

Supporting Information

Characterization of different phosphorus forms in flooded and upland paddy soils incubated with various manure

Guang-Lei Chen,^{a,b,1} Liang Xiao,^{a,1} Qiu-Lin Xia,^a Yu Wang,^b Jia-Hui Yuan,^b Hao Chen,^b Shen-Qiang Wang,^{b*} Yi-Yong Zhu^{a*}

^a Jiangsu Collaborative Innovation Center for Solid Organic Waste Resource Utilization, College of Resources and Environmental Science, Nanjing Agricultural University, Nanjing, 210095, China

^b State Key Laboratory of Soil and Sustainable Agriculture, Changshu National Agro-Ecosystem Observation and Research Station, Institute of Soil Science, Chinese Academy of Sciences, Nanjing 210008, China

Email: yiyong1973@njau.edu.cn & sqwang@issas.ac.cn

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Tables

Table S1 The application rates of animal manure adopted in soil culture experiment

Treatment	Application rate	Flooded condition	Upland condition
		Manure (t ha ⁻¹)	Manure (t ha ⁻¹)
CK	--	0	0
PM	LP	1.70	1.70
	MP	3.41	3.41
	HP	5.68	5.68
CM	LP	1.70	1.70
	MP	3.40	3.40
	HP	5.67	5.67
DM	LP	2.58	2.58
	MP	5.15	5.15
	HP	8.58	8.58
OM	LP	1.82	1.82
	MP	3.64	3.64
	HP	6.06	6.06

PM, pig manure; CM, chicken manure; DM, dairy manure; OM, commercial organic compost. LP, 60 kg P₂O₅ ha⁻¹; MP, 120 kg P₂O₅ ha⁻¹; HP, 200 kg P₂O₅ ha⁻¹.

Table S2 Experimentally determined parameters of the exponential equation of the release of water-extractable P (Y) and time (t) in animal manure

Treatment	Nonlinear equations	Y_0 (mg kg ⁻¹)	k (mg kg ⁻¹ h ⁻¹)	R^2	WEP/TP (%)
PM	$Y_t = 2843 - 2097e^{-0.076t}$	2843 ± 21.5	0.0759	0.986	20.5
CM	$Y_t = 2797 - 1709e^{-0.016t}$	2497 ± 305	0.0164	0.912	16.2
DM	$Y_t = 18.39 - 6.84e^{-0.45t}$	18.39 ± 0.284	0.4505	0.715	0.32
OM	$Y_t = 4215 - 1756e^{-0.57t}$	4215 ± 22.5	0.5714	0.887	31.6

$Y_t = Y_0 + A e^{-kt}$. Y_t , Release amount of rapidly soluble nutrient in unit time of unit mass sample. Y_0 , The maximum amount of soluble nutrient content per unit mass of soil. k , the release rate constant. R^2 = coefficient of determination. PM, pig manure; CM, chicken manure; DM, dairy manure; OM, commercial organic compost.

Table S3 Experimentally determined parameters of the exponential equation of the release rate of Olsen-P (Y) and incubation time in soil culture experiment with different animal manures

Treatment	Flooded condition			upland condition			
	Y_0 (mg kg ⁻¹)	k (mg kg ⁻¹ d ⁻¹)	R^2	Y_0 (mg kg ⁻¹)	k (mg kg ⁻¹ d ⁻¹)	R^2	
PM	CK	30.4	0.0302	0.800	26.9	0.1215	0.350
	LP	30.9	0.3460	0.706	31.9	0.1080	0.530
	MP	34.2	0.0893	0.863	35.3	0.7692	0.919
	HP	35.0	1.7544	0.910	39.3	1.5060	0.987
CM	CK	30.4	0.0302	0.800	26.9	0.1215	0.350
	LP	28.5	0.0714	0.661	31.2	0.2137	0.863
	MP	31.7	0.0746	0.669	35.9	0.0469	0.784
	HP	35.0	0.1063	0.824	36.9	0.3876	0.890
DM	CK	30.4	0.0302	0.800	26.9	0.1215	0.350
	LP	30.0	0.0472	0.643	27.6	0.1572	0.805
	MP	33.3	0.0694	0.565	30.7	0.1786	0.593
	HP	32.7	0.0549	0.869	29.7	0.3559	0.780
OM	CK	30.4	0.0302	0.800	26.9	0.1215	0.350
	LP	30.2	0.2591	0.558	29.8	0.1965	0.797
	MP	35.8	0.0709	0.928	34.4	0.9709	0.929
	HP	36.8	0.0629	0.934	36.2	45.4545	0.848 ns

$Y_t = Y_0 + A e^{-kt}$. Y_t , Release amount of rapidly soluble nutrient in unit time of unit mass sample. Y_0 , The maximum amount of soluble nutrient content per unit mass of soil. k , the release rate constant. R^2 = coefficient of determination. LP, 60 kg P₂O₅ ha⁻¹; MP, 120 kg P₂O₅ ha⁻¹; HP, 200 kg P₂O₅ ha⁻¹. PM, pig manure; CM, chicken manure; DM, dairy manure; OM, commercial organic compost. Ns, Fitting was not convergent.

Figures

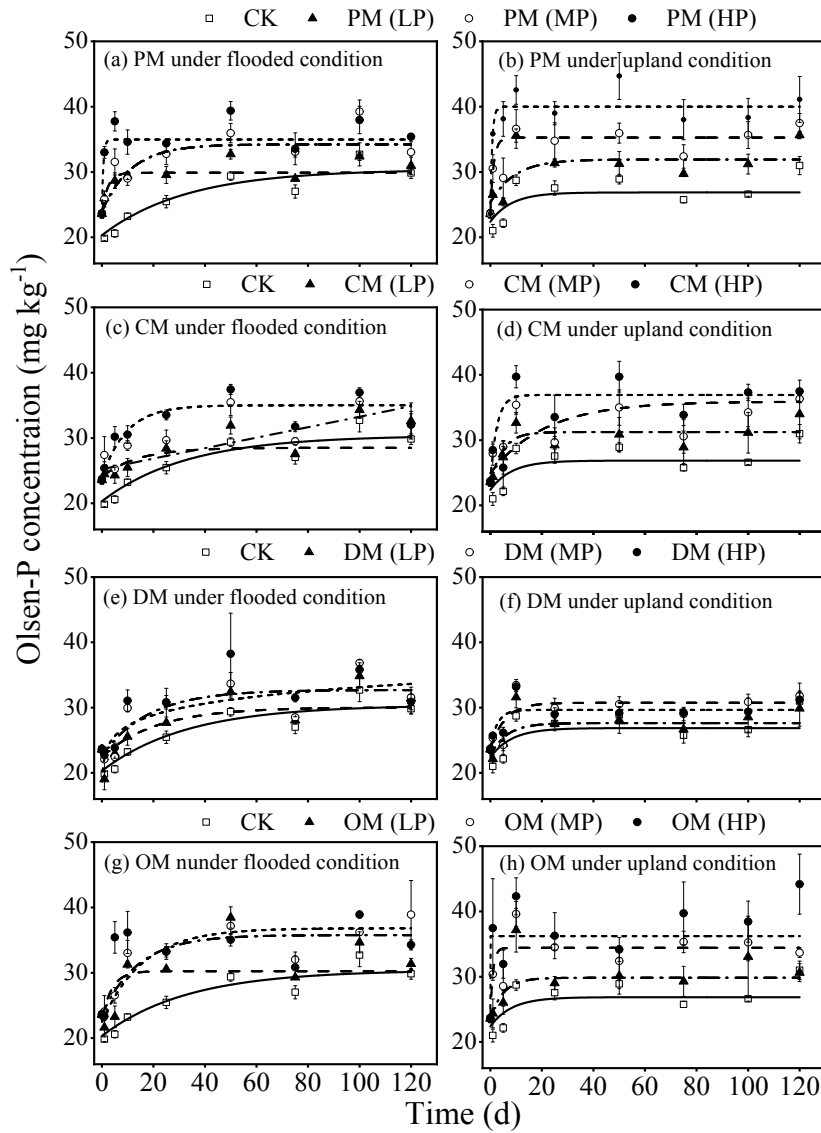


Figure S1 Dynamic change of Olsen-P in soil treated with different release proportions of animal manures in flooded and upland soils. The changes of Olsen-P in PM, CM, DM, and OM under flooded (a, c, e, g), and PM, CM, DM, and OM under upland (b, d, f, h) conditions, respectively. PM, pig manure; CM, chicken manure; DM, dairy manure; OM, commercial organic compost. The error bar ($n = 3$) represents the standard deviation

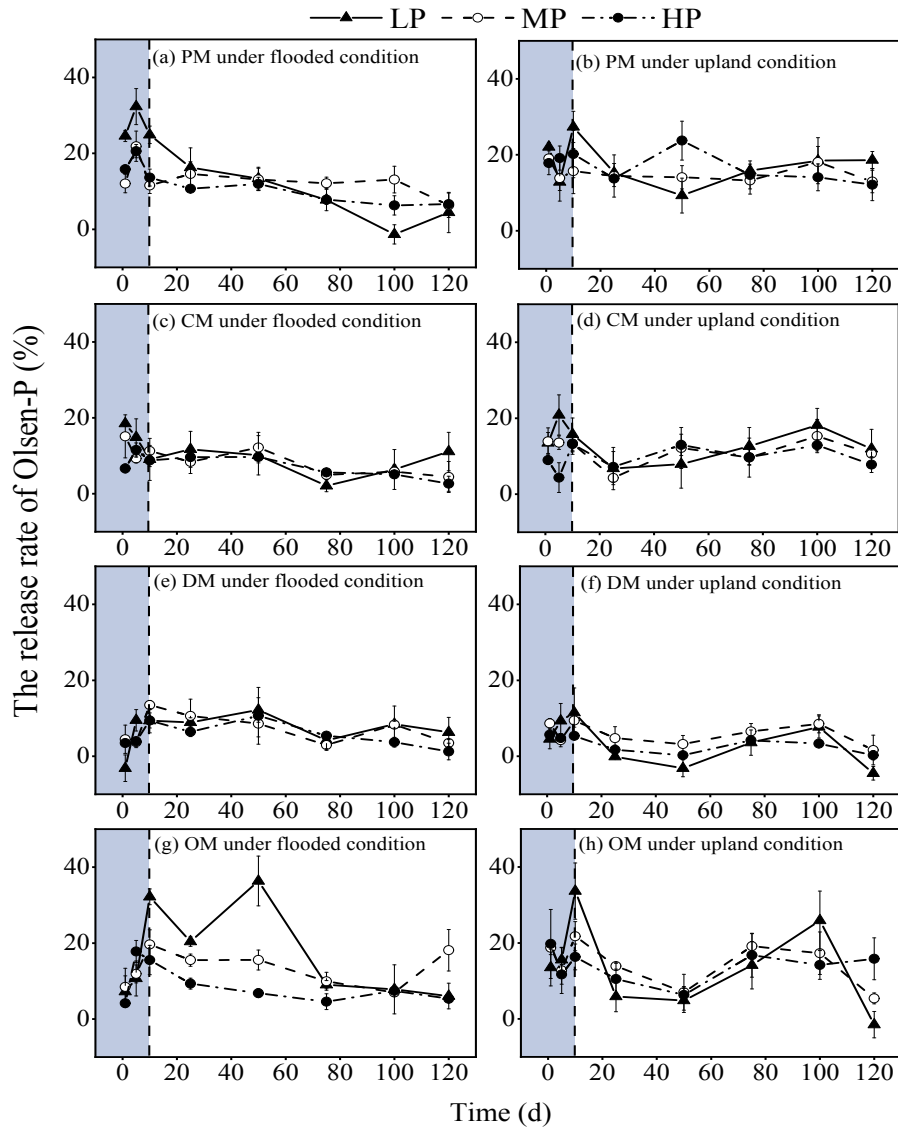


Figure S2 The release rate of Olsen-P under different animal manure levels under flooded and upland conditions. Release effect of the PM, CM, DM, and OM under flooded (a, c, e, g), and PM, CM, DM, and OM under upland (b, d, f, h) conditions with LP, MP, and HP, respectively. PM, pig manure; CM, chicken manure; DM, dairy manure; OM, commercial organic compost. LM, The error bar (n = 3) represents the standard deviation.