6.8972	0.299	2,4-Imidazolidinedione, 5-methyl-	32
6.9447	0.283	Galacto-heptulose	42
7.1406	0.762	2,5-Dimethyl-4-hydroxy-3(2H)-furanone	52
7.1940	0.210	2,5-Furandicarboxaldehyde	50
7.3127	0.668	Furyl hydroxymethyl ketone	72
7.3364	0.432	2-Furancarboxylic acid, 1-methylethyl ester	38
7.5738	0.159	Cyclohexanone, 2-ethyl-	32
7.6273	0.051	d-Glycero-d-galacto-heptose	42
7.6629	0.030	1-Nitro-2-acetamido-1,2-dideoxy-d-mannitol	40
7.7341	0.086	Glyceraldehyde	35
7.7935	0.092	Pyrimidine-4,6-diol, 5-methyl-	52
7.9537	0.196	Butanoic acid, 2-ethyl-2-methyl-	38
8.0546	0.100	6-Methyl-2,3-dihydropyran-2,4-dione	32
8.1199	0.064	5,8-Tridecadione	22
8.4345	3.083	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-	76
8.5413	2.358	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl-	90
8.7194	0.109	Isosorbide Dinitrate	32
9.0577	0.911	4H-Pyran-4-one, 3,5-dihydroxy-2-methyl-	91
9.1348	0.304	Catechol	86
9.2179	0.696	2(3H)-Furanone, dihydro-4-hydroxy-	52

9.3782	0.329	Tetrahydro-4H-pyran-4-ol	49
9.4613	0.632	s-Triazole, 3-acetamido-	43
9.9183	13.191	5-Hydroxymethylfurfural	93
10.1082	2.846	6-Acetyl-.beta.-d-mannose	25
10.4643	0.136	Hexanoic acid, 3-hydroxy-, methyl ester	32
10.5118	0.343	Acetic acid n-octadecyl ester	16
10.5830	0.346	Acetic acid n-octadecyl ester	25
10.6543	0.335	Propanal, 2,3-dihydroxy-, (S)-	27
10.7670	0.891	Propanal, 2,3-dihydroxy-, (S)-	27
10.8917	0.231	Pentanoic acid, 2-methyl-4-oxo-	38
11.0163	1.583	Piperazine, 1,4-dinitroso-	25
11.3665	0.259	1-Hexene-3,5-dione	27
11.5445	1.043	Phenol, 4-propyl-	35
11.6989	0.685	1,3-Dioxane, 2-methyl-	27
11.9007	0.214	1,3-Dioxane, 4-methyl-	27
12.1440	1.362	Ethanone, 1-(3-ethylcyclobutyl)-	38
12.3636	0.755	4-Amino-1,6-dihydro-1-methyl-6-oxopyrimidine // Thiophene, 2-(1,1-dimethylethyl)-	46 // 43
12.6901	0.105	5-Hydroxymethylfurfural	27
13.0403	0.507	Propanamide, N-acetyl-	35
13.2539	1.255	1,3-Dioxolane-4-methanol, .alpha.-ethynyl-2,2-dimethyl-, acetate	14
13.3489	0.774	4-Nitro-3-oxobutyric acid, methyl ester // .alpha.-D-Mannopyranoside, methyl 3,6-anhydro-	38 // 38
13.5269	0.204	L-Alanine, 3-[(aminocarbonyl)amino]-	35
13.5863	0.280	N-Cyclooct-4-enylacetamide	42
13.6575	0.644	Isopropyl isothiocyanate	12
13.7940	0.638	Rhamnose	38
13.9424	0.538	Decane, 1-fluoro-	42
14.0908	0.187	3-Methyl-4,7-dioxo-oct-2-enal	30
14.1383	0.071	17-Pentatriacontene	22
14.2629	0.539	Imidazole, 2-fluoro-1-triacetylribofuranosyl-	12
14.4054	0.306	1-Docosanol, acetate	27
14.5478	0.231	9-Acetoxynonanal	53
14.6606	0.253	Tetraacetyl-d-glucosamine	30
14.7200	0.124	9-Acetoxynonanal	53
14.8683	0.469	.beta.-D-Glucopyranose, 4-O-.beta.-D-galactopyranosyl-	30
15.1770	0.894	Decane, 1-fluoro-	35
15.2244	0.164	Decane, 1-fluoro-	35
15.2838	0.322	Maltose	38
15.4144	0.500	1-Deoxy-d-altritol	55
15.4915	0.317	.beta.-d-Lyxofuranoside, methyl	35
15.6162	0.655	.beta.-D-Glucopyranose, 4-O-.beta.-D-galactopyranosyl-	38
15.8655	1.625	3-Deoxy-d-mannoic lactone	47
16.1444	0.433	3-Deoxy-d-mannoic lactone	74
16.2038	0.494	3-Deoxy-d-mannoic lactone	43
16.3344	0.895	3-Deoxy-d-mannoic lactone	38
16.4293	2.486	3-Deoxy-d-mannoic lactone	43
16.6845	0.917	3-Deoxy-d-mannonic acid	46
16.8685	0.505	Hydroperoxide, 1,4-dioxan-2-yl	52
16.9516	0.341	Ethanol, 2-(2-ethoxyethoxy)-, acetate	35
17.5867	5.963	1,3-Dioxolane, 2-(3-methoxypropyl)-2-methyl-	38
17.6460	0.792	Thiophane, hexyl-	38
17.6935	0.713	Uridine, 2'-O-methyl-	43
17.7529	0.989	1,3-Dioxolane, 2-methyl-2-(3-methylbutyl)-	38
17.8122	0.867	Thiophene, tetrahydro-2-methyl-	50
17.9191	1.325	Thiophene, 2-ethyltetrahydro-	43
17.9784	0.917	.alpha.-D-Xylofuranoside, methyl 2-O-methyl-	43
18.0259	1.013	.alpha.-D-Xylofuranoside, methyl 2-O-methyl-	43
18.0793	1.039	.alpha.-D-Xylofuranoside, methyl 2-O-methyl-	43
18.1328	1.126	.alpha.-D-Xylofuranoside, methyl 2-O-methyl-	43
18.3583	5.302	1-Propene, 3-[(4-nitrobutyl)thio]-	53
18.4058	4.180	.alpha.-D-Xylofuranoside, methyl 2-O-methyl-	43
19.2130	0.133	.alpha.-Methyl 4-O-methyl-D-mannoside	45
19.2783	0.358	Card-20(22)-enolide, 3-[(2,6-dideoxy-4-O-.beta.-D-glucopyranosyl-3-O-methyl-.beta.-D-ribo-hexopyranosyl)oxy]-5,14-dihydroxy-19-oxo-, (3.beta.,5.beta.)-	80

19.4860	0.111	.alpha.-Methyl 4-O-methyl-D-mannoside	43
19.5453	0.098	Card-20(22)-enolide, 3-[(2,6-dideoxy-4-O-.beta.-D-glucopyranosyl-3-O-methyl-.beta.-D-ribo-hexopyranosyl)oxy]-5,14-dihydroxy-19-oxo-, (3.beta.,5.beta.)-	72
19.6106	0.278	Card-20(22)-enolide, 3-[(2,6-dideoxy-4-O-.beta.-D-glucopyranosyl-3-O-methyl-.beta.-D-ribo-hexopyranosyl)oxy]-5,14-dihydroxy-19-oxo-, (3.beta.,5.beta.)-	62
19.7828	0.189	Card-20(22)-enolide, 3-[(2,6-dideoxy-4-O-.beta.-D-glucopyranosyl-3-O-methyl-.beta.-D-ribo-hexopyranosyl)oxy]-5,14-dihydroxy-19-oxo-, (3.beta.,5.beta.)-	64
20.8333	0.053	Card-20(22)-enolide, 3-[(2,6-dideoxy-4-O-.beta.-D-glucopyranosyl-3-O-methyl-.beta.-D-ribo-hexopyranosyl)oxy]-5,14-dihydroxy-19-oxo-, (3.beta.,5.beta.)-	38
21.6286	0.050	2,5-Furandione, dihydro-3-(2-methyl-2-propenyl)-	30
22.0263	0.007	2-Hexadecenoic acid, 2,3-dimethyl-, methyl ester, (E)-	45
22.3765	0.017	Estra-1,3,5(10)-trien-17.beta.-ol	46
23.1303	0.005	N-Isopropoxy-2-carbomethoxyaziridine	38
24.0384	0.002	Bicyclo[2.2.1]heptan-2-one, 4,7,7-trimethyl-, semicarbazone	43
24.1749	0.087	1,6-Dioxaspiro[4.4]nonane, 2-ethyl-	25
24.3233	0.068	2H-Azepin-2-one, hexahydro-1-methyl-	27
25.0236	0.004	1H-Indole, 5-methyl-2-phenyl-	38
25.0771	0.012	Ethanamine, 2-phenoxy-	35
25.2670	0.008	Acetamide, N-(1-methyl-3-phenylpropyl)-	27
25.9139	0.014	1H-Indole, 5-methyl-2-phenyl-	38
26.7152	0.015	1H-Indole, 5-methyl-2-phenyl-	35
26.7805	0.022	1H-Indole, 5-methyl-2-phenyl-	30
26.9585	0.067	1-Nonadecene	38
27.3265	0.031	Benzo[h]quinoline, 2,4-dimethyl-	43
28.3177	0.004	Benzo[h]quinoline, 2,4-dimethyl-	43
28.7154	0.015	Perhydro-htx-2-one, 2-depentyl-, acetate ester	56

Table S4. Effectiveness values reported in the literature for natural substances against *Pectobacterium atrosepticum*.

Extract / Essential Oil	Effectiveness Values	Main Phytochemical Constituents	Ref.
Taxus baccata fruit extract	MIC = 1500 µg·mL^{-1}	5-hydroxymethylfurfural (13.3%); methyl 2-O-methyl-α-D-xylofuranoside (8.3%); and 1,3-dioxolane derivatives (8.2%)	This work
T. baccata bark extract	MIC = 500 µg·mL^{-1}	9-octadecenoic acid, methyl ester (15.7%); hexadecanoic acid, methyl ester (13.5%); and undecane (12.2%)	
T. baccata leaf extract	MIC = 187.5 µg·mL^{-1}	2-hexylthiophene (22.4%); 3-O-methyl-D-fructose (16.1%); and catechol (6.2%)	
Pinus halepensis cone EO	DIZ = 10.33 mm, at 2000 µg·mL^{-1} MIC = 1000 µg·mL^{-1}	Caryophyllene (15.17%); α-pinene (13.51%); and caryophyllene oxide (12.57%)	[1]
P. halepensis cone n-butanol fraction	DIZ = 12.33 mm, at 2000 µg·mL^{-1} MIC = 225 µg·mL^{-1}	3,4-dimethyldihydrofuran-2,5-dione (36.25%); 2-methylenecholestan-3-ol (18.12%); and (Z)-9-octadecenoic acid (13.45%)	
Eryngium triquetrum aerial part EO	PI = 85%, at 40,000 µg·mL^{-1}	Falcarinal (74.8%); and octanal (5.6%)	[2]
Smyrnium olusatrum root EO	PI = 63%, at 40,000 µg·mL^{-1}	Furanoeremophilene (31.5%); furanodiene (19.1%); and E-B-caryophyllene (11%)	
Eucalyptus globulus EO	DIZ = 7.7 mm	Eucalyptol (66.21%); α-pinene (27.42%); and α-terpineol (1.82%)	[3]
P. silvestris EO	DIZ = 19.2 mm	Carene (23.51%); and bornyl acetate (20.31%)	
Lavandula angustifolia EO	DIZ = 7.2 mm	Linalyl anthranilate (23.71%); linalool (15.22%); and borneol (15.04%)	
Juniperus virginiana EO	DIZ = 12.2 mm	β-himachalene (48.02%)	
Rosmarinus officinalis EO	DIZ = 6.1 mm	Eucalyptol (34%); and camphor (23%)	
Cupressus macrocarpa branchlet EO	MIC = 170 µg·mL^{-1}	Terpinen-4-ol (23.7%); α-phellandrene (19.2%); and α-citronellol (17.3%)	[4]
Corymbia citriodora leaf EO	MIC = 170 µg·mL^{-1}	α-citronellal (56.0%); α-citronellol (14.7%); and citronellol acetate (12.3%)	
Duranta plumieri variegata	DIZ = 9.3 mm, at 2000 µg·mL^{-1}	4,7-Dimethoxy-2-methylindan-1-one (66.67%); 5-(Hexadecyloxy)-2-pentadecyl-; and trans-1,3-dioxane (8.64%)	[5]
Lantana camara leaf extract	DIZ = 9.6 mm, at 2000 µg·mL^{-1}	5,8-diethyl-dodecane (49.50%); pyrimidin-2-one, 4-[N-methylureido]-1-[4-methylaminocarbonyloxymethyl (36.26%); and oleic acid,3-(octadecyloxy)propyl ester (9.17%)	
Citharexylum spinosum leaf extract	DIZ = 13.6 mm, at 2000 µg·mL^{-1}	10-octadecenoic acid, methyl ester (24.66%); N-[5-(3-hydroxy-2-methylpropenyl)-1,3,4,5-tetrahydrobenzo[cd]indol-3-yl]-N -methylacetamide (17.02%); and 4,6-dimethyl-undecane (13.35%)	
Ceratonia siliqua leaf extract	MIC_{50} = 1500−2400 µg·mL^{-1}	n.t.	[6]
C. siliqua pod extract	n.a.		
Trachyspermum ammi EO	DIZ = 46.67 mm, at 400 µg·mL^{-1}	n.t.	[7]

Thymus vulgaris EO	DIZ = 30.67 mm, at 400 μg·mL^{-1}		
Mentha aquatica EO	DIZ = 15.33 mm, at 400 μg·mL^{-1}		
Eugenia caryophylata aerial part extract	PI = 100%, at 0.2%	n.t.	[8]
Cinnamomum zelanicum aerial part extract	PI = 100%, at 0.5%		
Datura metel aerial part extract	PI = 100%, at 0.5%		
D. stramonium leaf extract	DIZ = 11.7 mm	n.t.	[9]
Ficus carica leaf extract	DIZ = 9.5 mm		
Polygonum hydropiper leaf extract	DIZ = 9.2 mm		
Populus alba leaf extract	DIZ = 9.0 mm		
Trigonella foenum-graecum seed extract	DIZ = 8.8 mm		
Curcuma longa rhizome extract	DIZ = 8.2 mm		
Azadirachta indica leaf extract	DIZ = 8.3 mm		
Salix alba green bark extract	DIZ = 8.2 mm		
Cannabis sativa leaf PE	DIZ = 6.8 mm		
Zingiber officinale rhizome extract	DIZ = 7.3 mm		
Juglans regia leaf extract	DIZ = 6.6 mm		
Conyza canadensis leaf extract	DIZ = 6.4 mm		
Anthemis cotula leaf extract	DIZ = 4.5 mm		
Delonix regia bark extract	MIC = 4000 μg·mL^{-1}	n.t	[10]
Erythrina humeana bark extract	MIC = 1000 μg·mL^{-1}		

MIC = Minimum Concentration Inhibition; MIC_{50} = Minimum Concentration Inhibition at which 50% the isolates were inhibited; DIZ = Diameter Inhibition Zone (mm); PI = Percent Inhibition (%); PE = Plant Extract; EO = Essential Oil; n.a. = not activity; n.t. = not tested.

Table S5. Effectiveness values reported in the literature for natural substances against *Pectobacterium parmentieri*.

Extract / Essential Oil	Effectiveness Values	Main Phytochemical Constituents	Ref.
Taxus baccata fruit extract	MIC = 1000 μg·mL^{-1}	5-hydroxymethylfurfural (13.3%); methyl 2-O-methyl-α-D-xylofuranoside (8.3%); and 1,3-dioxolane derivatives (8.2%)	This work
T. baccata bark extract	MIC = 500 μg·mL^{-1}	9-octadecenoic acid, methyl ester (15.7%); hexadecanoic acid, methyl ester (13.5%); and undecane (12.2%)	
T. baccata leaf extract	MIC = 187.5 μg·mL^{-1}	2-hexylthiophene (22.4%); 3-O-methyl-D-fructose (16.1%); and catechol (6.2%)	
Eucalyptus globulus EO	DIZ = 9.5 mm	Eucalyptol (66.21%); α-pinene (27.42%); and α-terpineol (1.82%)	[3]
Pinus sylvestris EO	DIZ = 31.7 mm	Carene (23.51%); and bornyl acetate (20.31%)	
Lavandula angustifolia EO	DIZ = 10.0 mm	Linalyl anthranilate (23.71%); linalool (15.22%); and borneol (15.04%)	
Juniperus virginiana EO	DIZ = 4.9 mm	β-himachalene (48.02%)	
Rosmarinus officinalis EO	DIZ = 9.0 mm	Eucalyptol (34%); and camphor (23%)	
Citrus paradisi EO	DIZ = 16.8 mm	Limonene (32.46%); and borneol (10.94%)	
Delonix regia bark extract	MIC = 4000 μg·mL^{-1}	n.t	[10]
Erythrina humeana bark extract	MIC = 2000 μg·mL^{-1}		

MIC = Minimum Concentration Inhibition; DIZ = Diameter Inhibition Zone (mm); EO = Essential Oil; n.a. = not activity; n.t. = not tested.

Table S6. Effectiveness values reported in the literature for natural substances against *Pectobacterium carotovorum* subsp. *carotovorum*.

Extract / Essential Oil	Effectiveness Values	Main Phytochemical Constituents	Ref.
Taxus baccata fruit extract	MIC = 1500 μg·mL^{-1}	5-hydroxymethylfurfural (13.3%); methyl 2-O-methyl-α-D-xylofuranoside (8.3%); and 1,3-dioxolane derivatives (8.2%)	This work
T. baccata bark extract	MIC = 500 μg·mL^{-1}	9-octadecenoic acid, methyl ester (15.7%); hexadecanoic acid, methyl ester (13.5%); and undecane (12.2%)	
T. baccata leaf extract	MIC = 187.5 μg·mL^{-1}	2-hexylthiophene (22.4%); 3-O-methyl-D-fructose (16.1%); and catechol (6.2%)	
Eucalyptus globulus EO	DIZ = 5.4 mm	Eucalyptol (66.21%), α-pinene (27.42%), and α-terpineol (1.82%)	[3]
Pinus sylvestris EO	DIZ = 26.6 mm	Carene (23.51%), and bornyl acetate (20.31%)	
Lavandula angustifolia EO	DIZ = 12.4 mm	Linalyl anthranilate (23.71%), linalool (15.22%), and borneol (15.04%)	
Juniperus virginiana EO	DIZ = 5.3 mm	β-himachalene (48.02%)	
Rosmarinus officinalis EO	DIZ = 10.8 mm	Eucalyptol (34%), and camphor (23%)	
Citrus paradisi EO	DIZ = 16.8 mm	Limonene (32.46%), and borneol (10.94%)	
Cupressus macrocarpa branchlet EO	MIC = 130 μg·mL^{-1}	Terpinen-4-ol (23.7%), α-phellandrene (19.2%), and α-citronellol (17.3%)	[4]
Corumbia citriodora leaves EO	MIC = 160 μg·mL^{-1}	α-citronellal (56.0%), α-citronellol (14.7%), and citronellol acetate (12.3%)	
Duranta plumieri variegata	DIZ = 11.3 mm, at 2000 μg·mL^{-1}	4,7-Dimethoxy-2-methylindan-1-one (66.67%), 5-(Hexadecyloxy)-2-pentadecyl-, trans-1,3-dioxane (8.64%), and 2-(2-Aminopropoxy)-3-methyl-benzenemethanol (5.46%)	[5]
Lantana camara leaf PE	DIZ = 12.3 mm, at 2000 μg·mL^{-1}	5,8-Diethyl-dodecane (49.50%), Pyrimidin-2-one, 4-[N-methylureido]-1-[4-methylaminocarbonyloxymethyl (36.26%), and oleic acid,3-(octadecyloxy)propil ester (9.17%)	
Citharexylum spinosum leaf PE	DIZ = 10.3 mm, at 2000 μg·mL^{-1}	10-Octadecenoic acid, methyl ester (24.66%), N-[5-(3-Hydroxy-2-methylpropenyl)-1,3,4,5-tetrahydrobenzo[cd]indol-3-yl]-N -methylacetamide (17.02%), and 4,6-Dimethyl-undecane (13.35%)	
Origanum rotundifolium EO	MIC = 7.81 μL·mL^{-1}	thymol (40.86%), carvacrol (43.62%), and p-cymene (5.95%)	[11]
Bougainvillea spectabilis bark PE	DIZ = 12 mm, at 4000 μg·mL^{-1}	Nonanal (38.28%), cis-2-nonenal (9.75%), and octanal (8.16%)	[12]
Citharexylum spinosum wood PE	DIZ = 10 mm, at 4000 μg·mL^{-1}	2-undecenal (22.39%), trans-2-decenal (18.74%), and oleic acid (10.85%)	
Hyssopus officinalis EO	Sub-MIC = 10,000 μg·mL^{-1}	n.t	[13]
	DIZ = 11 mm		
Satureja khuzistanica EO	Sub-MIC = 90 μg·mL^{-1}		
	DIZ = 28−29 mm		
Zataria multiflora EO	Sub-MIC = 110 μg·mL^{-1}		
	DIZ = 23 mm		
Rhus ciliata PE	n.a., at 2500 μg·mL^{-1}	n.t.	[14]

R. erosa PE	n.a., at 2500 μg·mL^{-1}		
R. lancea PE	n.a., at 2500 μg·mL^{-1}		
Asclepias fruticosa PE	DIZ = 7 mm, at 2500 μg·mL^{-1}		
Protasparagus laricinus PE	DIZ = 7 mm, at 2500 μg·mL^{-1}		
Bulbine asphodeloides inflorescence PE	n.a., at 2500 μg·mL^{-1}		
B. asphodeloides root PE	DIZ = 9 mm, at 2500 μg·mL^{-1}		
Senecio radicans PE	DIZ = 7 mm, at 2500 μg·mL^{-1}		
Vernonia oligocephala PE	n.a., at 2500 μg·mL^{-1}		
Ehretia rigida PE	DIZ = 7 mm, at 2500 μg·mL^{-1}		
Coccinia sessilifolia	n.a., at 2500 μg·mL^{-1}		
Diospyros austro-africana var. *microphylla*	n.a., at 2500 μg·mL^{-1}		
Euclea crispa subsp. *crispa*	DIZ = 10 mm, at 2500 μg·mL^{-1}		
Acacia erioloba	DIZ = 13 mm, at 2500 μg·mL^{-1}		
A. hebeclada subsp. *hebeclada*	DIZ = 7 mm, at 2500 μg·mL^{-1}		
A. karroo	n.a., at 2500 μg·mL^{-1}		
Elephantorrhiza elephantina	n.a., at 2500 μg·mL^{-1}		
Senna italica subsp. *arachoides*	DIZ = 7 mm, at 2500 μg·mL^{-1}		
Buddleja saligna	DIZ = 11 mm, at 2500 μg·mL^{-1}		
Olea europaea subsp. *africana*	n.a., at 2500 μg·mL^{-1}		
Rumex lanceolatus	n.a., at 2500 μg·mL^{-1}		
Clematis brachiata	n.a., at 2500 μg·mL^{-1}		
Ranunculus multifidus	n.a., at 2500 μg·mL^{-1}		
Ziziphus mucronata subsp. *mucronata*	n.a., at 2500 μg·mL^{-1}		
Osyris lanceolata	n.a., at 2500 μg·mL^{-1}		
Grewia flava	n.a., at 2500 μg·mL^{-1}		
G. occidentalis	n.a., at 2500 μg·mL^{-1}		
Datura stramonium seed PE	DIZ = 20−26 mm		
Datura stramonium leaf PE	DIZ = 19−24.66 mm		
Urtica dioica leaf PE	DIZ = 19.33−25.33 mm		
Trigonella foenumgraecum seed PE	DIZ = 17.66−23.33 mm		
Syzygium aromaticum clove PE	DIZ = 15.66−22 mm	n.t.	[15]
Salix alba leaf PE	DIZ = 15.66−21.33 mm		
Hibiscus rosa-sinensis leaf PE	DIZ = 15−21.33 mm		
Eucalyptus sp. leaf PE	DIZ = 14.33−20.66 mm		
Azadirachta indica leaf PE	DIZ = 14.33−20 mm		

Conyza canadensis leaf PE	DIZ =14−19.66 mm		
Cupressus torulosa leaf PE	DIZ = 13−18.66 mm		
Morus alba leaf PE	DIZ = 11.66−15.33 mm		
Ficus carica leaf PE	DIZ = 11.66−15.33 mm		
Polygonum hydropipe leaf PE	DIZ = 11−15.33 mm		
Juglans regia leaf PE	DIZ = 11−15 mm		
Cannabis sativa leaf PE	DIZ = 10.66−14.66 mm		
Ricinus communis root PE	DIZ = 10−13 mm		
Pinus sp. needle PE	DIZ = 9.66−12.33 mm		
Populus alba leaf PE	DIZ = 9.66−12 mm		
Artemisia absinthium leaf PE	DIZ = 9.5−12 mm		
J. regia fruit cover PE	DIZ = 9.33−11.33 mm		
Allium sativum clove PE	DIZ = 9−11 mm		
Anthemis cotula leaf PE	DIZ = 8.66−10.66 mm		
Zingiber officinale rhizome PE	DIZ = 8.66−10 mm		
Plantago major leaf PE	DIZ = 4.66−8 mm		
Lavandula sp. leaf PE	DIZ = 4.5−4.66 mm		
Delonix regia bark PE	MIC = 2000 $\mu g \cdot mL^{-1}$	n.t	[10]
Erythrina humeana bark PE	MIC = 2000 $\mu g \cdot mL^{-1}$		

Table S7. Effectiveness values reported in the literature for natural substances against *Dickeya chrysanthemi*.

Extract / Essential Oil	Effectiveness Values	Main Phytochemical Constituents	Ref.
Taxus baccata fruit extract	MIC = 1500 μg·mL^{-1}	5-hydroxymethylfurfural (13.3%); methyl 2-O-methyl-α-D-xylofuranoside (8.3%); and 1,3-dioxolane derivatives (8.2%)	This work
T. baccata bark extract	MIC = 750 μg·mL^{-1}	9-octadecenoic acid, methyl ester (15.7%); hexadecanoic acid, methyl ester (13.5%); and undecane (12.2%)	
T. baccata leaf extract	MIC = 187.5 μg·mL^{-1}	2-hexylthiophene (22.4%); 3-O-methyl-D-fructose (16.1%); and catechol (6.2%)	
Salvia mukerjeei aerial part EO	DIZ = 18 mm	β-Caryophyllene (28.7%), γ-Muurolene (15.5%), and Dehydro-aromadendrane (9.5%)	[16]
Inula cappa aerial part EO	DIZ = 9 mm	β-Caryophyllene (27.5%), cis-dihydro-mayurone (6.7%), and β-bisabolene (6.5%)	[17]
Anisomeles indica EO	MIC = 31.25 μL·mL^{-1}	Abietadiene (20.5%), β-caryophyllene (8.8%), and linoleic acid (8.7%)	[18]
Salvia hians aerial part EO	MIC = 31.25 μL·mL^{-1}	γ-cadinene (10.9%), δ-cadinene (9.2%), and caryophyllene acetate (9.7%)	[19]
Origanum rotundifolium EO	MIC = 7.81 μL·mL^{-1}	thymol (40.86%), carvacrol (43.62%), and p-cymene (5.95%)	[11]
Thymus pallidus leaf EO	DIZ = 11.25 mm	α-terpinene (42.21%), thymol (23.95%), and methone (4.54%)	[20]
T. pallidus leaf PE	Inhibition at 100 mg of dry matter·mL of culture medium^{-1}	n.t	
Cananga odorata EO	DIZ = 8.33 mm	Phthalic acid (49.46%), linalool (14.52%), and benzyl acetate (13.46%)	[21]
Carum carvi EO	DIZ = 3 mm	Limonene (54.42%), carvone (29.90%), and benzene (7.94%)	
Cinnamomum camphora EO	DIZ = 5 mm	Iso camphene (16.78%), α-campholenal (14.97%), and β-4-dimethyl (14.80%)	
C. cassia EO	DIZ = 43 mm	(E)-cinnmaldehyde (66.36%), benzyl benzoate (10.24%), and β-linalool (9.16%)	
C. zeylanicum EO	DIZ = 41.6 mm	(E)-cinnmaldehyde (64.13%), β-linalool (10.25%), and benzyl benzoate (9.26%)	
Citrus bigaradia EO	DIZ = 24 mm	Linalool (56.51%), Linalyl acetate (24.12%), and Cymene (5.15%)	
Cymbopogon citratus EO	DIZ = 8.6 mm	Citral (29.40%), β-Citral (21.39%), and nerol acetate (10.81%)	
Laurus nobilis EO	DIZ = 3 mm	Eugenol (50.40%), benzyldehyde (10.96%), and caryophyllene (10.23%)	
Syzygium aromaticum EO	DIZ = 10 mm	Eugenol (47.64%), benzyl alcohol (34.10%), and 3 allyl-6-methoxyphenol (4.98%)	
T. vulgaris EO	DIZ = 3 mm	Camphene (87.29%), p-cymol (6.50%), and terpinene (4.16%)	
Daucus carota EO	DIZ = 3 mm	n.t.	
Foeniculum vulgare EO	DIZ = 7.66 mm		
Gaultheria frangrantissima EO	DIZ = 3 mm		
Jasminum grandiflorum EO	DIZ = 4 mm		
Marjorana hortensis EO	DIZ = 7.33 mm		
Melaleuca alternifolia EO	DIZ = 10 mm		
M. leucadendron EO	DIZ = 13.6 mm		
M. quinquenervia EO	DIZ = 8 mm		
Nardostachys jatamansi EO	DIZ = 3 mm		
Ocimum basilicum EO	DIZ = 5 mm		

Pimpinella anisum EO	DIZ = 5 mm		
Pinus sylvestris EO	DIZ = 5 mm		
Pelargonium graveolens EO	DIZ = 9.33 mm		
Primula rosea EO	DIZ = 2 mm		
Rosmarinus officinalis EO	DIZ = 4 mm		
Simmondsia chinensis EO	DIZ = 3 mm		
Triticum sativum EO	DIZ = 3 mm		
Anethum graveolens EO	DIZ = 3 mm		
Aniba rosaeodora EO	DIZ = 5 mm		
Brarringtonia acutangula EO	DIZ = 3 mm		
Citrus limon EO	DIZ = 5 mm		
C. aurantium EO	DIZ = 5 mm		
Corylus avellana EO	DIZ = 4 mm		
Crocus sativus EO	DIZ = 4 mm		
Cupressus sempervirens EO	DIZ = 11 mm		
C. nobilis leaf EO	DIZ = 15.67 mm	n.t.	[22]
C. nobilis peel EO	DIZ = 20 mm		
Delonix regia bark PE	MIC = 500 $\mu g \cdot mL^{-1}$	n.t	[10]
Erythrina humeana bark PE	MIC = 500 $\mu g \cdot mL^{-1}$		

MIC = Minimum Concentration Inhibition; MIC_{50} = Minimum Concentration Inhibition at which 50% the isolates were inhibited; Sub-MIC = concentration of an antimicrobial agent that is not active on bacterial growth but is still active in altering bacterial biochemistry and shape; DIZ = Diameter Inhibition Zone (mm); PI = Percent Inhibition (%); PE = Plant Extract; EO = Essential Oil; n.a. = not activity; n.t. = not tested

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