Supporting Information

Mycelium-Enhanced Bacterial Degradation of Organic Pollutants under Bioavailability Restrictions

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Table S1. Effects of Oomycetes on Bacterial Degradation (%) of Total Polycyclic Aromatic Hydrocarbons and Alkanes Initially Present in the Non-aqueous Phase Liquid[a]

treatment		ΣPAHs + alkyl-PAHs (%)[c]		Σalkanes (%)[c]	
inoculum	**DV8 agar[b]**	**shaken**	**static**	**shaken**	**static**
Mycobacterium gilvum **VM552**	-	40.10 ± 3.70a	7.82 ± 6.69a	36.64 ± 4.87a	-0.41 ± 5.78a
	+	38.81 ± 2.47a	8.74 ± 4.18a	35.14 ± 3.68a	-0.80 ± 7.20a
M. gilvum **VM552 +** ***Pythium oligandrum***	-	40.59 ± 6.07a	7.25 ± 7.02a	45.70 ± 10.70a	6.97 ± 4.06ab
	+	38.36 ± 1.06a	13.90 ± 6.92a	43.15 ± 4.22a	17.74 ± 2.49b
P. oligandrum	+	control[d]	control[d]	control[d]	control[d]

[a]The results are reported as mean percentage ± SD derived from duplicate or triplicate experiments, which were measured at the end of the mineralization experiments. [b]The treatments might contain (+) or not contain (-) diluted V8 agar (DV8) (see text for details). [c]The results are derived from GC-MS analysis, where ΣPAHs comprise of 16 EPA PAHs and their 2-, 3-, and 4-methyl derivatives, and Σalkanes comprise of all alkanes detected. [d]The average of these non-degrading treatments is a control for the calculations of the biodegradation percentage of each group of hydrocarbons. Values in each column followed by the same lowercase letter are not significantly different, supporting by separated one-way ANOVA at $P = 0.05$.

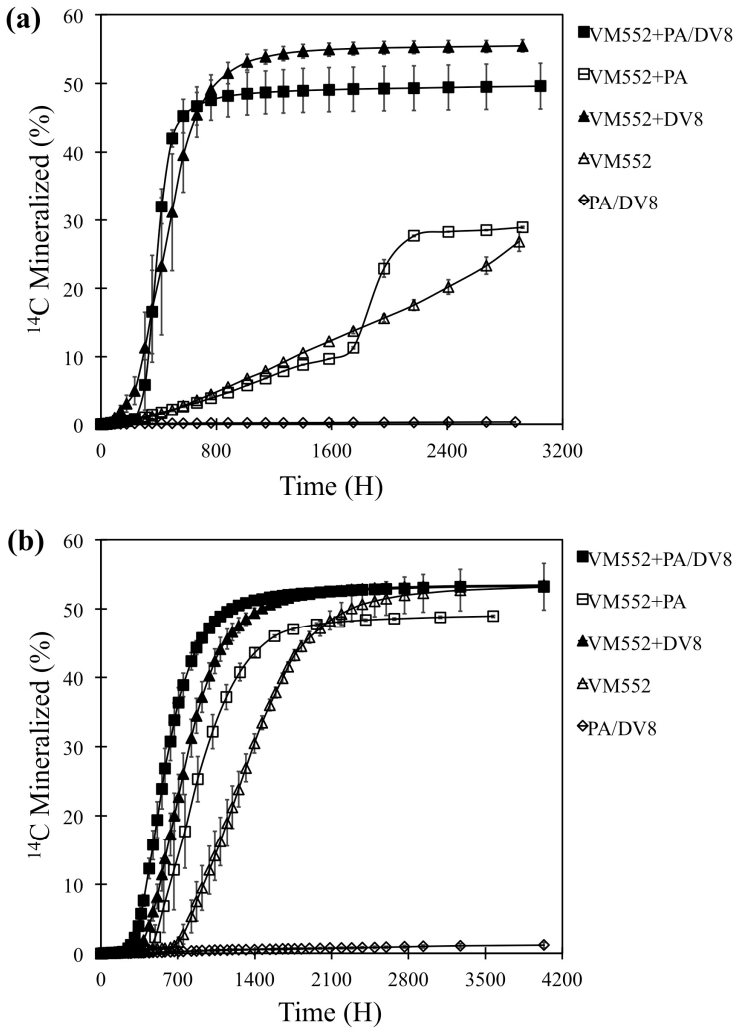

Figure S1 Effects of *Pythium aphanidermatum* mycelium on bacterial mineralization of ^{14}C-phenanthrene initially associated with the NAPL (as a result of $^{14}CO_2$ produced). The experiments were carried out under shaken (**a**) and static (**b**) conditions. Different treatments were constructed with *Mycobacterium gilvum* VM552 plus *P. aphanidermatum* growing on DV8 agar (VM552+PA/DV8), *M. gilvum* VM552 plus *P. aphanidermatum* mycelia (VM552+PA), *M. gilvum* VM552 plus DV8 agar (VM552+DV8), *M. gilvum* VM552 alone as a positive control (VM552), and *P. aphanidermatum* growing on DV8 agar as a negative control (PA/DV8). Error bars represent standard error from at least duplicate experiments.

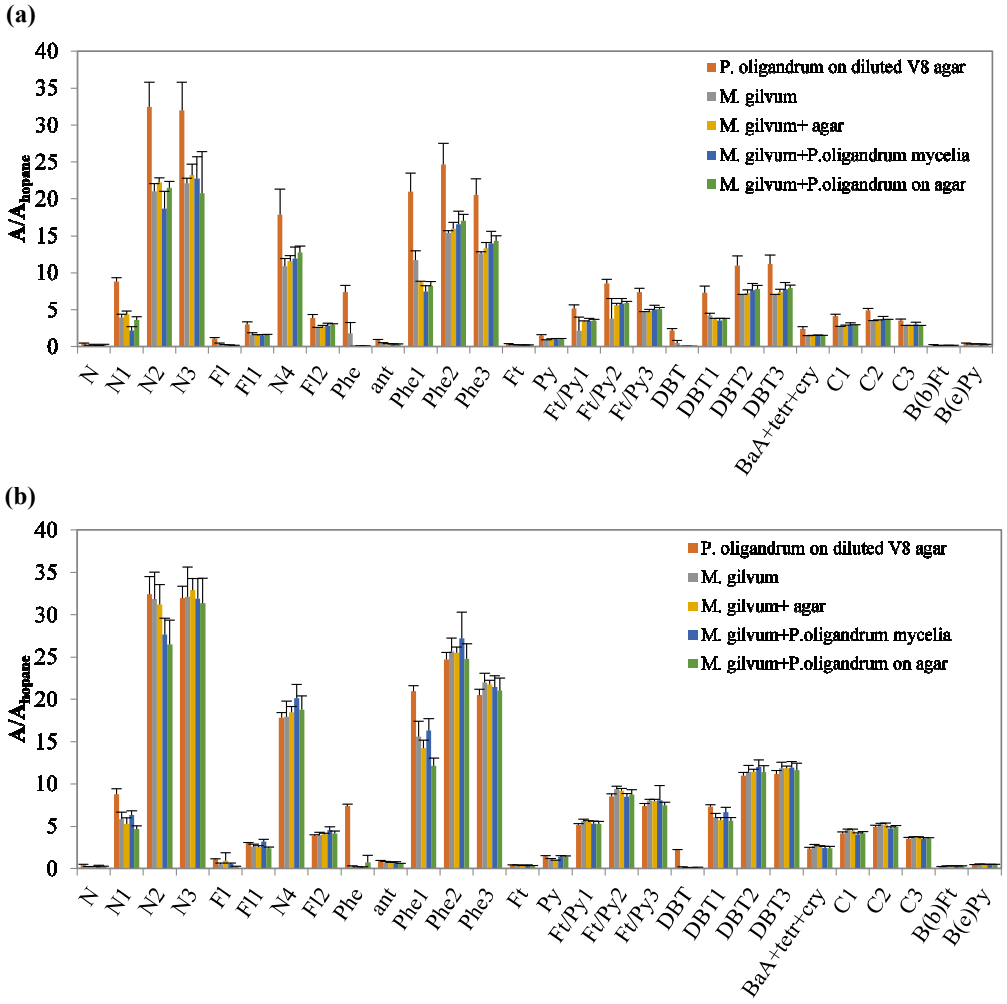

Figure S2 Effects of *Pythium oligandrum* on the hopane normalized areas (A/A_{Hop}) of PAHs and alkyl-PAHs analyzed by molecular ions based GC-MS. The NAPL (heavy fuel oil/HMN) residues used for this analysis were collected at the end of the mineralization experiments under shaken (**a**) and static (**b**) conditions. Different treatments may contain *Mycobacterium gilvum* VM552, *P. oligandrum* mycelia, and diluted V8 agar. The chemical abbreviations are N for naphthalene; N1, monomethylnaphthalenes; N2, dimethylnaphthalenes; N3, trimethylnaphthalenes; Fl, fluorene; Fl1, monomethylfluorenes; N4, tetramethylnaphthalenes; Fl2, dimethylfluorenes; Phe, phenanthrene; ant, anthracene; Phe1, monomethylphenanthrenes; Phe2, dimethylphenanthrenes; Phe3, trimethylphenanthrenes; Ft, fluoranthene; Py, pyrene; Ft/Py1, monomethylfluoranthenes and monomethylpyrenes; Ft/Py2, dimethylfluoranthenes and dimethylpyrenes; Ft/Py3, trimethylfluoranthenes and trimethylpyrenes; DBT, dibenzothiofene; DBT1, monomethyldibenzothiofene; DBT2, dimethyldibenzothiofene; DBT3, trimethyldibenzothiofene; BaA+tetr+cry, benzo(a)anthracene, tetracene and chrysene; C1, monomethylbenzo(a)anthracenes and monomethylchrysenes; C2, dimethylbenzo(a)anthracenes and dimethylchrysenes; C3, trimethylbenzo(a)anthracenes and trimethylchrysenes; B(b)Ft, benzo(b)fluoranthene; B(e)Py, benzo(e)pyrene.

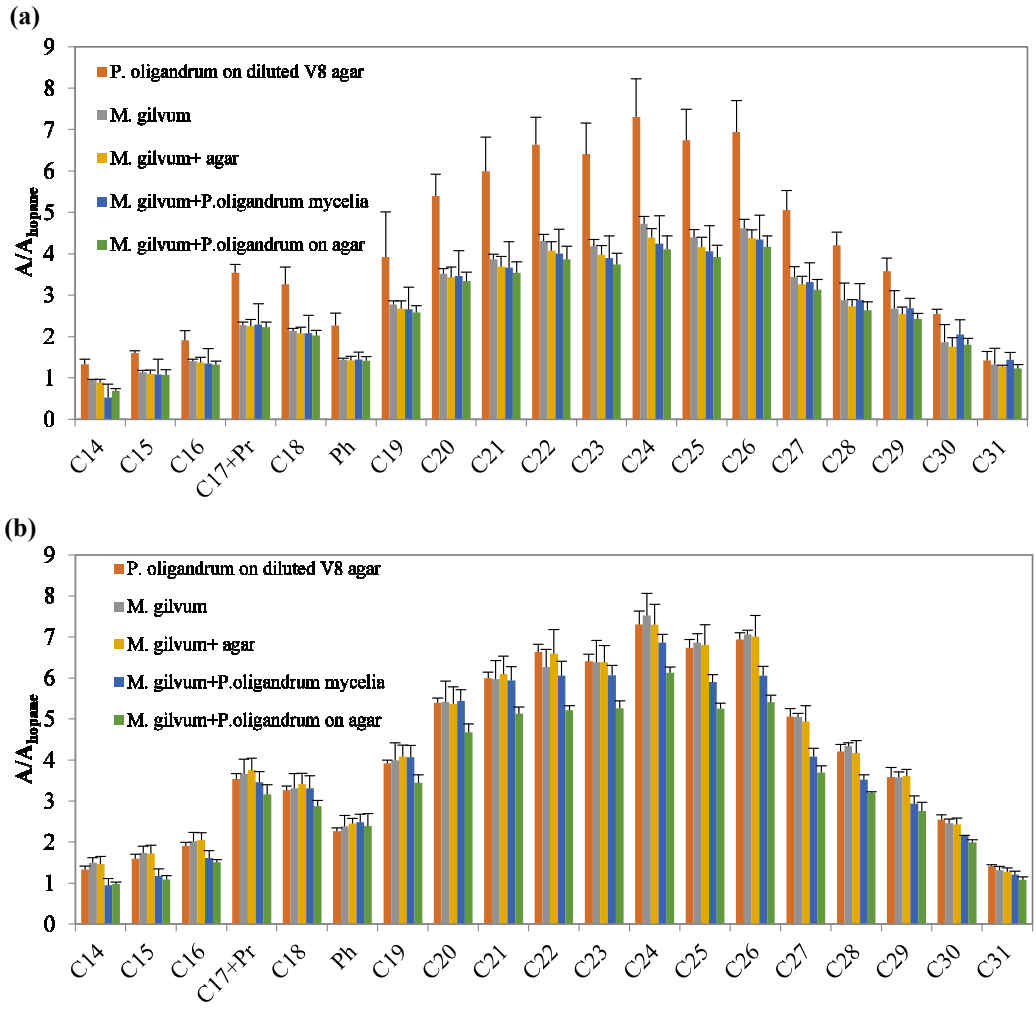

Figure S3 Effects of *Pythium oligandrum* on the hopane normalized areas (A/A_{Hop}) of *n*-alkanes analyzed by *m*/*z* 85 based GC-MS. The NAPL (heavy fuel oil/HMN) residues used for this analysis were collected at the end of the mineralization experiments under shaken (**a**) and static (**b**) conditions. Different treatments may contain *Mycobacterium gilvum* VM552, *P. oligandrum* mycelia, and diluted V8 agar. The chemical abbreviations are pristane (Pr), phytane (Ph), and *n*-alkane (Cn, n = number of carbon atoms).

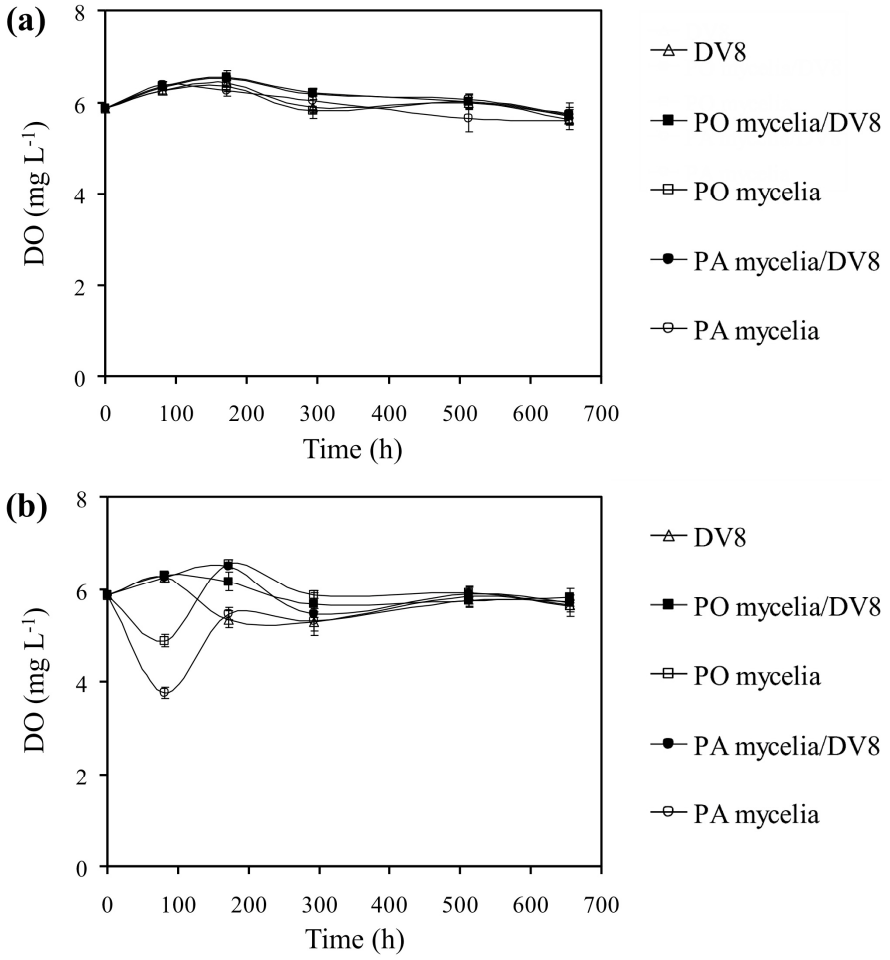

Figure S4 Evolution of dissolved oxygen (DO) concentration in the aqueous phase of the mineralization experiments. The measurement was done in the absence of bacterial inoculum and NAPL, while the tests were imitated the mineralization experiments under shaken (a) and static conditions (b). Two oomycetes, *P. oligandrum* (PO) and *P. aphanidermatum* (PA) were used, while five treatments supplemented with DV8 agar (DV8), oomycete mycelia growing on DV8 agar (PO or PA mycelia/DV8) and solely oomycete mycelia (PO or PA mycelia) were installed. DO was measured from a duplicate set of the tests by using an oxygen meter.

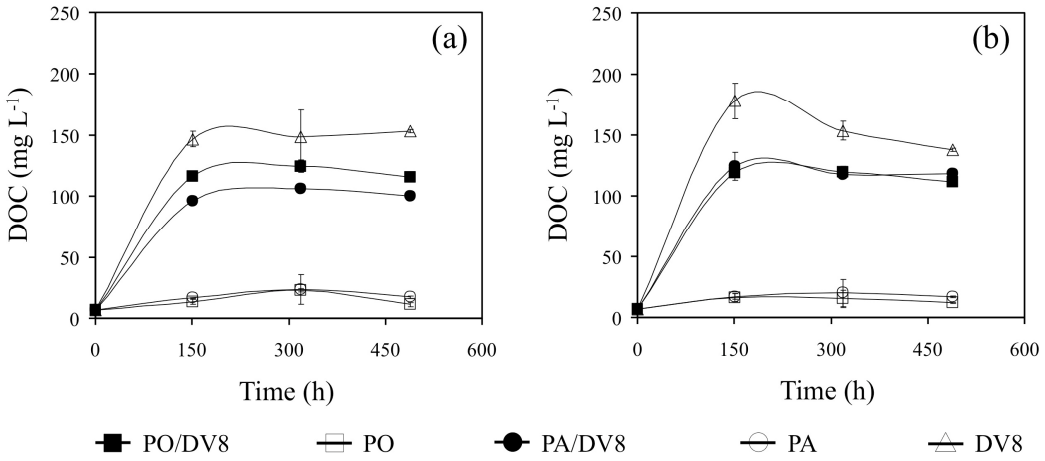

Figure S5 Variations of dissolved organic carbon (DOC) concentration in the aqueous phase of the mineralization experiments. The measurement was done in the absence of bacterial inoculum and NAPL, while the tests were imitated the mineralization experiments under shaken (a) and static conditions (b). Two oomycetes, *P. oligandrum* (PO) and *P. aphanidermatum* (PA) were used, while five treatments supplemented with DV8 agar (DV8), oomycete mycelia growing on DV8 agar (PO/DV8 or PA/DV8) and solely oomycete mycelia (PO or PA) were installed in duplicate. DOC was assumed by the analysis of TOC that was measured using a Shimadzu TOC-VCSH equipped with ASI-V auto sampler after filtration the aliquot samples through Whatman® No. 1 (pore size, Ø = 11 μm). The analysis of TOC was performed twice per each aliquot sample.