

Modelling carbofuran biotransformation by *Novosphingobium* sp. KN65.2 in the presence of coincidental carbon and indigenous microbes

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1 **TABLE S1.** Matrix notation of the model framework.

		V1	V2	V3	V4	V5	Kinetics Rate Expression
		S_{TP}	$S_{AOC,X}$	$S_{AOC,other}$	$X_{KN65.2}$	X_{BC}	
$X_{KN65.2}$							
P1	Growth $X_{KN65.2}$ on S_{TP}	$-\frac{1}{Y_{TP,X}}$			1		$\mu_{XB,X,TP,max} \frac{S_{TP} X_{KN65.2}}{S_{TP} + K_{TP,X}}$
P2	Growth $X_{KN65.2}$ on $S_{AOC, Z}$		$-\frac{1}{Y_{AOC,X}}$		1		$\mu_{XB,X,AOC,max} \frac{S_{AOC,X} X_{KN65.2}}{S_{AOC,X} + K_{AOC,X}}$
P3	Decay of $X_{KN65.2}$				-1		$b_X X_{KN65.2}$
X_{BC}							
P4	Growth X_{BC} on $S_{AOC,X}$		$-\frac{1}{Y_{AOCX,BC}}$			1	$\mu_{XB,BC,AOCx,max} \frac{S_{AOC,X} X_{BC}}{S_{AOC,X} + K_{AOC,X,BC}}$
P5	Growth X_{BC} on $S_{AOC,other}$			$-\frac{1}{Y_{AOCother,BC}}$		1	$\mu_{XB,BC,AOC other,max} \frac{S_{AOC,other} X_{BC}}{S_{AOC,other} + K_{AOC,other,BC}}$
P6	Decay of X_{BC}					-1	$b_{BC} X_{BC}$

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3 **TABLE S2.** Model parameters calculated from batch experiments in the absence of carbofuran supplements.

<i>Strain</i>	KN65 (X_{KN65})					Natural community (X_{BC})			
Substrate	Carbofuran¹	AOC_{GW}	AOC_{BF}	AOC_{SS}	AOC_{SP}	AOC_{GW}	AOC_{BF}	AOC_{SS}	AOC_{SP}
μ_{max} [day ⁻¹]	7.8	0.106	0.647	7.78	15.18	10.0	10.11	16.78	6.11
K_s [mg L ⁻¹]	1.5	0.0001	1.4×10^{-4}	0.63	1.92	4.35	1.10	2.64	0.0003
Y_{CS} [Cells (mg substrate) ⁻¹]	3.12×10^9	1.0×10^9	1.0×10^9	1.0×10^9	1.0×10^9	1.0×10^9	1.0×10^9	1.0×10^9	1.0×10^9

4 ¹Data from previous publication: Helbling, D. E.; Hammes, F.; Egli, T.; Kohler, H. P. E., Kinetics and Yields of Pesticide Biodegradation at Low
5 Substrate Concentrations and under Conditions Restricting Assimilable Organic Carbon. *Appl Environ Microb* 2014, 80, (4), 1306-1313.

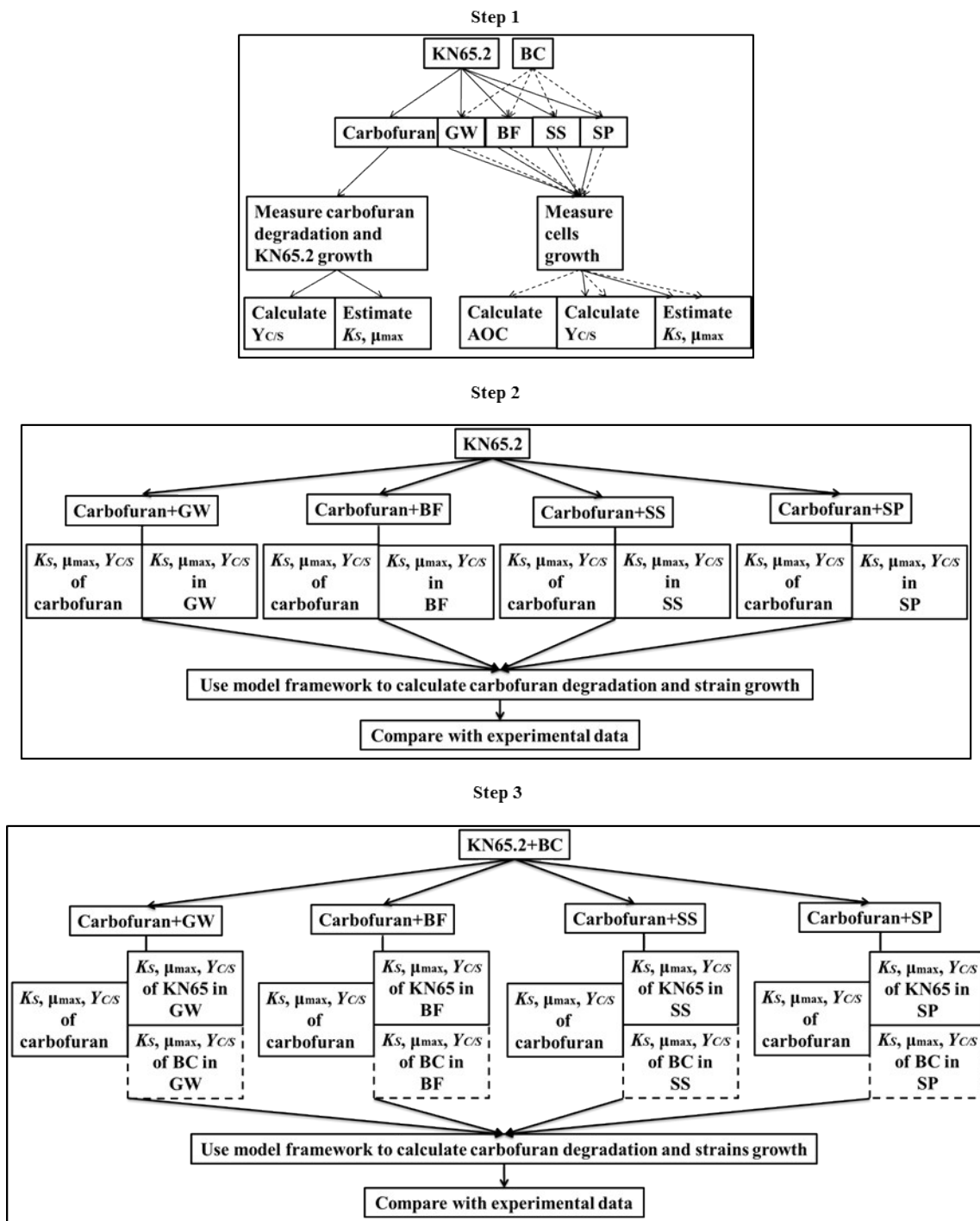


FIGURE S1. General procedure for prediction of carbofuran degradation by KN65.2 in water samples by the proposed model framework

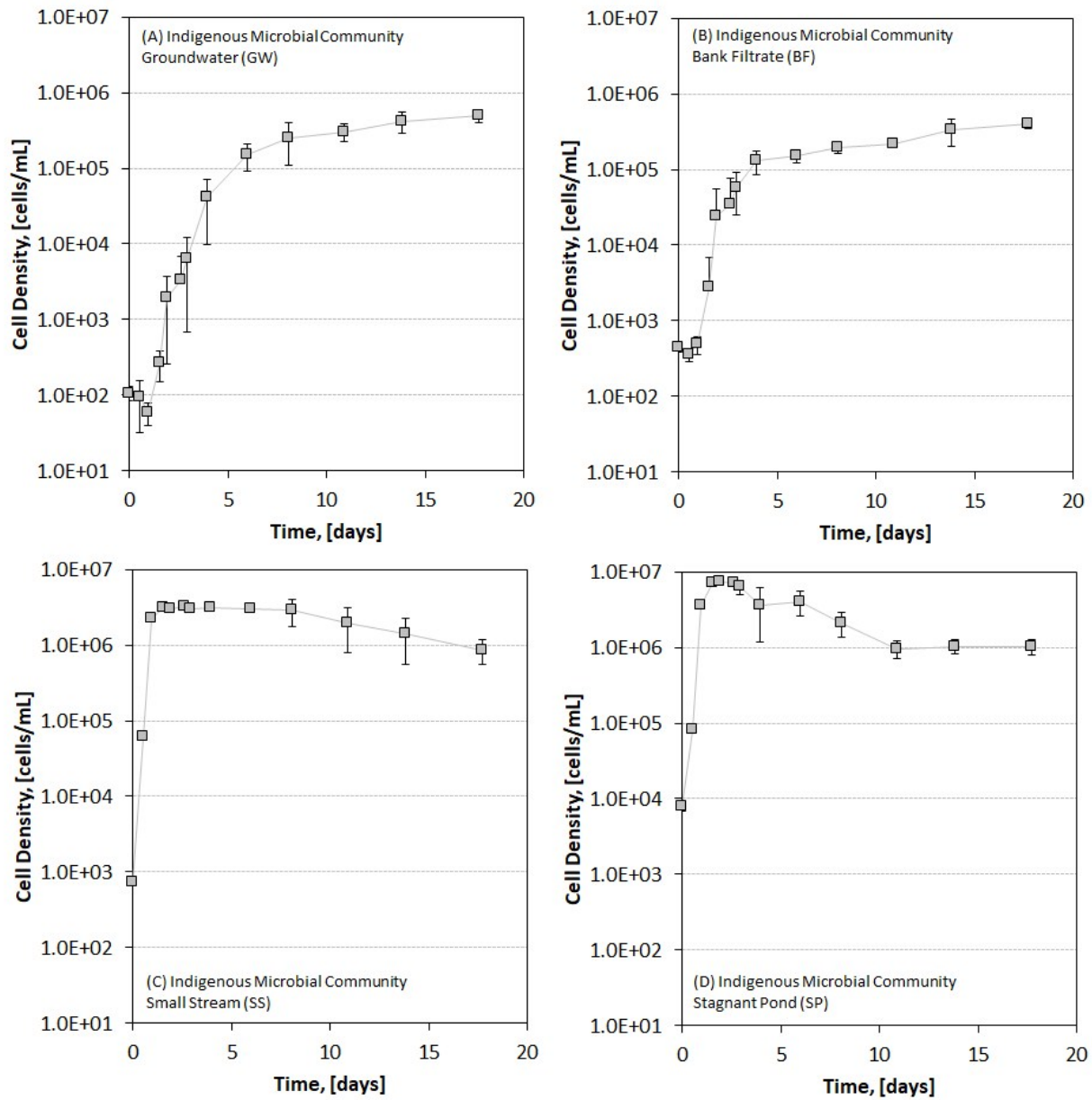


Figure S2: Growth of the indigenous microbial community on AOC in (A) groundwater, (B) bank filtrate, (C) a shallow stream, and (D) a stagnant pond.