

Supplementary materials

Profiling metabolites with antifungal activities from endophytic plant-beneficial strains of *Pseudomonas chlororaphis* isolated from *Chamaecytisus albus* (Hack.) Rothm.

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2.3. The analysis of diffussible metabolites

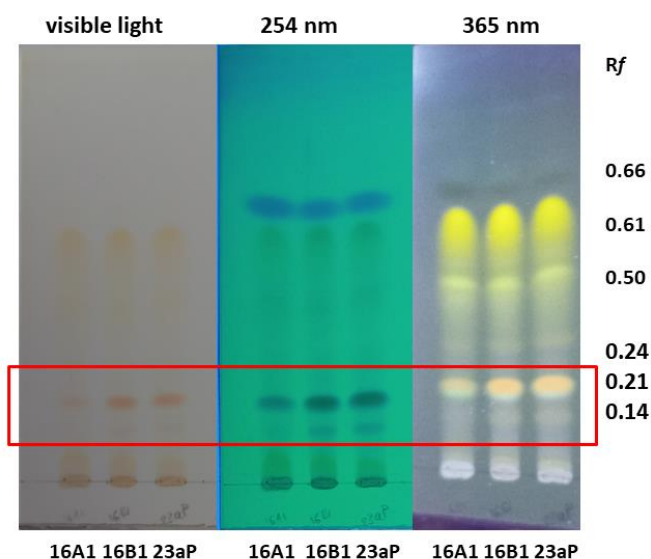


Figure S1. HPTLC chromatograms of ethyl acetate extracts of cell-free *Pseudomonas chlororaphis* culture supernatants. Separation was performed twice with chloroform/acetic acid (49:1; v/v) as the developing mixture. The area containing the spots with the greatest difference in intensity is marked with a red frame. 16A1, 16B1, 23aP – strains tested

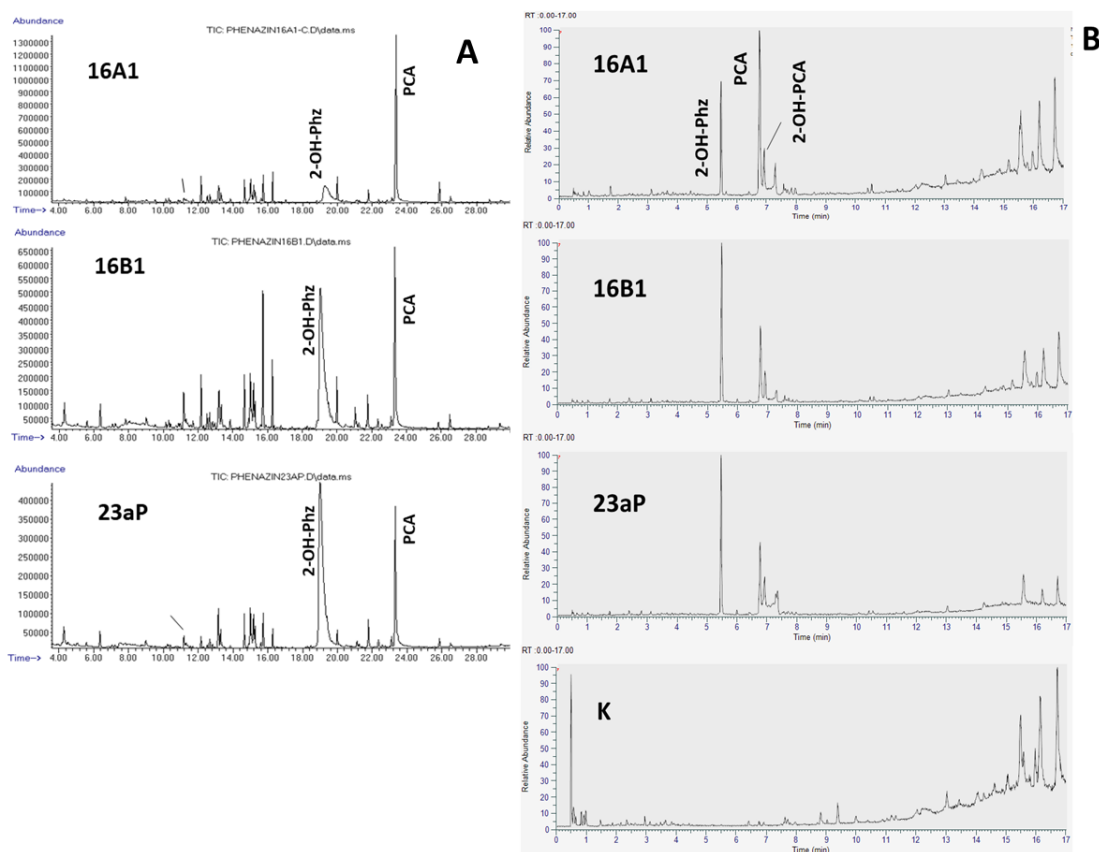
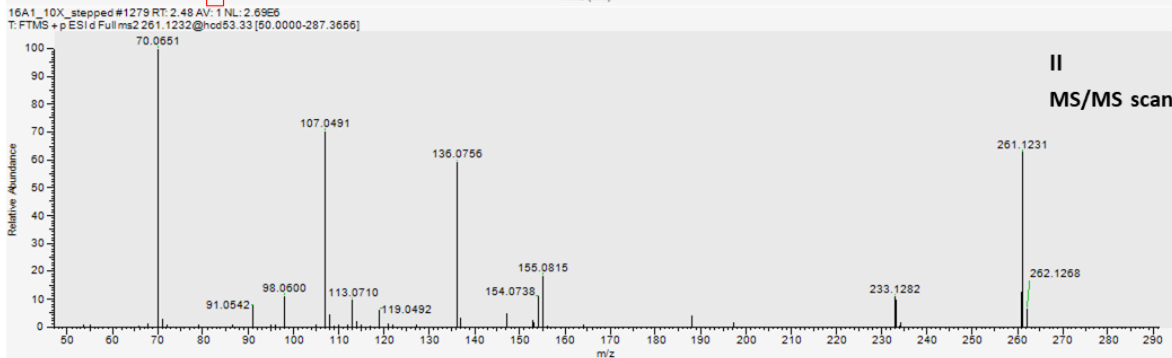
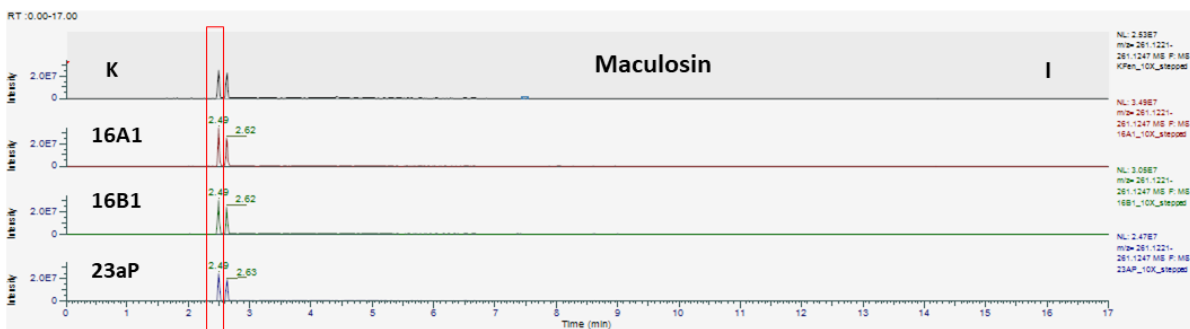
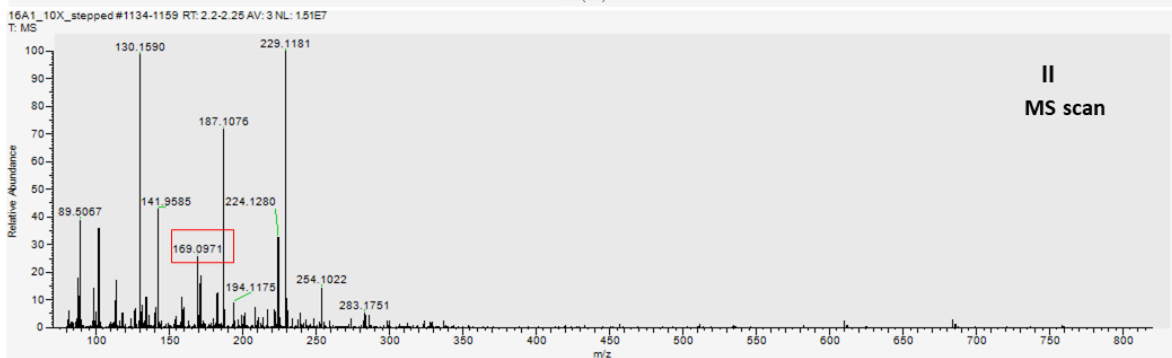
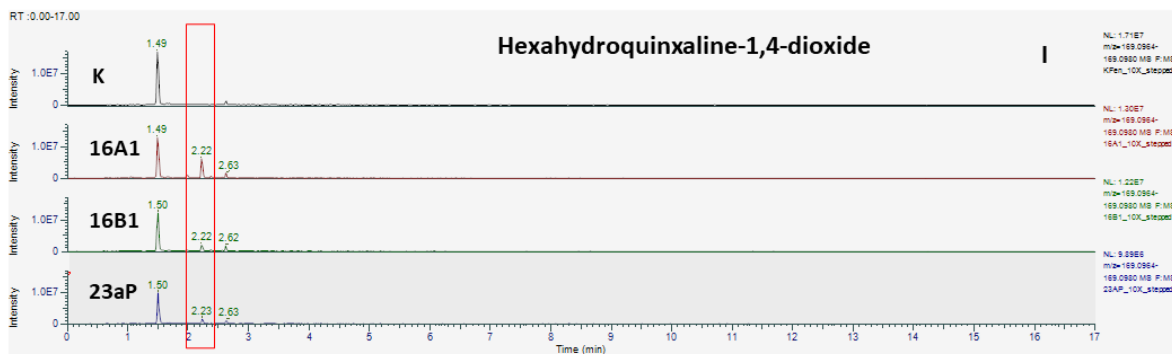
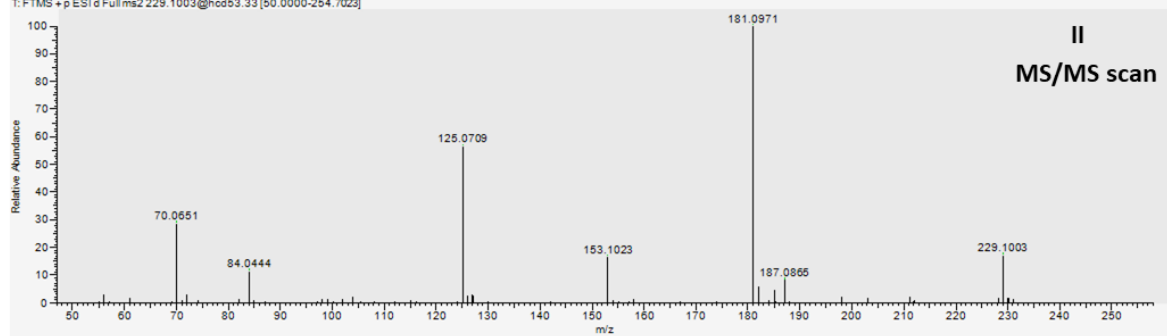
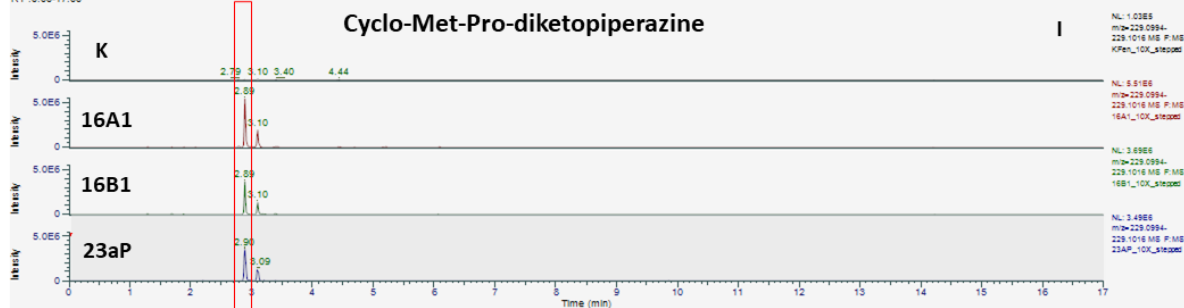
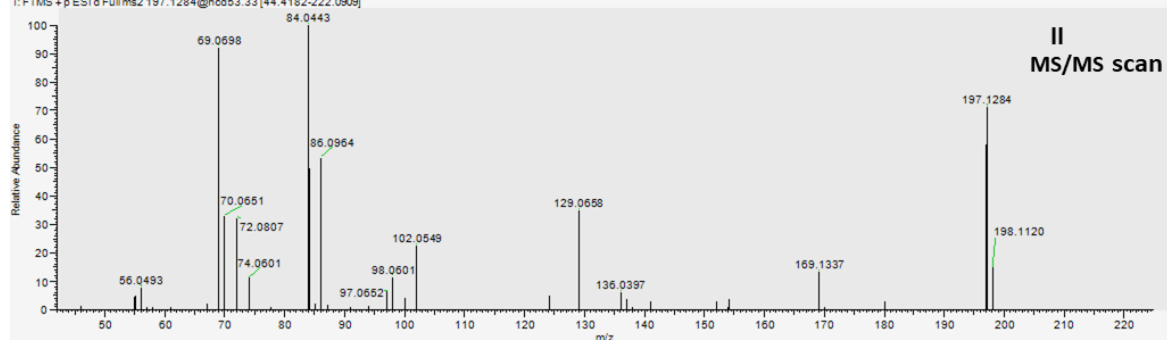
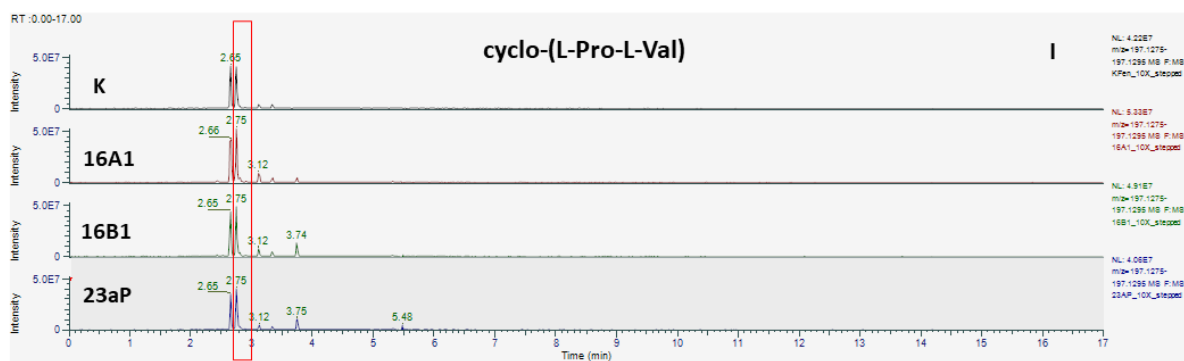


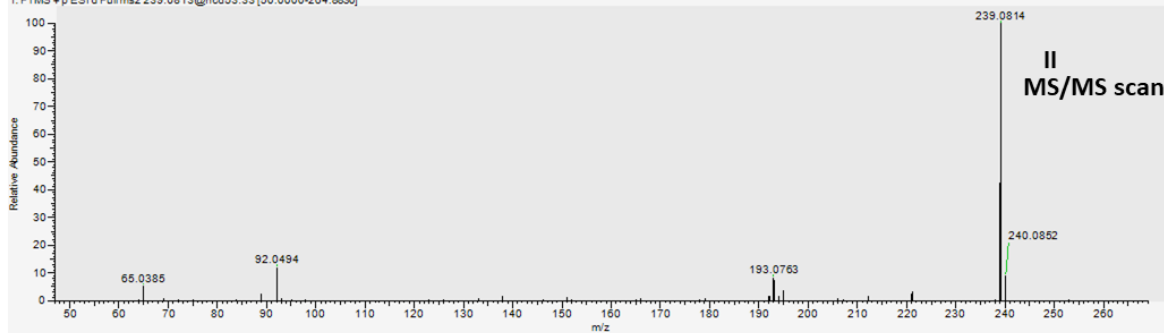
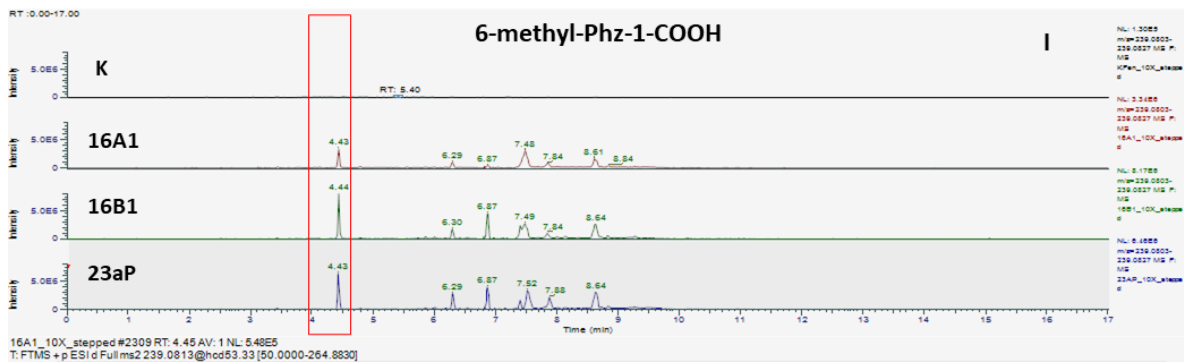
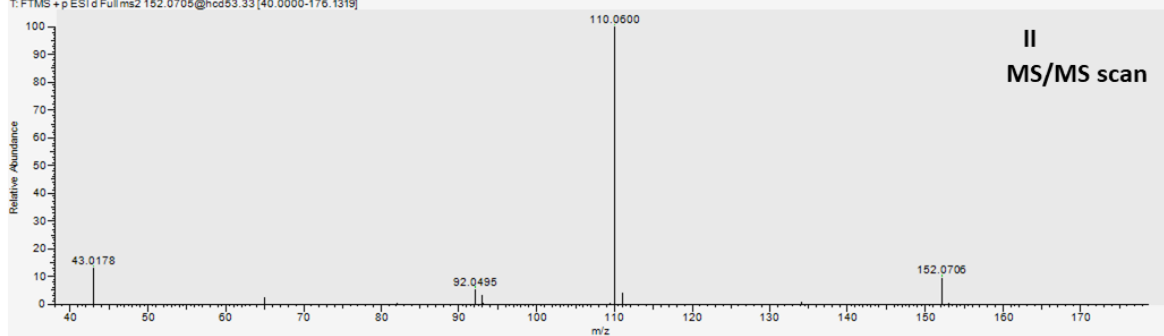
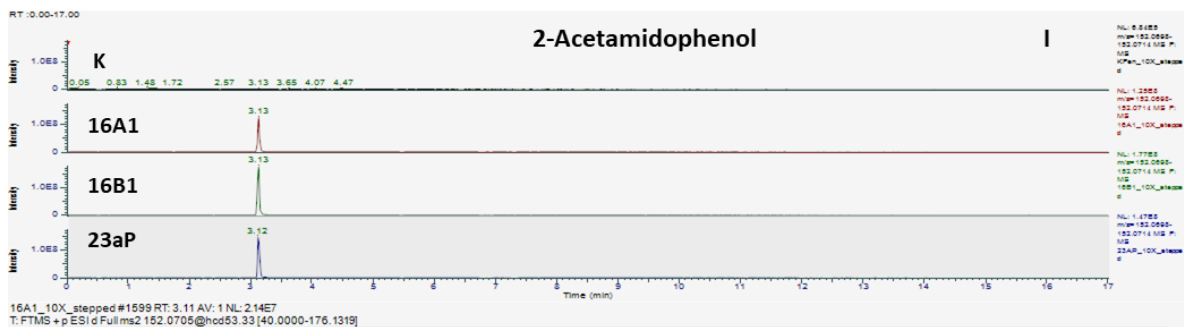
Figure S2. Chromatograms of metabolites obtained of cell-free supernatants of 16A1, 16B1, and 23aP *P. chlororaphis* cultures registered in (A) GC – MS analysis, (B) LC – MS analysis. K – negative control; ethyl acetate extract obtained from bacteria-free 79CA medium. Abbreviations: 2-OH-Phz – 2-hydroxyphenazine, PCA – phenazine-1-carboxylic acid, 2-hydroxy-1-carboxylic acid.

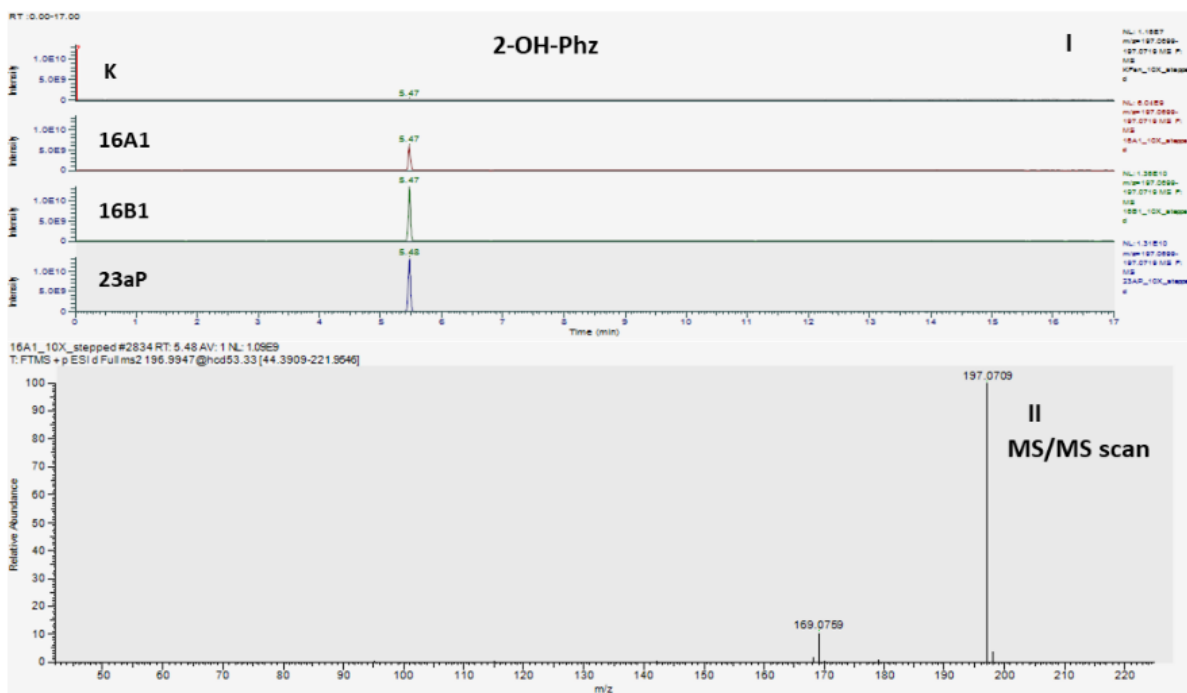
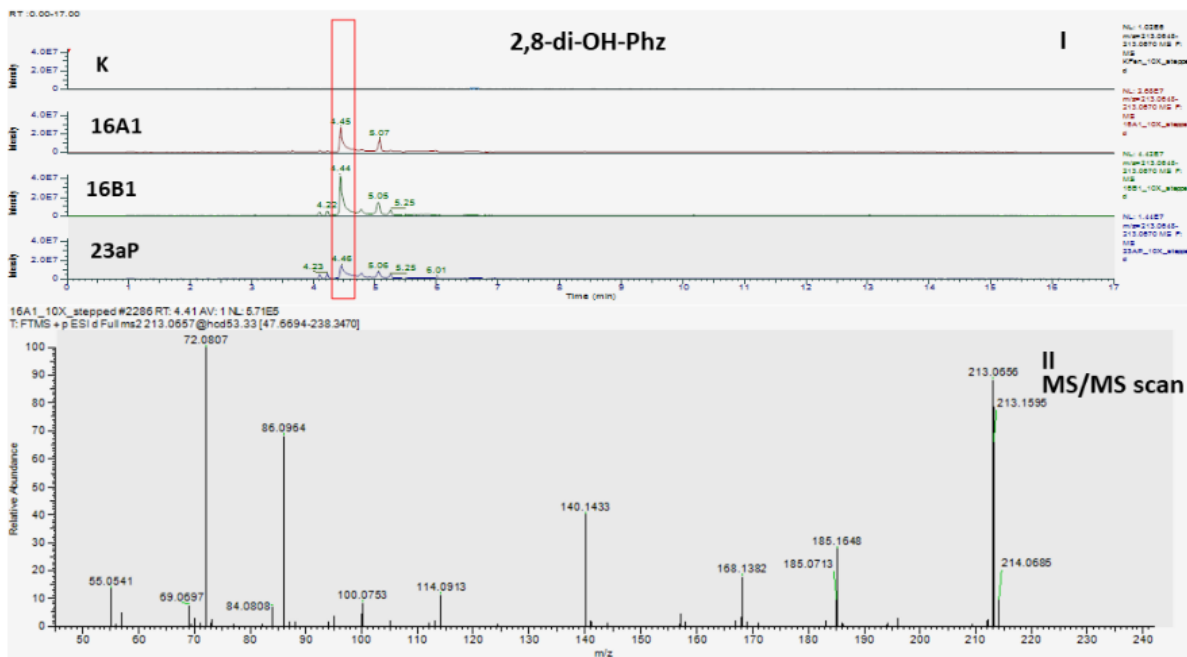
Table S1. The relative contents of metabolites in LC – MS analysis calculated according to corrected mass spectra peak areas.

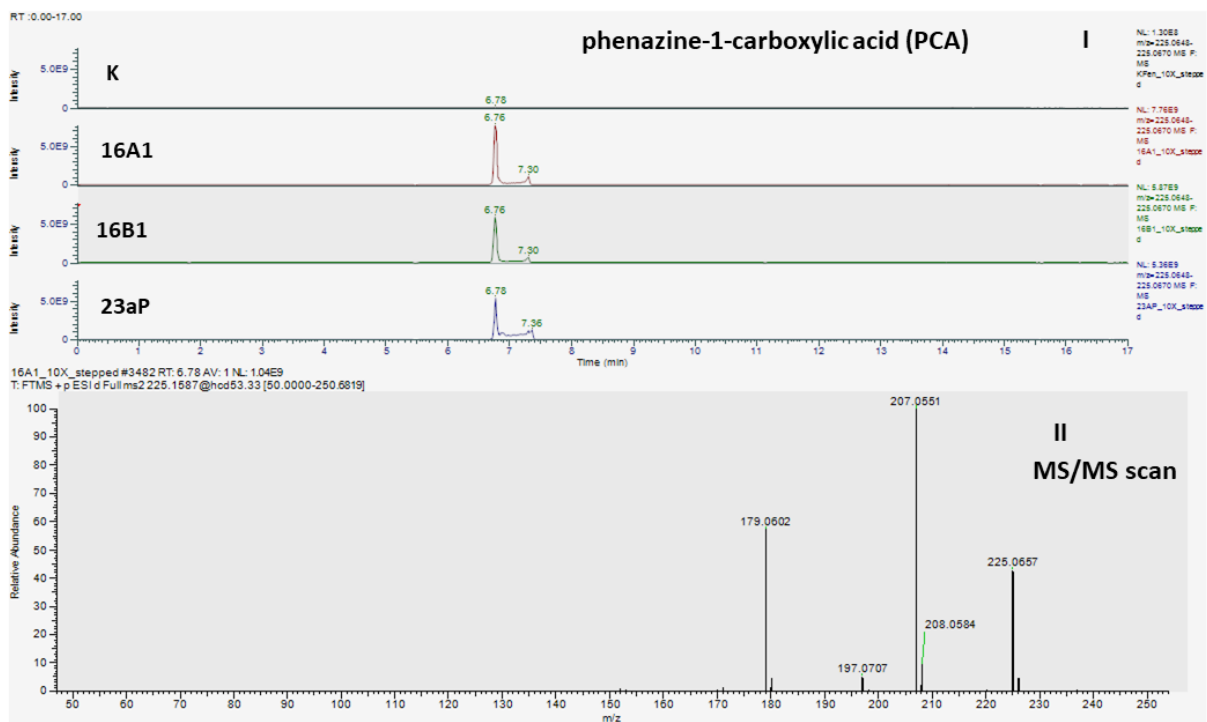
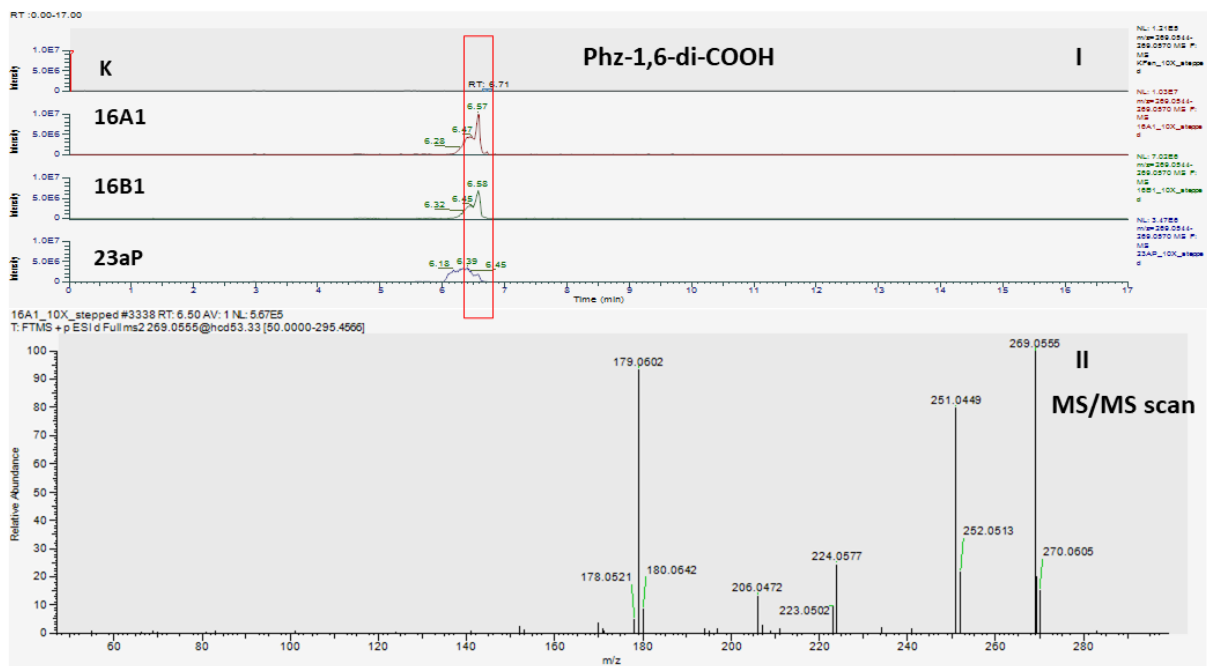
Metabolites	Relative content (%)		
	16A1	16B1	23aP
hexahydroquinoxaline-1,4-dioxide	0.024	0.008	0.006
maculosin [cyclo-(L-Pro-L-Tyr)]	0.116	0.085	0.075
cyclo-(L-Pro-L-Val)	0.203	0.144	0.140
cyclo-(L-Pro-L-Met-diketopiperazine)	0.012	0.010	0.012
2-acetamidophenol	0.610	0.685	0.668
6-methyl-PCA	0.013	0.025	0.023
2,8-di-OH-Phz	0.262	0.314	0.160
2-OH-Phz	28.318	52.556	56.369
Phz-1,6-di-COOH	0.198	0.111	0.144
PCA	58.210	34.778	29.493
2-OH-PCA	11.308	10.776	12.146
lahorenoic acid A	0.236	0.100	0.118
phenazine	0.289	0.168	0.186
lahorenoic acid C	0.194	0.242	0.248
pyrrolnitrin	0.001	0.003	0.002

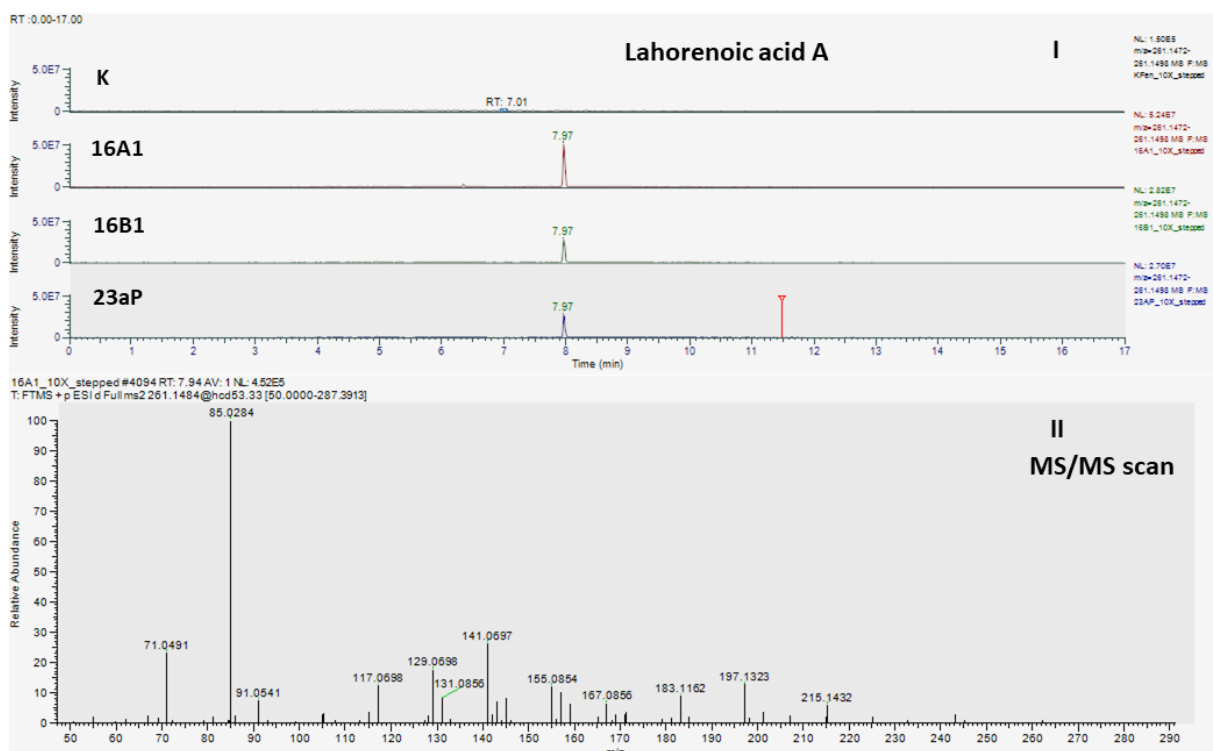
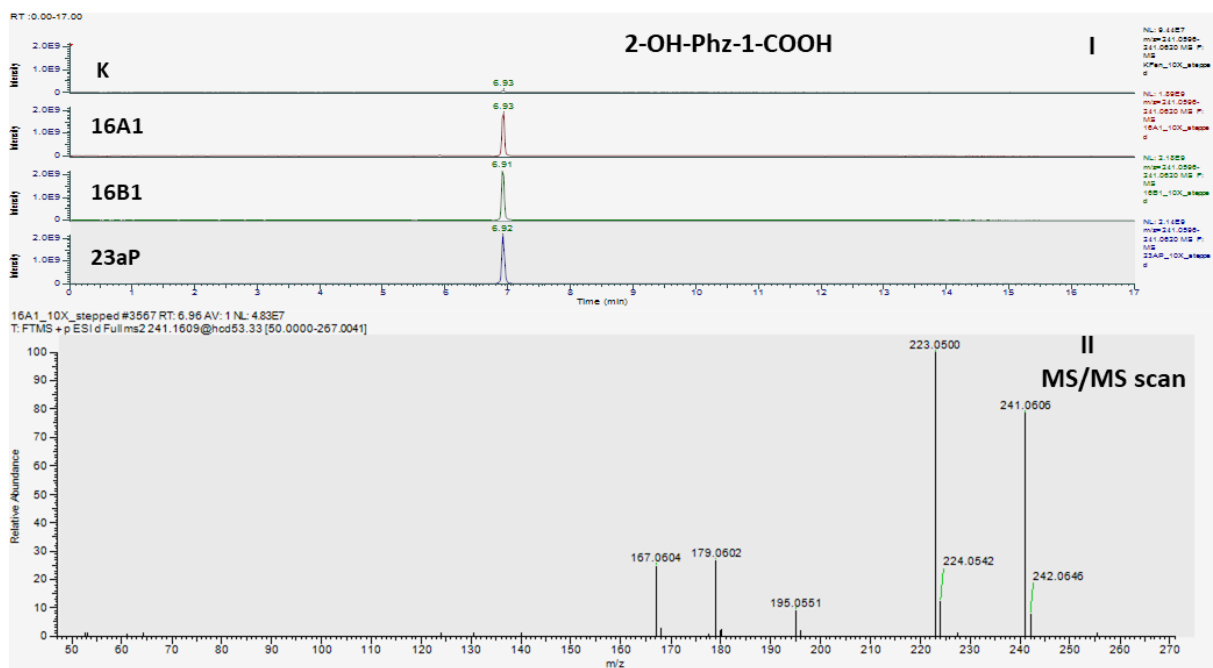


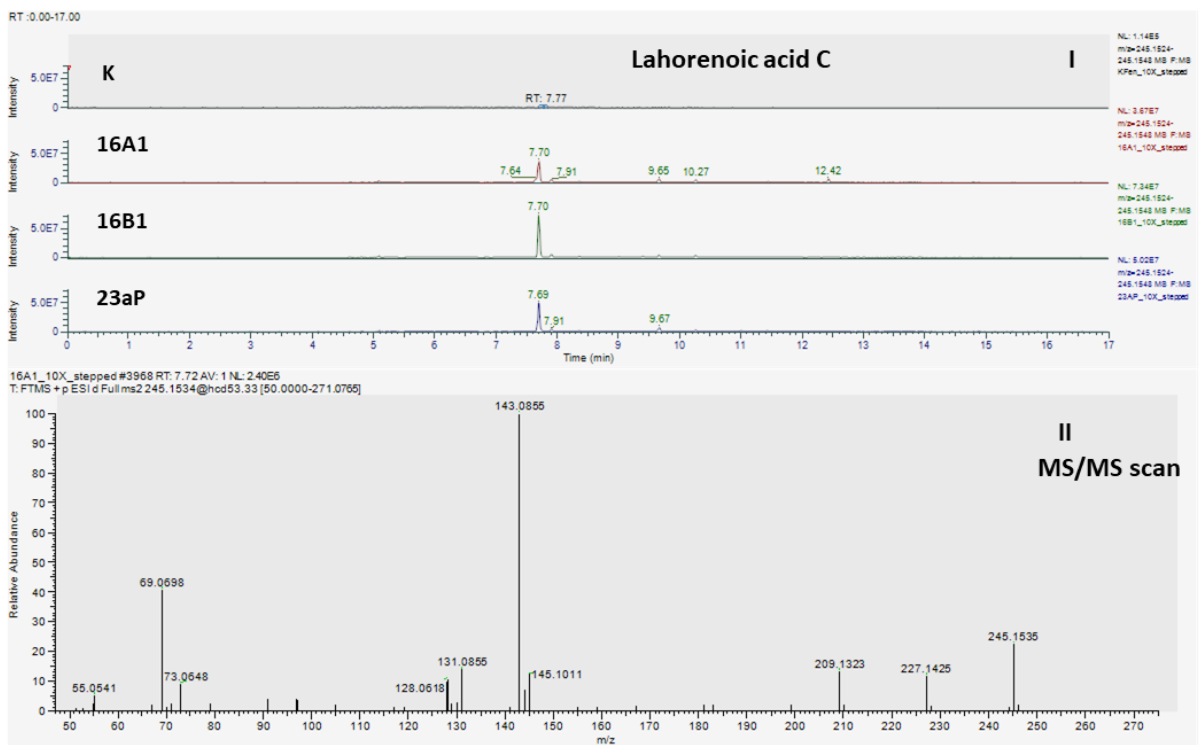
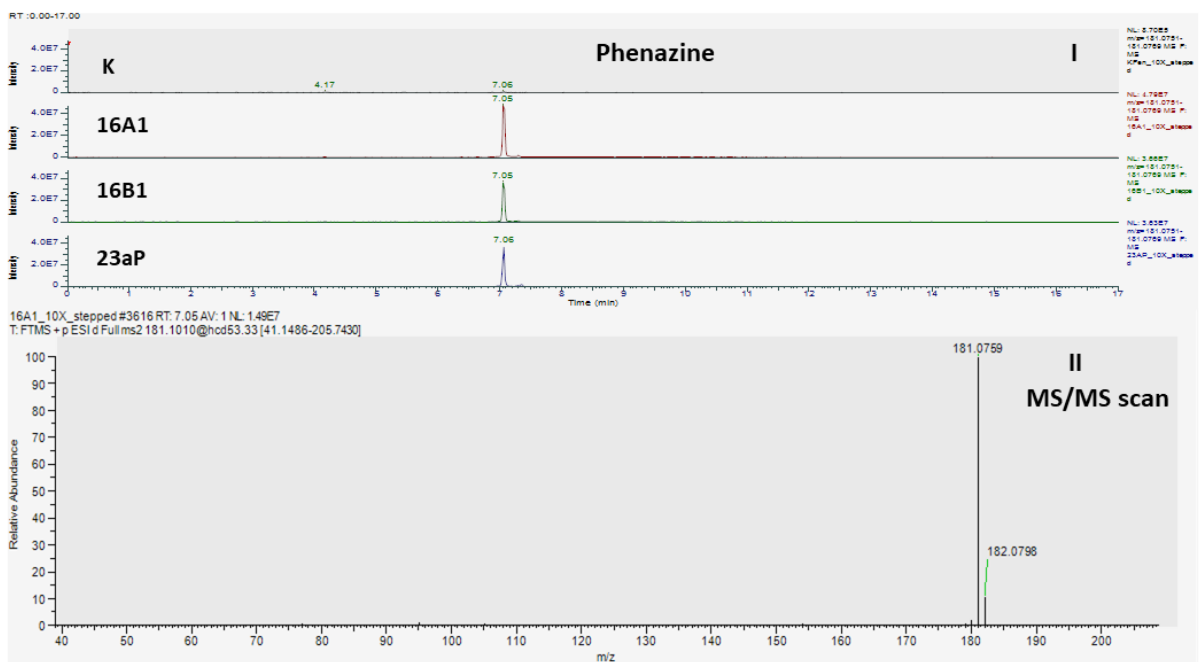












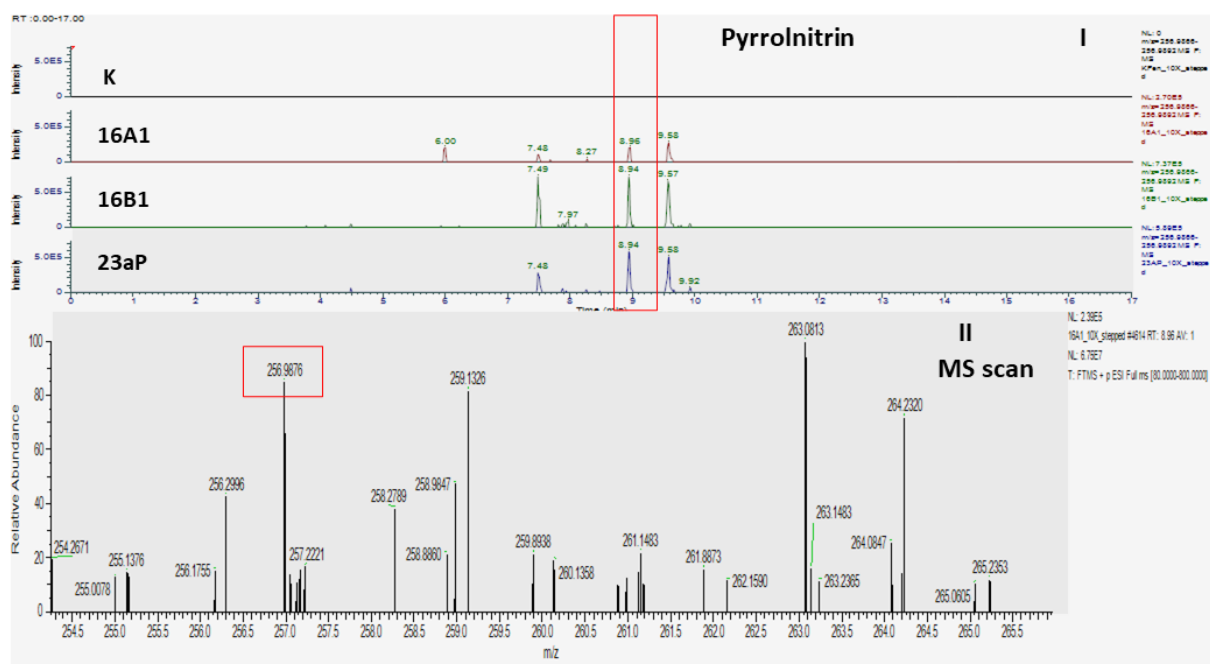
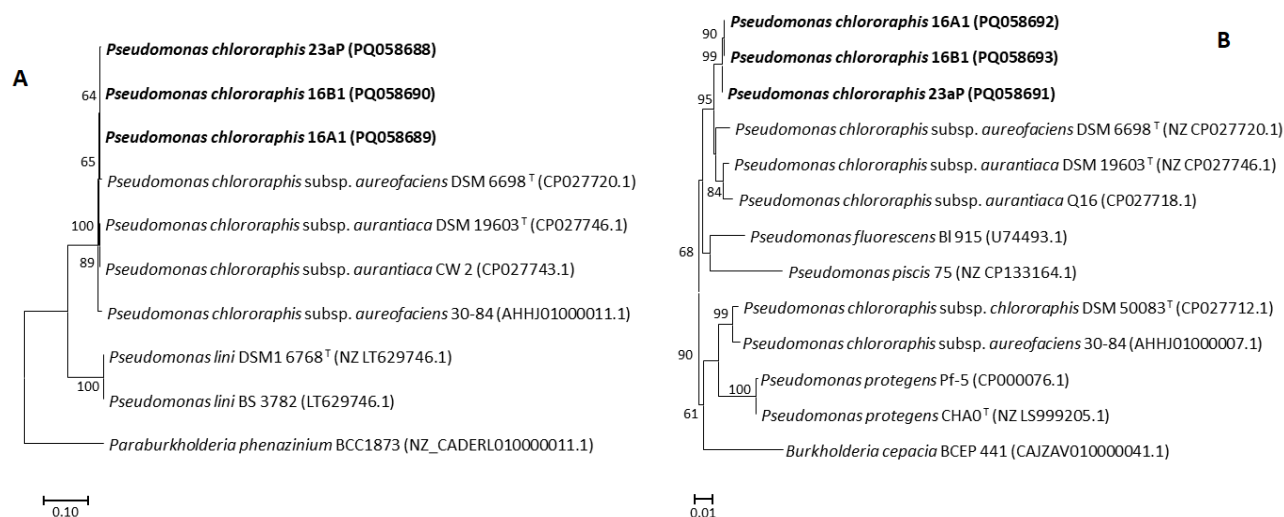


Figure S3. Secondary metabolites identified in cell-free supernatants of 16A1, 16B1, and 23aP *P. chlororaphis* cultures. (I) ionograms for particular compounds, and (II) MS or MS/MS scans registered for particular compounds in LC-MS or LC-MS/MS analysis used for their identification.

2.4. Molecular characteristics of some genes for antifungal antibiotics



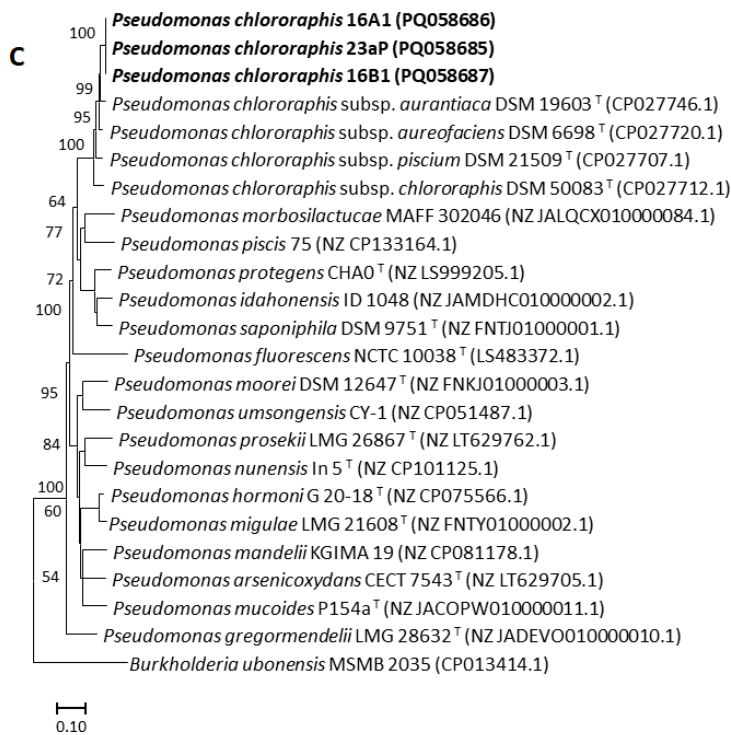


Figure S4. Maximum likelihood phylogenetic trees based on 701 bp fragments of the *phzO* gene (A), 694 bp fragments of the *prnC* gene (B), and 764 bp fragments of the *phzF* gene (C) constructed using the Neighbor-Joining (NJ) method [58]. Bootstrap values [%] higher than 50 are shown next to the branches. The scale bar represents 0.05 substitutions per nucleotide position.

2.4. Molecular characteristics of genes for antifungal antibiotics

Table S2. Primers used in this study

Primer	Sequence	Target	Properties	Size (bp)	Reference
Phl2a Phl2b	GAGGACGTCGAAGACCACCA ACCGCAGCATCGTGTATGAG	<i>phl</i> (2,4-diacetylphloroglucinol)	antifungal	745	[56]
2989_5' ENTR 2989_3' ENTR	CACCTCTACAATCACCAGGGCG TTCGCCGTCGATGGAACC	<i>rzxB</i> (rhizoxin)	antifungal/ antibiotic	1394	[56]
Aca Acb	CGGAGCATGGACCCCCAGC ACGATGTGCTCGGCGTAC	<i>hcnBC</i> (hydrogen cyanide)	antifungal	587	[56]
PltBf PltBr	CGGAGCATGGACCCCCAGC GTGCCCCGATATTGGTCTTGACCGAG	<i>plt</i> (pyoluteorin)	antifungal	792	[56]
prnBF prnBR	GTGGAWCGCACCTTGRASCGG TCAGGATTTCGAGCRCGGC	<i>prnB</i> (pyrrolnitrin)	antifungal/ antibacterial	1080	This study
hcnF hcnR	GGYGGCGGYGTGATCGGSGC AACGGBGTGATRTCCAGCGGC	<i>hcn</i> (hydrogen	antifungal/ antibacterial	1220	This study

		cyanide)			
pltF pltR	ATGAAAGCGACAGACACTAAA GATGTGGTCGTTGTCCTTGCG	<i>plt</i> (pyoluteorin)	antifungal/ antibacterial	888	This study
prnCF prnCR	CCSGCCAGGAGCACGACCCGA GATGAASCCGTTGCGGTGYAG	<i>prnC</i> (pyrrolnitrin)	antifungal	694	This study
phzFF phzFR	ATGCGCCGATTCGATTTCAA CTACAACGTCAGGCTGCCCT	<i>phzF</i> (phenazine)	antifungal/ antibacterial	843	This study
phzOF phzOF	ATGCTAGATYTTCAAAACAA CTATTTGGCGTTGAGCCCCA	<i>phzO</i> (2-OH-PCA)	antifungal/ antibacterial	1476	This study