

Supplementary Information

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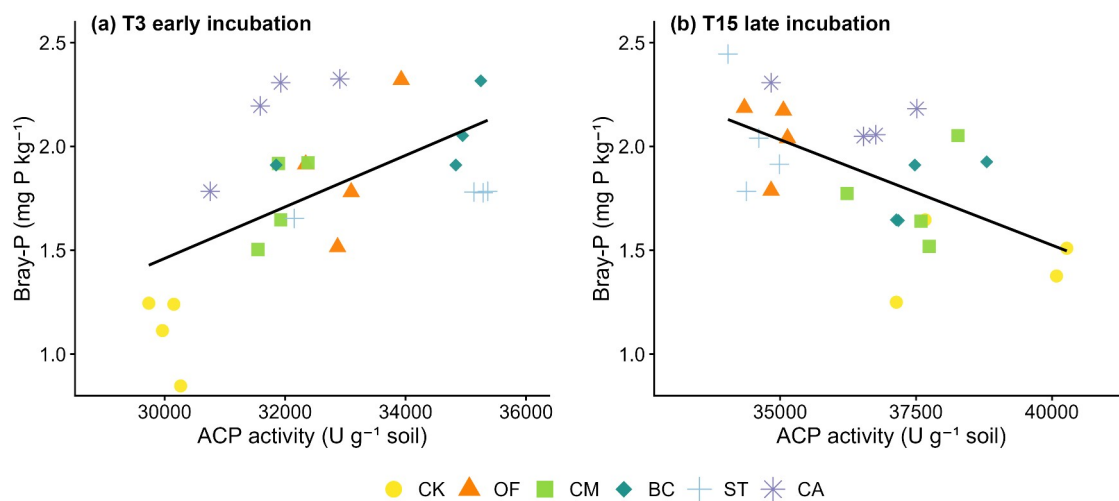
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Time- and scale-dependent phosphorus mobilization by organic amendments in paddy soil: complementary evidence from microcosm and field experiments

Supplementary Figure S1

Supplementary Figure S1. Temporal shifts in the association between acid phosphatase (ACP) activity and Bray-P availability during incubation.



Each point represents an individual microcosm bottle ($n = 24$ per time point).

Pearson correlations were calculated using bottle-level observations.

At T3, ACP activity was positively associated with Bray-P ($r = 0.570$, $P = 0.0036$), but the association did not remain below the 0.05 FDR threshold after Benjamini-Hochberg correction across the complete 15-pair within-time correlation set ($q_{15} = 0.054$). At T15, the association became negative ($r = -0.602$, $P = 0.0019$) and remained FDR-supported under the same full 15 within-time correction ($q_{15} = 0.028$).

For the targeted Bray-P-focused five-relation analysis, q_5 values were 0.018 at T3 and 0.009 at T15; these values refer only to the Bray-P-focused comparison family and are not displayed in the current graphic. The T3 and T15 correlation coefficients differed significantly (Fisher r -to- z comparison: $z = 4.357$, $P < 0.001$), supporting a marked temporal shift in the ACP-Bray-P association. These results should be interpreted as stage-dependent association patterns rather than causal evidence.

Supplementary Table S1

Supplementary Table S1. Microcosm incubation dynamics of phosphorus-related and physicochemical indicators across organic material treatments. Values are reported as mean $\pm$ SE for bottle-level observations (n = 4 per treatment $\times$ time combination). Bray-P, DOC, pH, ACP, Eh, and SRP are shown for T0, T3, T7, and T15. Soil total phosphorus (TP) is shown only for T0 and T15. T0, T3, T7 and T15 correspond to incubation days 0, 3, 7 and 15, respectively. Abbreviations: DOC, dissolved organic carbon; ACP, acid phosphatase activity; Eh, redox potential; SRP, soluble reactive phosphorus; TP, total phosphorus. Treatment abbreviations: CK, OF, CM, BC, ST, and CA.

Indicator	Unit	Treatment	T0 Mean $\pm$ SE	T3 Mean $\pm$ SE	T7 Mean $\pm$ SE	T15 Mean $\pm$ SE
Soil Bray-P	mg P kg ⁻¹	CK	2.092 $\pm$ 0.175	1.111 $\pm$ 0.093	2.279 $\pm$ 0.061	1.446 $\pm$ 0.085
Soil Bray-P	mg P kg ⁻¹	OF	2.605 $\pm$ 0.116	1.883 $\pm$ 0.168	2.815 $\pm$ 0.183	2.047 $\pm$ 0.093
Soil Bray-P	mg P kg ⁻¹	CM	1.921 $\pm$ 0.097	1.748 $\pm$ 0.104	2.410 $\pm$ 0.110	1.746 $\pm$ 0.115
Soil Bray-P	mg P kg ⁻¹	BC	2.419 $\pm$ 0.185	2.048 $\pm$ 0.096	2.256 $\pm$ 0.141	1.782 $\pm$ 0.079
Soil Bray-P	mg P kg ⁻¹	ST	2.148 $\pm$ 0.084	1.749 $\pm$ 0.032	2.605 $\pm$ 0.111	2.046 $\pm$ 0.143
Soil Bray-P	mg P kg ⁻¹	CA	2.209 $\pm$ 0.242	2.153 $\pm$ 0.126	2.515 $\pm$ 0.161	2.149 $\pm$ 0.061
Overlying-water DOC	mg L ⁻¹	CK	90.346 $\pm$ 0.816	105.392 $\pm$ 2.939	90.438 $\pm$ 2.319	94.278 $\pm$ 4.255
Overlying-water DOC	mg L ⁻¹	OF	100.911 $\pm$ 2.865	112.300 $\pm$ 3.539	104.571 $\pm$ 1.674	99.221 $\pm$ 2.748
Overlying-water DOC	mg L ⁻¹	CM	92.909 $\pm$ 1.474	96.700 $\pm$ 2.116	95.068 $\pm$ 1.677	83.188 $\pm$ 5.720
Overlying-water DOC	mg L ⁻¹	BC	95.146 $\pm$ 2.384	102.248 $\pm$ 2.529	91.658 $\pm$ 1.102	83.573 $\pm$ 2.588
Overlying-water DOC	mg L ⁻¹	ST	102.194 $\pm$ 3.469	110.550 $\pm$ 1.749	99.146 $\pm$ 1.599	102.023 $\pm$ 3.088
Overlying-water DOC	mg L ⁻¹	CA	104.866 $\pm$ 4.343	106.846 $\pm$ 4.818	99.721 $\pm$ 1.326	100.549 $\pm$ 1.810
Overlying-water pH	unitless	CK	6.800 $\pm$ 0.054	6.895 $\pm$ 0.019	6.650 $\pm$ 0.025	6.085 $\pm$ 0.129
Overlying-water pH	unitless	OF	6.897 $\pm$ 0.038	6.998 $\pm$ 0.045	6.665 $\pm$ 0.030	6.155 $\pm$ 0.117
Overlying-water pH	unitless	CM	6.890 $\pm$ 0.026	6.808 $\pm$ 0.046	6.423 $\pm$ 0.163	6.062 $\pm$ 0.111
Overlying-water pH	unitless	BC	6.830 $\pm$ 0.050	6.883 $\pm$ 0.029	6.633 $\pm$ 0.044	6.000 $\pm$ 0.141
Overlying-water pH	unitless	ST	6.850 $\pm$ 0.027	6.760 $\pm$ 0.030	6.530 $\pm$ 0.039	6.200 $\pm$ 0.041
Overlying-water pH	unitless	CA	6.955 $\pm$ 0.079	6.893 $\pm$ 0.057	6.543 $\pm$ 0.052	6.232 $\pm$ 0.065
Soil ACP activity	U g ⁻¹ soil	CK	42631.510 $\pm$ 731.796	30028.971 $\pm$ 115.746	36948.568 $\pm$ 397.532	38789.388 $\pm$ 809.339
Soil ACP activity	U g ⁻¹ soil	OF	41121.094 $\pm$ 2348.569	33059.245 $\pm$ 329.909	34437.500 $\pm$ 295.924	34843.424 $\pm$ 178.698
Soil ACP activity	U g ⁻¹ soil	CM	39591.797 $\pm$ 1921.024	31935.872 $\pm$ 170.533	37732.096 $\pm$ 1685.343	37458.333 $\pm$ 434.245
Soil ACP activity	U g ⁻¹ soil	BC	37628.255 $\pm$ 1901.878	34220.378 $\pm$ 794.671	35919.596 $\pm$ 671.310	37647.135 $\pm$ 391.357
Soil ACP activity	U g ⁻¹ soil	ST	43839.844 $\pm$ 879.434	34484.701 $\pm$ 778.661	37184.570 $\pm$ 344.488	34503.581 $\pm$ 198.242
Soil ACP activity	U g ⁻¹ soil	CA	39110.352 $\pm$ 1350.023	31794.271 $\pm$ 445.322	35494.792 $\pm$ 522.656	36410.482 $\pm$ 565.855
Soil Eh	mV	CK	191.000 $\pm$ 7.714	170.750 $\pm$ 17.834	53.750 $\pm$ 15.052	45.500 $\pm$ 8.490
Soil Eh	mV	OF	183.750 $\pm$ 19.931	115.500 $\pm$ 6.397	80.250 $\pm$ 27.054	56.500 $\pm$ 11.565
Soil Eh	mV	CM	127.750 $\pm$ 4.768	81.250 $\pm$ 16.469	55.250 $\pm$ 15.288	45.250 $\pm$ 16.630
Soil Eh	mV	BC	203.250 $\pm$ 15.986	139.750 $\pm$ 17.095	35.750 $\pm$ 16.439	53.750 $\pm$ 14.343
Soil Eh	mV	ST	171.500 $\pm$ 5.838	155.250 $\pm$ 12.277	56.250 $\pm$ 20.718	39.750 $\pm$ 11.919
Soil Eh	mV	CA	174.750 $\pm$ 22.746	94.250 $\pm$ 26.389	44.750 $\pm$ 11.686	20.750 $\pm$ 9.464
Soluble reactive phosphorus (SRP)	μ g P L ⁻¹	CK	17.462 $\pm$ 1.123	17.325 $\pm$ 0.137	13.796 $\pm$ 0.648	16.225 $\pm$ 0.137
Soluble reactive phosphorus (SRP)	μ g P L ⁻¹	OF	16.775 $\pm$ 0.687	16.775 $\pm$ 0.687	16.546 $\pm$ 0.648	13.475 $\pm$ 0.137
Soluble reactive phosphorus (SRP)	μ g P L ⁻¹	CM	18.837 $\pm$ 0.794	16.087 $\pm$ 0.794	16.775 $\pm$ 1.316	14.197 $\pm$ 1.414
Soluble reactive phosphorus (SRP)	μ g P L ⁻¹	BC	15.400 $\pm$ 1.316	14.884 $\pm$ 1.267	14.575 $\pm$ 0.137	13.337 $\pm$ 1.123
Soluble reactive phosphorus (SRP)	μ g P L ⁻¹	ST	15.400 $\pm$ 0.687	16.775 $\pm$ 0.687	17.256 $\pm$ 0.206	16.775 $\pm$ 0.687
Soluble reactive phosphorus (SRP)	μ g P L ⁻¹	CA	14.025 $\pm$ 1.316	16.087 $\pm$ 1.375	18.150 $\pm$ 1.316	13.853 $\pm$ 0.516
Soil total phosphorus (TP)	mg P kg ⁻¹	CK	1119.012 $\pm$ 85.674			1107.364 $\pm$ 24.879
Soil total phosphorus (TP)	mg P kg ⁻¹	OF	1119.694 $\pm$ 129.506			1109.405 $\pm$ 32.654
Soil total phosphorus (TP)	mg P kg ⁻¹	CM	1120.838 $\pm$ 178.830			1114.285 $\pm$ 27.052
Soil total phosphorus (TP)	mg P kg ⁻¹	BC	1119.735 $\pm$ 40.377			1107.663 $\pm$ 51.887
Soil total phosphorus (TP)	mg P kg ⁻¹	ST	1119.954 $\pm$ 42.773			1109.420 $\pm$ 121.822
Soil total phosphorus (TP)	mg P kg ⁻¹	CA	1121.213 $\pm$ 82.723			1109.054 $\pm$ 56.520

Supplementary Table S2

Supplementary Table S2. Formal inferential statistics supporting the dynamic responses shown in Fig. 1. Part A summarizes the overall factorial tests for Bray-P, DOC, pH, ACP, Eh, and TP. Part B compiles the planned treatment-versus-CK contrasts within each time point, and Part C compiles the planned time-versus-T0 contrasts within each treatment. Statistical branches, covariance handling, and multiplicity adjustment follow the prespecified Fig. 1 analysis framework. T0, T3, T7 and T15 correspond to incubation days 0, 3, 7 and 15, respectively. Abbreviations: Bray-P, Bray-extractable phosphorus; DOC, dissolved organic carbon; ACP, acid phosphatase activity; Eh, redox potential; TP, total phosphorus.

The following panels are display views of the same Table S2. Rows retain the source order and the repeated identifiers permit direct row-wise matching across panels.

Part A. Overall factorial tests (complete field set)

Response	Effect	df	F statistic	P value	partial_eta2	Levene P	Inference type
Bray-P	Treatment	5, 72	11.61863571511017	3.021802158601313e-08	0.4465505356363754	0.3006906682038912	Classical Type III
Bray-P	Time	3, 72	38.50423621169368	5.866328881685661e-15	0.6160260255206522	0.3006906682038912	Classical Type III
Bray-P	Treatment × Time	15, 72	2.363344681898863	0.008020650823407778	0.329921955015068	0.3006906682038912	Classical Type III
DOC	Treatment	5, 72	15.40891898724763	2.780324987617419e-10	0.5169231059281159	0.2398137571729119	Classical Type III
DOC	Time	3, 72	18.47025716036371	5.473547868266825e-09	0.434898641904186	0.2398137571729119	Classical Type III
DOC	Treatment × Time	15, 72	1.501766067377844	0.1276143923234284	0.2383087615949423	0.2398137571729119	Classical Type III
pH	Treatment	5, 72	1.845113228071334	0.1148556352990157	0.113579585575495	0.5481670489906572	Classical Type III
pH	Time	3, 72	142.6636120908464	3.18893189726805e-30	0.8559973607981215	0.5481670489906572	Classical Type III
pH	Treatment × Time	15, 72	1.047275604047866	0.4196212378542191	0.1791048814806802	0.5481670489906572	Classical Type III
ACP	Treatment	5, 72	2.504162471167242	0.03794089644421696	0.1251008082853806	0.006042783595847387	HC3 Type III
ACP	Time	3, 72	71.04944101007862	1.800047118356912e-21	0.7405125215242283	0.006042783595847387	HC3 Type III
ACP	Treatment × Time	15, 72	10.88551845244345	4.078304917578951e-13	0.4354027738137771	0.006042783595847387	HC3 Type III
Eh	Treatment	5, 72	3.811239690068814	0.0040511437645369	0.2092795303851394	0.5855800912907756	Classical Type III
Eh	Time	3, 72	92.94422487707904	1.064356052833345e-24	0.7947739614741423	0.5855800912907756	Classical Type III
Eh	Treatment × Time	15, 72	1.785996884032576	0.05353782043581776	0.2711809488344334	0.5855800912907756	Classical Type III
TP	Treatment	5, 36	0.0003840484380350795	0.999999990503897	8.653624415624756e-05	0.03316274361426785	HC3 Type III
TP	Time	1, 36	0.03351437689296963	0.8557707769477361	0.001239734369187887	0.03316274361426785	HC3 Type III
TP	Treatment × Time	5, 36	0.0001502809269596594	0.999999990899893	4.123216801143402e-05	0.03316274361426785	HC3 Type III

Supplementary Table S2 — Part B

Part B1. Treatment-versus-CK contrasts: estimates and test statistics

Response	Comparison family	By level	Contrast	Estimate	SE	df	Statistic
Bray-P	Treatment vs CK within Time	T0	BC vs CK	0.3274073603726448	0.1812091898936464	72	1.806792252450351
Bray-P	Treatment vs CK within Time	T0	CA vs CK	0.1169912652458612	0.1812091898936463	72	0.6456144156624986
Bray-P	Treatment vs CK within Time	T0	CM vs CK	-0.1702907242433969	0.1812091898936465	72	-0.9397466229132324
Bray-P	Treatment vs CK within Time	T0	OF vs CK	0.5130997356072022	0.1812091898936464	72	2.831532638650092
Bray-P	Treatment vs CK within Time	T0	ST vs CK	0.0560038760779053	0.1812091898936465	72	0.3090564894130069
Bray-P	Treatment vs CK within Time	T15	BC vs CK	0.3359987830014186	0.1812091898936465	72	1.854203880049459
Bray-P	Treatment vs CK within Time	T15	CA vs CK	0.7028219993445669	0.1812091898936465	72	3.878511899738972
Bray-P	Treatment vs CK within Time	T15	CM vs CK	0.3005635124468684	0.1812091898936465	72	1.658654909407587
Bray-P	Treatment vs CK within Time	T15	OF vs CK	0.60133683946235	0.1812091898936464	72	3.318467677137571
Bray-P	Treatment vs CK within Time	T15	ST vs CK	0.6003071883844507	0.1812091898936465	72	3.312785564224294
Bray-P	Treatment vs CK within Time	T3	BC vs CK	0.9361324695725295	0.1812091898936465	72	5.166031977307306
Bray-P	Treatment vs CK within Time	T3	CA vs CK	1.041591334643623	0.1812091898936465	72	5.748005028083528
Bray-P	Treatment vs CK within Time	T3	CM vs CK	0.6363965444908641	0.1812091898936464	72	3.511944095464319
Bray-P	Treatment vs CK within Time	T3	OF vs CK	0.7715608848700862	0.1812091898936464	72	4.257846333968622
Bray-P	Treatment vs CK within Time	T3	ST vs CK	0.637419771381589	0.1812091898936465	72	3.517590756603995
Bray-P	Treatment vs CK within Time	T7	BC vs CK	-0.02293727861798783	0.1812091898936465	72	-0.1265790031479637
Bray-P	Treatment vs CK within Time	T7	CA vs CK	0.2357225380974932	0.1812091898936465	72	1.300831035312509
Bray-P	Treatment vs CK within Time	T7	CM vs CK	0.131004585302176	0.1812091898936465	72	0.722946698272342
Bray-P	Treatment vs CK within Time	T7	OF vs CK	0.5361995196511893	0.1812091898936464	72	2.959008425377822
Bray-P	Treatment vs CK within Time	T7	ST vs CK	0.3262594728522623	0.1812091898936465	72	1.800457653630852
DOC	Treatment vs CK within Time	T0	BC vs CK	4.799999999999999	4.085791259952834	72	1.174803041713737
DOC	Treatment vs CK within Time	T0	CA vs CK	14.520000000000005	4.085791259952833	72	3.553779201184074
DOC	Treatment vs CK within Time	T0	CM vs CK	2.5624999999999968	4.085791259952837	72	0.6271734988315453
DOC	Treatment vs CK within Time	T0	OF vs CK	10.56499999999995	4.085791259952835	72	2.585790444938556
DOC	Treatment vs CK within Time	T0	ST vs CK	11.847500000000004	4.085791259952835	72	2.899683132646577
DOC	Treatment vs CK within Time	T15	BC vs CK	-10.704999999999975	4.085791259952835	72	-2.620055533655267
DOC	Treatment vs CK within Time	T15	CA vs CK	6.2700000000000328	4.085791259952835	72	1.534586473238652
DOC	Treatment vs CK within Time	T15	CM vs CK	-11.089999999999975	4.085791259952835	72	-2.714284527626057
DOC	Treatment vs CK within Time	T15	OF vs CK	4.942499999999979	4.085791259952835	72	1.20968000701461
DOC	Treatment vs CK within Time	T15	ST vs CK	7.744999999999979	4.085791259952835	72	1.895593657931804
DOC	Treatment vs CK within Time	T3	BC vs CK	-3.1441666666666535	4.085791259952835	72	-0.7695367840947483
DOC	Treatment vs CK within Time	T3	CA vs CK	1.453333333333521	4.085791259952835	72	0.3557042542967058
DOC	Treatment vs CK within Time	T3	CM vs CK	-8.691666666666787	4.085791259952835	72	-2.127290924492095
DOC	Treatment vs CK within Time	T3	OF vs CK	6.908333333332997	4.085791259952834	72	1.690818961077504
DOC	Treatment vs CK within Time	T3	ST vs CK	5.158333333333506	4.085791259952836	72	1.262505352119494
DOC	Treatment vs CK within Time	T7	BC vs CK	1.2200000000000055	4.085791259952837	72	0.2985957731022553
DOC	Treatment vs CK within Time	T7	CA vs CK	9.2825000000000056	4.085791259952837	72	2.2718977572308
DOC	Treatment vs CK within Time	T7	CM vs CK	4.6300000000000034	4.085791259952837	72	1.133195433986385
DOC	Treatment vs CK within Time	T7	OF vs CK	14.132499999999983	4.085791259952834	72	3.458938330629004
DOC	Treatment vs CK within Time	T7	ST vs CK	8.707500000000002	4.085791259952836	72	2.131166142858834
pH	Treatment vs CK within Time	T0	BC vs CK	0.03000000000000086	0.1026337203630247	72	0.2923015934128488
pH	Treatment vs CK within Time	T0	CA vs CK	0.1550000000000008	0.1026337203630246	72	1.510224899299684
pH	Treatment vs CK within Time	T0	CM vs CK	0.09000000000000097	0.1026337203630247	72	0.8769047802385302
pH	Treatment vs CK within Time	T0	OF vs CK	0.09750000000000093	0.1026337203630247	72	0.9499801785917403

Response	Comparison family	By level	Contrast	Estimate	SE	df	Statistic
pH	Treatment vs CK within Time	T0	ST vs CK	0.05000000000000117	0.1026337203630247	72	0.4871693223547454
pH	Treatment vs CK within Time	T15	BC vs CK	-0.08500000000000033	0.1026337203630247	72	-0.8281878480030508
pH	Treatment vs CK within Time	T15	CA vs CK	0.1474999999999999	0.1026337203630247	72	1.437149500946464
pH	Treatment vs CK within Time	T15	CM vs CK	-0.02250000000000027	0.1026337203630247	72	-0.2192261950596329
pH	Treatment vs CK within Time	T15	OF vs CK	0.06999999999999962	0.1026337203630247	72	0.6820370512966238
pH	Treatment vs CK within Time	T15	ST vs CK	0.1149999999999999	0.1026337203630247	72	1.120489441415887
pH	Treatment vs CK within Time	T3	BC vs CK	-0.01249999999999991	0.1026337203630247	72	-0.1217923305886826
pH	Treatment vs CK within Time	T3	CA vs CK	-0.00249999999999877	0.1026337203630247	72	-0.0243584661177355
pH	Treatment vs CK within Time	T3	CM vs CK	-0.08750000000000004	0.1026337203630247	72	-0.8525463141207849
pH	Treatment vs CK within Time	T3	OF vs CK	0.1024999999999998	0.1026337203630247	72	0.9986971108272027
pH	Treatment vs CK within Time	T3	ST vs CK	-0.13500000000000002	0.1026337203630247	72	-1.315357170357783
pH	Treatment vs CK within Time	T7	BC vs CK	-0.01750000000000027	0.1026337203630247	72	-0.1705092628241594
pH	Treatment vs CK within Time	T7	CA vs CK	-0.10750000000000003	0.1026337203630247	72	-1.047414043062681
pH	Treatment vs CK within Time	T7	CM vs CK	-0.22750000000000004	0.1026337203630247	72	-2.216620416714042
pH	Treatment vs CK within Time	T7	OF vs CK	0.01499999999999935	0.1026337203630247	72	0.1461507967064139
pH	Treatment vs CK within Time	T7	ST vs CK	-0.12000000000000004	0.1026337203630247	72	-1.169206373651365
ACP	Treatment vs CK within Time	T0	BC vs CK	-5003.25520833335	2353.059451414048	72	-2.126276582313589
ACP	Treatment vs CK within Time	T0	CA vs CK	-3521.158854166705	1773.16553461273	72	-1.985803798592187
ACP	Treatment vs CK within Time	T0	CM vs CK	-3039.713541666707	2373.706011520911	72	-1.280577092071762
ACP	Treatment vs CK within Time	T0	OF vs CK	-1510.416666666706	2840.493722265014	72	-0.5317444128911143
ACP	Treatment vs CK within Time	T0	ST vs CK	1208.33333333293	1321.075038675904	72	0.9146591207600056
ACP	Treatment vs CK within Time	T15	BC vs CK	-1142.252604166663	1038.0681250595	72	-1.100363816778587
ACP	Treatment vs CK within Time	T15	CA vs CK	-2378.906249999999	1140.304843066664	72	-2.086202005072888
ACP	Treatment vs CK within Time	T15	CM vs CK	-1331.054687500004	1060.564415367764	72	-1.255043699574292
ACP	Treatment vs CK within Time	T15	OF vs CK	-3945.963541666664	957.0525574757064	72	-4.123037455826272
ACP	Treatment vs CK within Time	T15	ST vs CK	-4285.807291666664	962.170522082535	72	-4.454311572953206
ACP	Treatment vs CK within Time	T3	BC vs CK	4191.406249999997	927.2897072337958	72	4.520061224990203
ACP	Treatment vs CK within Time	T3	CA vs CK	1765.299479166665	531.2988879301856	72	3.322610905593747
ACP	Treatment vs CK within Time	T3	CM vs CK	1906.901041666659	237.9871708482999	72	8.012621163021322
ACP	Treatment vs CK within Time	T3	OF vs CK	3030.2734375	403.7108739228462	72	7.506048593774366
ACP	Treatment vs CK within Time	T3	ST vs CK	4455.729166666668	908.9991937476865	72	4.901796610287707
ACP	Treatment vs CK within Time	T7	BC vs CK	-1028.971354166697	900.8803291568631	72	-1.14218428448728
ACP	Treatment vs CK within Time	T7	CA vs CK	-1453.7760416667	758.2440433559805	72	-1.917293059411719
ACP	Treatment vs CK within Time	T7	CM vs CK	783.528645833258	1999.470617145324	72	0.3918680470293591
ACP	Treatment vs CK within Time	T7	OF vs CK	-2511.067708333351	572.2499474451429	72	-4.388061055390603
ACP	Treatment vs CK within Time	T7	ST vs CK	236.0026041666502	607.4030342737053	72	0.388543670100113
Eh	Treatment vs CK within Time	T0	BC vs CK	12.249999999999979	22.36817090073402	72	0.5476531833721728
Eh	Treatment vs CK within Time	T0	CA vs CK	-16.250000000000021	22.36817090073401	72	-0.726478712636578
Eh	Treatment vs CK within Time	T0	CM vs CK	-63.25000000000002	22.36817090073403	72	-2.827678681493112
Eh	Treatment vs CK within Time	T0	OF vs CK	-7.2500000000000229	22.36817090073402	72	-0.32412127179171
Eh	Treatment vs CK within Time	T0	ST vs CK	-19.500000000000023	22.36817090073402	72	-0.8717744551638921
Eh	Treatment vs CK within Time	T15	BC vs CK	8.250000000000001	22.36817090073403	72	0.3688276541077966
Eh	Treatment vs CK within Time	T15	CA vs CK	-24.750000000000006	22.36817090073402	72	-1.106482962323391
Eh	Treatment vs CK within Time	T15	CM vs CK	-0.2500000000000568	22.36817090073403	72	-0.01117659557902667
Eh	Treatment vs CK within Time	T15	OF vs CK	10.99999999999992	22.36817090073402	72	0.491770205477058
Eh	Treatment vs CK within Time	T15	ST vs CK	-5.7500000000000057	22.36817090073403	72	-0.2570616983175574
Eh	Treatment vs CK within Time	T3	BC vs CK	-30.99999999999999	22.36817090073403	72	-1.385897851798991
Eh	Treatment vs CK within Time	T3	CA vs CK	-76.5	22.36817090073403	72	-3.420038247181382
Eh	Treatment vs CK within Time	T3	CM vs CK	-89.5	22.36817090073402	72	-4.001221217290637

Response	Comparison family	By level	Contrast	Estimate	SE	df	Statistic
Eh	Treatment vs CK within Time	T3	OF vs CK	-55.25000000000006	22.36817090073401	72	-2.470027622964336
Eh	Treatment vs CK within Time	T3	ST vs CK	-15.50000000000002	22.36817090073403	72	-0.6929489258994965
Eh	Treatment vs CK within Time	T7	BC vs CK	-18	22.36817090073403	72	-0.8047148816897368
Eh	Treatment vs CK within Time	T7	CA vs CK	-9	22.36817090073403	72	-0.4023574408448685
Eh	Treatment vs CK within Time	T7	CM vs CK	1.500000000000028	22.36817090073403	72	0.067059573474146
Eh	Treatment vs CK within Time	T7	OF vs CK	26.49999999999993	22.36817090073402	72	1.184719131376555
Eh	Treatment vs CK within Time	T7	ST vs CK	2.499999999999961	22.36817090073403	72	0.1117659557902395
TP	Treatment vs CK within Time	T0	BC vs CK	0.7224487035030286	109.3632169746809	36	0.006605956952329641
TP	Treatment vs CK within Time	T0	CA vs CK	2.20051675992074	137.5162931967705	36	0.01600186209769373
TP	Treatment vs CK within Time	T0	CM vs CK	1.825828478858127	228.9689558416855	36	0.007974131131211287
TP	Treatment vs CK within Time	T0	OF vs CK	0.6815824026822406	179.3010639610559	36	0.003801329382129489
TP	Treatment vs CK within Time	T0	ST vs CK	0.9413023777456924	110.5711076421406	36	0.008513095308696582
TP	Treatment vs CK within Time	T15	BC vs CK	0.2990440366773204	66.44537574946227	36	0.004500599677619259
TP	Treatment vs CK within Time	T15	CA vs CK	1.690400671961335	71.30657790522501	36	0.02370609727209291
TP	Treatment vs CK within Time	T15	CM vs CK	6.921033340619958	42.43896801767006	36	0.1630820367200797
TP	Treatment vs CK within Time	T15	OF vs CK	2.041170006445048	47.40255781790668	36	0.04306033472467977
TP	Treatment vs CK within Time	T15	ST vs CK	2.05618464372996	143.5719048609924	36	0.01432163657451488

Supplementary Table S2 — Part B

Part B2. Treatment-versus-CK contrasts: P values and inference fields

Response	Comparison family	By level	Contrast	Raw P	Adjusted P	significance	Inference covariance
Bray-P	Treatment vs CK within Time	T0	BC vs CK	0.07497290425951134	0.2998916170380453	ns	Classical
Bray-P	Treatment vs CK within Time	T0	CA vs CK	0.5205813698666094	1	ns	Classical
Bray-P	Treatment vs CK within Time	T0	CM vs CK	0.3504896437985641	1	ns	Classical
Bray-P	Treatment vs CK within Time	T0	OF vs CK	0.006002227888271877	0.03001113944135939	significant	Classical
Bray-P	Treatment vs CK within Time	T0	ST vs CK	0.758171118379999	1	ns	Classical
Bray-P	Treatment vs CK within Time	T15	BC vs CK	0.06780562825759055	0.1356112565151811	ns	Classical
Bray-P	Treatment vs CK within Time	T15	CA vs CK	0.0002300934359719105	0.001150467179859552	significant	Classical
Bray-P	Treatment vs CK within Time	T15	CM vs CK	0.1015358725066562	0.1356112565151811	ns	Classical
Bray-P	Treatment vs CK within Time	T15	OF vs CK	0.001421955637741498	0.005687822550965992	significant	Classical
Bray-P	Treatment vs CK within Time	T15	ST vs CK	0.00144721932485909	0.005687822550965992	significant	Classical
Bray-P	Treatment vs CK within Time	T3	BC vs CK	2.049195245846117e-06	8.196780983384467e-06	significant	Classical
Bray-P	Treatment vs CK within Time	T3	CA vs CK	2.023986891032501e-07	1.011993445516251e-06	significant	Classical
Bray-P	Treatment vs CK within Time	T3	CM vs CK	0.0007723147035101787	0.00151688884469319	significant	Classical
Bray-P	Treatment vs CK within Time	T3	OF vs CK	6.137092679784958e-05	0.0001841127803935487	significant	Classical
Bray-P	Treatment vs CK within Time	T3	ST vs CK	0.0007584444422346593	0.00151688884469319	significant	Classical
Bray-P	Treatment vs CK within Time	T7	BC vs CK	0.8996264396903035	0.9441092023925644	ns	Classical
Bray-P	Treatment vs CK within Time	T7	CA vs CK	0.1974642195859985	0.5923926587579955	ns	Classical
Bray-P	Treatment vs CK within Time	T7	CM vs CK	0.4720546011962822	0.9441092023925644	ns	Classical
Bray-P	Treatment vs CK within Time	T7	OF vs CK	0.004174541412323939	0.0208727070616197	significant	Classical
Bray-P	Treatment vs CK within Time	T7	ST vs CK	0.07597672539707598	0.3039069015883039	ns	Classical
DOC	Treatment vs CK within Time	T0	BC vs CK	0.243944271898706	0.4878885437974119	ns	Classical
DOC	Treatment vs CK within Time	T0	CA vs CK	0.0006750043924223789	0.003375021962111894	significant	Classical
DOC	Treatment vs CK within Time	T0	CM vs CK	0.532529375148526	0.532529375148526	ns	Classical
DOC	Treatment vs CK within Time	T0	OF vs CK	0.01173875680869809	0.03521627042609428	significant	Classical
DOC	Treatment vs CK within Time	T0	ST vs CK	0.004949370976178622	0.01979748390471449	significant	Classical
DOC	Treatment vs CK within Time	T15	BC vs CK	0.01071591488899988	0.04286365955599952	significant	Classical
DOC	Treatment vs CK within Time	T15	CA vs CK	0.1292682616999342	0.2585365233998684	ns	Classical
DOC	Treatment vs CK within Time	T15	CM vs CK	0.008306577735775502	0.04153288867887751	significant	Classical
DOC	Treatment vs CK within Time	T15	OF vs CK	0.2303586007396994	0.2585365233998684	ns	Classical
DOC	Treatment vs CK within Time	T15	ST vs CK	0.06202770568825185	0.1860831170647556	ns	Classical
DOC	Treatment vs CK within Time	T3	BC vs CK	0.4440920472819964	0.8881840945639927	ns	Classical
DOC	Treatment vs CK within Time	T3	CA vs CK	0.7231021137181102	0.8881840945639927	ns	Classical
DOC	Treatment vs CK within Time	T3	CM vs CK	0.03682197983605411	0.1841098991802705	ns	Classical
DOC	Treatment vs CK within Time	T3	OF vs CK	0.09519632135754351	0.380785285430174	ns	Classical
DOC	Treatment vs CK within Time	T3	ST vs CK	0.2108408730296639	0.6325226190889919	ns	Classical
DOC	Treatment vs CK within Time	T7	BC vs CK	0.766108576360627	0.766108576360627	ns	Classical
DOC	Treatment vs CK within Time	T7	CA vs CK	0.02608152323510432	0.1043260929404173	ns	Classical
DOC	Treatment vs CK within Time	T7	CM vs CK	0.260891560701127	0.5217831214022539	ns	Classical
DOC	Treatment vs CK within Time	T7	OF vs CK	0.0009147670009855649	0.004573835004927824	significant	Classical
DOC	Treatment vs CK within Time	T7	ST vs CK	0.03649026934040403	0.1094708080212121	ns	Classical
pH	Treatment vs CK within Time	T0	BC vs CK	0.7708966876209593	1	ns	Classical
pH	Treatment vs CK within Time	T0	CA vs CK	0.1353624539727227	0.6768122698636135	ns	Classical
pH	Treatment vs CK within Time	T0	CM vs CK	0.3834548880711921	1	ns	Classical
pH	Treatment vs CK within Time	T0	OF vs CK	0.3453002960644983	1	ns	Classical

Response	Comparison family	By level	Contrast	Raw P	Adjusted P	significance	Inference covariance
pH	Treatment vs CK within Time	T0	ST vs CK	0.6276182830913177	1	ns	Classical
pH	Treatment vs CK within Time	T15	BC vs CK	0.4103009903841667	1	ns	Classical
pH	Treatment vs CK within Time	T15	CA vs CK	0.155007186068435	0.7750359303421749	ns	Classical
pH	Treatment vs CK within Time	T15	CM vs CK	0.8270941427781843	1	ns	Classical
pH	Treatment vs CK within Time	T15	OF vs CK	0.4974037985693747	1	ns	Classical
pH	Treatment vs CK within Time	T15	ST vs CK	0.2662288489928463	1	ns	Classical
pH	Treatment vs CK within Time	T3	BC vs CK	0.9034027740387579	1	ns	Classical
pH	Treatment vs CK within Time	T3	CA vs CK	0.9806340619552079	1	ns	Classical
pH	Treatment vs CK within Time	T3	CM vs CK	0.3967380517806721	1	ns	Classical
pH	Treatment vs CK within Time	T3	OF vs CK	0.3212860929504679	1	ns	Classical
pH	Treatment vs CK within Time	T3	ST vs CK	0.1925634037317324	0.9628170186586621	ns	Classical
pH	Treatment vs CK within Time	T7	BC vs CK	0.8650878900682145	1	ns	Classical
pH	Treatment vs CK within Time	T7	CA vs CK	0.29841210444195	0.9847071684130985	ns	Classical
pH	Treatment vs CK within Time	T7	CM vs CK	0.02980848668465183	0.1490424334232592	ns	Classical
pH	Treatment vs CK within Time	T7	OF vs CK	0.884210770267447	1	ns	Classical
pH	Treatment vs CK within Time	T7	ST vs CK	0.2461767921032746	0.9847071684130985	ns	Classical
ACP	Treatment vs CK within Time	T0	BC vs CK	0.03690923716899401	0.1845461858449701	ns	HC3
ACP	Treatment vs CK within Time	T0	CA vs CK	0.05086341444784053	0.2034536577913621	ns	HC3
ACP	Treatment vs CK within Time	T0	CM vs CK	0.2044522067627086	0.613356620288126	ns	HC3
ACP	Treatment vs CK within Time	T0	OF vs CK	0.5965399262453521	0.7268473513061213	ns	HC3
ACP	Treatment vs CK within Time	T0	ST vs CK	0.3634236756530607	0.7268473513061213	ns	HC3
ACP	Treatment vs CK within Time	T15	BC vs CK	0.2748389884282346	0.4270425447716312	ns	HC3
ACP	Treatment vs CK within Time	T15	CA vs CK	0.04050345525385888	0.1215103657615766	ns	HC3
ACP	Treatment vs CK within Time	T15	CM vs CK	0.2135212723858156	0.4270425447716312	ns	HC3
ACP	Treatment vs CK within Time	T15	OF vs CK	9.889613508426525e-05	0.000395584540337061	significant	HC3
ACP	Treatment vs CK within Time	T15	ST vs CK	3.019691472018838e-05	0.0001509845736009419	significant	HC3
ACP	Treatment vs CK within Time	T3	BC vs CK	2.373378372141508e-05	4.746756744283016e-05	significant	HC3
ACP	Treatment vs CK within Time	T3	CA vs CK	0.001403796384682871	0.001403796384682871	significant	HC3
ACP	Treatment vs CK within Time	T3	CM vs CK	1.452381347913855e-11	7.261906739569274e-11	significant	HC3
ACP	Treatment vs CK within Time	T3	OF vs CK	1.27694168603285e-10	5.1077667441314e-10	significant	HC3
ACP	Treatment vs CK within Time	T3	ST vs CK	5.678017250819749e-06	1.703405175245924e-05	significant	HC3
ACP	Treatment vs CK within Time	T7	BC vs CK	0.2571616170183328	0.7714848510549983	ns	HC3
ACP	Treatment vs CK within Time	T7	CA vs CK	0.05916844267922869	0.2366737707169148	ns	HC3
ACP	Treatment vs CK within Time	T7	CM vs CK	0.6963131992905955	1	ns	HC3
ACP	Treatment vs CK within Time	T7	OF vs CK	3.842344946743129e-05	0.0001921172473371564	significant	HC3
ACP	Treatment vs CK within Time	T7	ST vs CK	0.6987603203130883	1	ns	HC3
Eh	Treatment vs CK within Time	T0	BC vs CK	0.5856238410995693	1	ns	Classical
Eh	Treatment vs CK within Time	T0	CA vs CK	0.4699006164206345	1	ns	Classical
Eh	Treatment vs CK within Time	T0	CM vs CK	0.006067521544641102	0.03033760772320551	significant	Classical
Eh	Treatment vs CK within Time	T0	OF vs CK	0.7467859358769138	1	ns	Classical
Eh	Treatment vs CK within Time	T0	ST vs CK	0.3862292050340458	1	ns	Classical
Eh	Treatment vs CK within Time	T15	BC vs CK	0.7133385445181905	1	ns	Classical
Eh	Treatment vs CK within Time	T15	CA vs CK	0.2722007978483057	1	ns	Classical
Eh	Treatment vs CK within Time	T15	CM vs CK	0.9911134638443126	1	ns	Classical
Eh	Treatment vs CK within Time	T15	OF vs CK	0.6243777700007632	1	ns	Classical
Eh	Treatment vs CK within Time	T15	ST vs CK	0.7978643412535263	1	ns	Classical
Eh	Treatment vs CK within Time	T3	BC vs CK	0.1700557283697484	0.3401114567394968	ns	Classical
Eh	Treatment vs CK within Time	T3	CA vs CK	0.001034758838964113	0.004139035355856454	significant	Classical
Eh	Treatment vs CK within Time	T3	CM vs CK	0.0001511423158108452	0.000755711579054226	significant	Classical

Response	Comparison family	By level	Contrast	Raw P	Adjusted P	significance	Inference covariance
Eh	Treatment vs CK within Time	T3	OF vs CK	0.01588076651088007	0.04764229953264021	significant	Classical
Eh	Treatment vs CK within Time	T3	ST vs CK	0.490570803835414	0.490570803835414	ns	Classical
Eh	Treatment vs CK within Time	T7	BC vs CK	0.4236335336156517	1	ns	Classical
Eh	Treatment vs CK within Time	T7	CA vs CK	0.6886130453557253	1	ns	Classical
Eh	Treatment vs CK within Time	T7	CM vs CK	0.9467201476430982	1	ns	Classical
Eh	Treatment vs CK within Time	T7	OF vs CK	0.2400244489815164	1	ns	Classical
Eh	Treatment vs CK within Time	T7	ST vs CK	0.9113199828299317	1	ns	Classical
TP	Treatment vs CK within Time	T0	BC vs CK	0.9947657193117954	1	ns	HC3
TP	Treatment vs CK within Time	T0	CA vs CK	0.9873212630994677	1	ns	HC3
TP	Treatment vs CK within Time	T0	CM vs CK	0.993681657591047	1	ns	HC3
TP	Treatment vs CK within Time	T0	OF vs CK	0.9969879724312826	1	ns	HC3
TP	Treatment vs CK within Time	T0	ST vs CK	0.9932546169153451	1	ns	HC3
TP	Treatment vs CK within Time	T15	BC vs CK	0.9964339010220573	1	ns	HC3
TP	Treatment vs CK within Time	T15	CA vs CK	0.9812179595452097	1	ns	HC3
TP	Treatment vs CK within Time	T15	CM vs CK	0.8713658913296987	1	ns	HC3
TP	Treatment vs CK within Time	T15	OF vs CK	0.9658913918973175	1	ns	HC3
TP	Treatment vs CK within Time	T15	ST vs CK	0.9886524552133078	1	ns	HC3

Supplementary Table S2 — Part B

Part B3. Treatment-versus-CK contrasts: confidence intervals and adjustment

Response	Comparison family	By level	Contrast	95% CI lower	95% CI upper	Adjustment method
Bray-P	Treatment vs CK within Time	T0	BC vs CK	-0.02776265181890214	0.6825773725641917	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T0	CA vs CK	-0.2381787469456855	0.4721612774374079	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T0	CM vs CK	-0.5254607364349441	0.1848792879481503	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T0	OF vs CK	0.1579297234156553	0.8682697477987491	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T0	ST vs CK	-0.2991661361136418	0.4111738882694524	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T15	BC vs CK	-0.01917122919012854	0.6911687951929657	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T15	CA vs CK	0.3476519871530198	1.057992011536114	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T15	CM vs CK	-0.05460649974467874	0.6557335246384155	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T15	OF vs CK	0.246166827270803	0.9565068516538968	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T15	ST vs CK	0.2451371761929036	0.9554772005759979	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T3	BC vs CK	0.5809624573809824	1.291302481764077	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T3	CA vs CK	0.6864213224520759	1.39676134683517	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T3	CM vs CK	0.2812265322993172	0.991566556682411	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T3	OF vs CK	0.4163908726785393	1.126730897061633	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T3	ST vs CK	0.2822497591900419	0.9925897835731361	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T7	BC vs CK	-0.378107290809535	0.3322327335735593	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T7	CA vs CK	-0.119447474094054	0.5908925502890403	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T7	CM vs CK	-0.2241654266613295	0.48617045977217647	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T7	OF vs CK	0.1810295074596424	0.8913695318427362	Holm-adjusted within the prespecified comparison family
Bray-P	Treatment vs CK within Time	T7	ST vs CK	-0.02891053933928484	0.6814294850438094	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T0	BC vs CK	-3.208150869507564	12.80815086950754	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T0	CA vs CK	6.511849130492497	22.5281508695076	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T0	CM vs CK	-5.445650869507594	10.57065086950753	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T0	OF vs CK	2.556849130491944	18.57315086950706	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T0	ST vs CK	3.839349130492483	19.8556508695076	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T15	BC vs CK	-18.71315086950731	-2.696849130492193	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T15	CA vs CK	-1.738150869507228	14.27815086950788	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T15	CM vs CK	-19.09815086950731	-3.081849130492193	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T15	OF vs CK	-3.065650869507578	12.95065086950753	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T15	ST vs CK	-0.2631508695077667	15.75315086950735	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T3	BC vs CK	-11.15231753617409	4.863984202841021	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T3	CA vs CK	-6.554817536174035	9.461484202841078	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T3	CM vs CK	-16.69981753617434	-0.6835157971592309	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T3	OF vs CK	-1.099817536174558	14.91648420284055	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T3	ST vs CK	-2.849817536174052	13.16648420284107	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T7	BC vs CK	-6.788150869507507	9.228150869507617	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T7	CA vs CK	1.274349130492494	17.29065086950762	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T7	CM vs CK	-3.378150869507528	12.63815086950759	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T7	OF vs CK	6.124349130492275	22.14065086950738	Holm-adjusted within the prespecified comparison family
DOC	Treatment vs CK within Time	T7	ST vs CK	0.6993491304924611	16.71565086950758	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T0	BC vs CK	-0.1711620919115276	0.2311620919115293	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T0	CA vs CK	-0.0461620919115274	0.356162091911529	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T0	CM vs CK	-0.1111620919115275	0.2911620919115294	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T0	OF vs CK	-0.1036620919115275	0.2986620919115294	Holm-adjusted within the prespecified comparison family

Response	Comparison family	By level	Contrast	95% CI lower	95% CI upper	Adjustment method
pH	Treatment vs CK within Time	T0	ST vs CK	-0.1511620919115272	0.2511620919115296	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T15	BC vs CK	-0.2861620919115287	0.1161620919115281	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T15	CA vs CK	-0.05366209191152851	0.3486620919115283	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T15	CM vs CK	-0.2236620919115287	0.1786620919115282	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T15	OF vs CK	-0.1311620919115288	0.2711620919115281	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T15	ST vs CK	-0.08616209191152853	0.3161620919115283	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T3	BC vs CK	-0.2136620919115283	0.1886620919115285	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T3	CA vs CK	-0.2036620919115283	0.1986620919115286	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T3	CM vs CK	-0.2886620919115285	0.1136620919115284	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T3	OF vs CK	-0.09866209191152862	0.3036620919115282	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T3	ST vs CK	-0.3361620919115286	0.06616209191152822	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T7	BC vs CK	-0.2186620919115287	0.1836620919115282	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T7	CA vs CK	-0.3086620919115287	0.09366209191152812	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T7	CM vs CK	-0.4286620919115288	-0.02633790808847197	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T7	OF vs CK	-0.1861620919115291	0.2161620919115278	Holm-adjusted within the prespecified comparison family
pH	Treatment vs CK within Time	T7	ST vs CK	-0.3211620919115288	0.08116209191152803	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T0	BC vs CK	-9615.251733104884	-391.2586835618167	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T0	CA vs CK	-6996.563302007656	-45.75440632575464	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T0	CM vs CK	-7692.177324247693	1612.750240914279	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T0	OF vs CK	-7077.784362306134	4056.951028972721	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T0	ST vs CK	-1380.973742471479	3797.640409138065	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T15	BC vs CK	-3176.866129283283	892.3609209499571	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T15	CA vs CK	-4613.903742410661	-143.9087575893377	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T15	CM vs CK	-3409.760941620822	747.6515666208134	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T15	OF vs CK	-5821.786554319048	-2070.140529014279	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T15	ST vs CK	-6171.661514948433	-2399.953068384896	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T3	BC vs CK	2373.918423821758	6008.894076178237	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T3	CA vs CK	723.9536588235012	2806.645299509829	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T3	CM vs CK	1440.446186803991	2373.355896529327	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T3	OF vs CK	2239.000124611222	3821.546750388778	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T3	ST vs CK	2674.090746921202	6237.367586412133	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T7	BC vs CK	-2794.696799314149	736.7540909807547	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T7	CA vs CK	-2939.934366644422	32.38228331102164	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T7	CM vs CK	-3135.433763771509	4702.49105543816	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T7	OF vs CK	-3632.677605325831	-1389.457811340871	Holm-adjusted within the prespecified comparison family
ACP	Treatment vs CK within Time	T7	ST vs CK	-954.5073430098123	1426.512551343113	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T0	BC vs CK	-31.59161496543889	56.09161496543847	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T0	CA vs CK	-60.09161496543886	27.59161496543845	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T0	CM vs CK	-107.0916149654389	-19.4083850345615	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T0	OF vs CK	-51.09161496543891	36.59161496543845	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T0	ST vs CK	-63.34161496543891	24.34161496543845	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T15	BC vs CK	-35.59161496543868	52.09161496543871	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T15	CA vs CK	-68.59161496543874	19.09161496543862	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T15	CM vs CK	-44.09161496543875	43.59161496543864	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T15	OF vs CK	-32.84161496543876	54.8416149654386	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T15	ST vs CK	-49.59161496543875	38.09161496543864	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T3	BC vs CK	-74.84161496543868	12.8416149654387	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T3	CA vs CK	-120.3416149654387	-32.65838503456131	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T3	CM vs CK	-133.3416149654387	-45.65838503456132	Holm-adjusted within the prespecified comparison family

Response	Comparison family	By level	Contrast	95% CI lower	95% CI upper	Adjustment method
Eh	Treatment vs CK within Time	T3	OF vs CK	-99.09161496543871	-11.4083850345614	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T3	ST vs CK	-59.34161496543872	28.34161496543867	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T7	BC vs CK	-61.84161496543869	25.84161496543869	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T7	CA vs CK	-52.84161496543869	34.84161496543869	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T7	CM vs CK	-42.34161496543867	45.34161496543872	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T7	OF vs CK	-17.34161496543875	70.34161496543861	Holm-adjusted within the prespecified comparison family
Eh	Treatment vs CK within Time	T7	ST vs CK	-41.34161496543874	46.34161496543865	Holm-adjusted within the prespecified comparison family
TP	Treatment vs CK within Time	T0	BC vs CK	-213.6294565668715	215.0743539738776	Holm-adjusted within the prespecified comparison family
TP	Treatment vs CK within Time	T0	CA vs CK	-267.3314179057494	271.7324514255909	Holm-adjusted within the prespecified comparison family
TP	Treatment vs CK within Time	T0	CM vs CK	-446.9533249708455	450.6049819285617	Holm-adjusted within the prespecified comparison family
TP	Treatment vs CK within Time	T0	OF vs CK	-350.7485029609873	352.1116677663518	Holm-adjusted within the prespecified comparison family
TP	Treatment vs CK within Time	T0	ST vs CK	-215.7780686008499	217.6606733563413	Holm-adjusted within the prespecified comparison family
TP	Treatment vs CK within Time	T15	BC vs CK	-129.9338924322687	130.5319805056234	Holm-adjusted within the prespecified comparison family
TP	Treatment vs CK within Time	T15	CA vs CK	-138.0704920222797	141.4512933662023	Holm-adjusted within the prespecified comparison family
TP	Treatment vs CK within Time	T15	CM vs CK	-76.25934397401335	90.10141065525326	Holm-adjusted within the prespecified comparison family
TP	Treatment vs CK within Time	T15	OF vs CK	-90.86784331665206	94.95018332954214	Holm-adjusted within the prespecified comparison family
TP	Treatment vs CK within Time	T15	ST vs CK	-279.3447488838151	283.4571181712751	Holm-adjusted within the prespecified comparison family

Supplementary Table S2 — Part C

Part C1. Time-versus-T0 contrasts: estimates and test statistics

Response	Comparison family	By level	Contrast	Estimate	SE	df	Statistic
Bray-P	Time vs T0 within Treatment	BC	T15 vs T0	-0.6374205254189671	0.1812091898936463	72	-3.517594917747142
Bray-P	Time vs T0 within Treatment	BC	T3 vs T0	-0.371637600007307	0.1812091898936464	72	-2.05087611850936
Bray-P	Time vs T0 within Treatment	BC	T7 vs T0	-0.1630208427206648	0.1812091898936463	72	-0.8996278986531727
Bray-P	Time vs T0 within Treatment	CA	T15 vs T0	-0.06018121394903506	0.1812091898936464	72	-0.3321090612697736
Bray-P	Time vs T0 within Treatment	CA	T3 vs T0	-0.05576263980943012	0.1812091898936464	72	-0.3077252309452838
Bray-P	Time vs T0 within Treatment	CA	T7 vs T0	0.3060550691215999	0.1812091898936464	72	1.688959976595154
Bray-P	Time vs T0 within Treatment	CK	T15 vs T0	-0.6460119480477406	0.1812091898936464	72	-3.565006545346249
Bray-P	Time vs T0 within Treatment	CK	T3 vs T0	-0.9803627092071916	0.1812091898936463	72	-5.410115843366317
Bray-P	Time vs T0 within Treatment	CK	T7 vs T0	0.1873237962699679	0.1812091898936465	72	1.033743356945143
Bray-P	Time vs T0 within Treatment	CM	T15 vs T0	-0.1751577113574753	0.1812091898936464	72	-0.9666050130254281
Bray-P	Time vs T0 within Treatment	CM	T3 vs T0	-0.1736754404729305	0.1812091898936464	72	-0.9584251249887628
Bray-P	Time vs T0 within Treatment	CM	T7 vs T0	0.4886191060435824	0.1812091898936464	72	2.696436678130718
Bray-P	Time vs T0 within Treatment	OF	T15 vs T0	-0.5577748441925929	0.1812091898936465	72	-3.078071506858768
Bray-P	Time vs T0 within Treatment	OF	T3 vs T0	-0.7219015599443076	0.1812091898936464	72	-3.983802148047785
Bray-P	Time vs T0 within Treatment	OF	T7 vs T0	0.210423580313955	0.1812091898936463	72	1.161219143672873
Bray-P	Time vs T0 within Treatment	ST	T15 vs T0	-0.1017086357411953	0.1812091898936464	72	-0.5612774705349614
Bray-P	Time vs T0 within Treatment	ST	T3 vs T0	-0.3989468139035077	0.1812091898936465	72	-2.201581576175323
Bray-P	Time vs T0 within Treatment	ST	T7 vs T0	0.4575793930443248	0.1812091898936464	72	2.525144521162989
DOC	Time vs T0 within Treatment	BC	T15 vs T0	-11.573	4.085791259952833	72	-2.832499083698563
DOC	Time vs T0 within Treatment	BC	T3 vs T0	7.1015000000000025	4.085791259952834	72	1.738096625152114
DOC	Time vs T0 within Treatment	BC	T7 vs T0	-3.487999999999997	4.085791259952834	72	-0.8536902103119764
DOC	Time vs T0 within Treatment	CA	T15 vs T0	-4.317999999999998	4.085791259952834	72	-1.05683323627498
DOC	Time vs T0 within Treatment	CA	T3 vs T0	1.979000000000002	4.085791259952835	72	0.4843615040732319
DOC	Time vs T0 within Treatment	CA	T7 vs T0	-5.1455000000000028	4.085791259952834	72	-1.259364385653766
DOC	Time vs T0 within Treatment	CK	T15 vs T0	3.9319999999999744	4.085791259952834	72	0.962359491670442
DOC	Time vs T0 within Treatment	CK	T3 vs T0	15.045666666666655	4.085791259952834	72	3.682436450960599
DOC	Time vs T0 within Treatment	CK	T7 vs T0	0.09199999999996544	4.085791259952835	72	0.02251705829950487
DOC	Time vs T0 within Treatment	CM	T15 vs T0	-9.720499999999978	4.085791259952834	72	-2.379098534787162
DOC	Time vs T0 within Treatment	CM	T3 vs T0	3.7914999999999794	4.085791259952834	72	0.9279720276369583
DOC	Time vs T0 within Treatment	CM	T7 vs T0	2.1595000000000032	4.085791259952834	72	0.5285389934543452
DOC	Time vs T0 within Treatment	OF	T15 vs T0	-1.6904999999999778	4.085791259952835	72	-0.4137509462535031
DOC	Time vs T0 within Treatment	OF	T3 vs T0	11.3890000000000004	4.085791259952834	72	2.787464967099547
DOC	Time vs T0 within Treatment	OF	T7 vs T0	3.6595000000000294	4.085791259952834	72	0.895664943989953
DOC	Time vs T0 within Treatment	ST	T15 vs T0	-0.17050000000005112	4.085791259952834	72	-0.0417299830443319
DOC	Time vs T0 within Treatment	ST	T3 vs T0	8.3565000000000013	4.085791259952835	72	2.045258670433515
DOC	Time vs T0 within Treatment	ST	T7 vs T0	-3.0480000000000059	4.085791259952834	72	-0.7459999314882387
pH	Time vs T0 within Treatment	BC	T15 vs T0	-0.8300000000000003	0.1026337203630246	72	-8.087010751088592
pH	Time vs T0 within Treatment	BC	T3 vs T0	0.05250000000000034	0.1026337203630247	72	0.5115277884724742
pH	Time vs T0 within Treatment	BC	T7 vs T0	-0.1974999999999998	0.1026337203630246	72	-1.924318823301198
pH	Time vs T0 within Treatment	CA	T15 vs T0	-0.7224999999999998	0.1026337203630246	72	-7.039596708025908
pH	Time vs T0 within Treatment	CA	T3 vs T0	-0.06249999999999963	0.1026337203630247	72	-0.6089616529434139
pH	Time vs T0 within Treatment	CA	T7 vs T0	-0.4124999999999999	0.1026337203630247	72	-4.019146909426555
pH	Time vs T0 within Treatment	CK	T15 vs T0	-0.7149999999999991	0.1026337203630247	72	-6.966521309672689
pH	Time vs T0 within Treatment	CK	T3 vs T0	0.0950000000000011	0.1026337203630246	72	0.9256217124740057

Response	Comparison family	By level	Contrast	Estimate	SE	df	Statistic
pH	Time vs T0 within Treatment	CK	T7 vs T0	-0.1499999999999987	0.1026337203630247	72	-1.461507967064189
pH	Time vs T0 within Treatment	CM	T15 vs T0	-0.8275000000000002	0.1026337203630247	72	-8.062652284970852
pH	Time vs T0 within Treatment	CM	T3 vs T0	-0.0824999999999999	0.1026337203630247	72	-0.8038293818853104
pH	Time vs T0 within Treatment	CM	T7 vs T0	-0.4675	0.1026337203630247	72	-4.555033164016763
pH	Time vs T0 within Treatment	OF	T15 vs T0	-0.7425000000000004	0.1026337203630247	72	-7.234464436967803
pH	Time vs T0 within Treatment	OF	T3 vs T0	0.0999999999999995	0.1026337203630247	72	0.9743386447094676
pH	Time vs T0 within Treatment	OF	T7 vs T0	-0.2325000000000003	0.1026337203630246	72	-2.265337348949517
pH	Time vs T0 within Treatment	ST	T15 vs T0	-0.6500000000000002	0.1026337203630247	72	-6.333201190611546
pH	Time vs T0 within Treatment	ST	T3 vs T0	-0.09000000000000025	0.1026337203630247	72	-0.8769047802385235
pH	Time vs T0 within Treatment	ST	T7 vs T0	-0.3200000000000002	0.1026337203630247	72	-3.1178836630703
ACP	Time vs T0 within Treatment	BC	T15 vs T0	18.88020833331055	2242.112514272309	72	0.008420722962441623
ACP	Time vs T0 within Treatment	BC	T3 vs T0	-3407.877604166695	2380.096371082033	72	-1.431823368823261
ACP	Time vs T0 within Treatment	BC	T7 vs T0	-1708.658854166703	2328.89068349456	72	-0.7336792861409952
ACP	Time vs T0 within Treatment	CA	T15 vs T0	-2699.86979166667	1690.267866571069	72	-1.597302915746551
ACP	Time vs T0 within Treatment	CA	T3 vs T0	-7316.080729166673	1641.492696926018	72	-4.456968186862673
ACP	Time vs T0 within Treatment	CA	T7 vs T0	-3615.559895833351	1671.618290382193	72	-2.162909987666325
ACP	Time vs T0 within Treatment	CK	T15 vs T0	-3842.122395833377	1259.922889504362	72	-3.049490113910718
ACP	Time vs T0 within Treatment	CK	T3 vs T0	-12602.53906250004	855.5093496817253	72	-14.73103603974469
ACP	Time vs T0 within Treatment	CK	T7 vs T0	-5682.942708333355	961.6352394140887	72	-5.909665614787468
ACP	Time vs T0 within Treatment	CM	T15 vs T0	-2133.463541666673	2274.174887905027	72	-0.9381264180750947
ACP	Time vs T0 within Treatment	CM	T3 vs T0	-7655.924479166676	2226.931044111161	72	-3.437881248910606
ACP	Time vs T0 within Treatment	CM	T7 vs T0	-1859.700520833322	2950.867778175601	72	-0.6302215689186513
ACP	Time vs T0 within Treatment	OF	T15 vs T0	-6277.669270833336	2719.733166415546	72	-2.308193078774323
ACP	Time vs T0 within Treatment	OF	T3 vs T0	-8061.848958333337	2738.519820734854	72	-2.94387095440851
ACP	Time vs T0 within Treatment	OF	T7 vs T0	-6683.59375	2733.33720109593	72	-2.44521376554646
ACP	Time vs T0 within Treatment	ST	T15 vs T0	-9336.263020833334	1040.963824481955	72	-8.968864048161917
ACP	Time vs T0 within Treatment	ST	T3 vs T0	-9355.143229166668	1356.326857602413	72	-6.897410588553712
ACP	Time vs T0 within Treatment	ST	T7 vs T0	-6655.273437499998	1090.612383101555	72	-6.102327041779312
Eh	Time vs T0 within Treatment	BC	T15 vs T0	-149.5	22.36817090073401	72	-6.683604156256431
Eh	Time vs T0 within Treatment	BC	T3 vs T0	-63.49999999999999	22.36817090073401	72	-2.838855277072129
Eh	Time vs T0 within Treatment	BC	T7 vs T0	-167.5	22.36817090073401	72	-7.488319037946169
Eh	Time vs T0 within Treatment	CA	T15 vs T0	-154.00000000000001	22.36817090073401	72	-6.884782876678867
Eh	Time vs T0 within Treatment	CA	T3 vs T0	-80.5	22.36817090073402	72	-3.59886377644577
Eh	Time vs T0 within Treatment	CA	T7 vs T0	-130	22.36817090073402	72	-5.811829701092546
Eh	Time vs T0 within Treatment	CK	T15 vs T0	-145.50000000000002	22.36817090073401	72	-6.504778626992053
Eh	Time vs T0 within Treatment	CK	T3 vs T0	-20.250000000000022	22.36817090073401	72	-0.9053042419009646
Eh	Time vs T0 within Treatment	CK	T7 vs T0	-137.25000000000002	22.36817090073403	72	-6.135950972884255
Eh	Time vs T0 within Treatment	CM	T15 vs T0	-82.50000000000006	22.36817090073402	72	-3.688276541077965
Eh	Time vs T0 within Treatment	CM	T3 vs T0	-46.50000000000002	22.36817090073401	72	-2.078846777698489
Eh	Time vs T0 within Treatment	CM	T7 vs T0	-72.5	22.36817090073402	72	-3.241212717916997
Eh	Time vs T0 within Treatment	OF	T15 vs T0	-127.25000000000001	22.36817090073403	72	-5.688887149723283
Eh	Time vs T0 within Treatment	OF	T3 vs T0	-68.25000000000006	22.36817090073402	72	-3.05121059307359
Eh	Time vs T0 within Treatment	OF	T7 vs T0	-103.50000000000001	22.36817090073401	72	-4.627110569715994
Eh	Time vs T0 within Treatment	ST	T15 vs T0	-131.75	22.36817090073402	72	-5.890065870145717
Eh	Time vs T0 within Treatment	ST	T3 vs T0	-16.250000000000001	22.36817090073403	72	-0.7264787126365686
Eh	Time vs T0 within Treatment	ST	T7 vs T0	-115.25	22.36817090073401	72	-5.152410561930125
TP	Time vs T0 within Treatment	BC	T15 vs T0	-12.0718502643726	75.91700697771971	36	-0.1590137802444645
TP	Time vs T0 within Treatment	CA	T15 vs T0	-12.15856168550629	115.6868605765186	36	-0.1050988990877168
TP	Time vs T0 within Treatment	CK	T15 vs T0	-11.64844559754689	103.0141215420644	36	-0.1130762018175382

Response	Comparison family	By level	Contrast	Estimate	SE	df	Statistic
TP	Time vs T0 within Treatment	CM	T15 vs T0	-6.55324073578506	208.8442948910824	36	-0.03137859590180686
TP	Time vs T0 within Treatment	OF	T15 vs T0	-10.28885799378408	154.2205070286164	36	-0.06671523905621017
TP	Time vs T0 within Treatment	ST	T15 vs T0	-10.53356333156262	149.0870634010224	36	-0.07065377163697212

Supplementary Table S2 — Part C

Part C2. Time-versus-T0 contrasts: P values and inference fields

Response	Comparison family	By level	Contrast	Raw P	Adjusted P	significance	Inference covariance
Bray-P	Time vs T0 within Treatment	BC	T15 vs T0	0.000758434308554779	0.002275302925664337	significant	Classical
Bray-P	Time vs T0 within Treatment	BC	T3 vs T0	0.04391914832728432	0.08783829665456865	ns	Classical
Bray-P	Time vs T0 within Treatment	BC	T7 vs T0	0.3713173462879575	0.3713173462879575	ns	Classical
Bray-P	Time vs T0 within Treatment	CA	T15 vs T0	0.740771806761827	1	ns	Classical
Bray-P	Time vs T0 within Treatment	CA	T3 vs T0	0.7591798362437785	1	ns	Classical
Bray-P	Time vs T0 within Treatment	CA	T7 vs T0	0.09555370162923423	0.2866611048877027	ns	Classical
Bray-P	Time vs T0 within Treatment	CK	T15 vs T0	0.0006509401766931601	0.00130188035338632	significant	Classical
Bray-P	Time vs T0 within Treatment	CK	T3 vs T0	7.845764731662076e-07	2.353729419498623e-06	significant	Classical
Bray-P	Time vs T0 within Treatment	CK	T7 vs T0	0.3047159284384085	0.3047159284384085	ns	Classical
Bray-P	Time vs T0 within Treatment	CM	T15 vs T0	0.3369771711090321	0.6739543422180643	ns	Classical
Bray-P	Time vs T0 within Treatment	CM	T3 vs T0	0.3410557944990729	0.6739543422180643	ns	Classical
Bray-P	Time vs T0 within Treatment	CM	T7 vs T0	0.008720979368785235	0.02616293810635571	significant	Classical
Bray-P	Time vs T0 within Treatment	OF	T15 vs T0	0.002947011310551586	0.005894022621103171	significant	Classical
Bray-P	Time vs T0 within Treatment	OF	T3 vs T0	0.0001605032203985072	0.0004815096611955217	significant	Classical
Bray-P	Time vs T0 within Treatment	OF	T7 vs T0	0.2493881752773548	0.2493881752773548	ns	Classical
Bray-P	Time vs T0 within Treatment	ST	T15 vs T0	0.576351219119688	0.576351219119688	ns	Classical
Bray-P	Time vs T0 within Treatment	ST	T3 vs T0	0.03090013519567757	0.06180027039135514	ns	Classical
Bray-P	Time vs T0 within Treatment	ST	T7 vs T0	0.01376789150920842	0.04130367452762526	significant	Classical
DOC	Time vs T0 within Treatment	BC	T15 vs T0	0.005985956058540164	0.01795786817562049	significant	Classical
DOC	Time vs T0 within Treatment	BC	T3 vs T0	0.0864689122584534	0.1729378245169068	ns	Classical
DOC	Time vs T0 within Treatment	BC	T7 vs T0	0.3961079857267177	0.3961079857267177	ns	Classical
DOC	Time vs T0 within Treatment	CA	T15 vs T0	0.29412081487537	0.6358984130968512	ns	Classical
DOC	Time vs T0 within Treatment	CA	T3 vs T0	0.6295995113099934	0.6358984130968512	ns	Classical
DOC	Time vs T0 within Treatment	CA	T7 vs T0	0.2119661376989504	0.6358984130968512	ns	Classical
DOC	Time vs T0 within Treatment	CK	T15 vs T0	0.3390900439353208	0.6781800878706417	ns	Classical
DOC	Time vs T0 within Treatment	CK	T3 vs T0	0.0004435271106707403	0.001330581332012221	significant	Classical
DOC	Time vs T0 within Treatment	CK	T7 vs T0	0.9820977924541622	0.9820977924541622	ns	Classical
DOC	Time vs T0 within Treatment	CM	T15 vs T0	0.02000821354173748	0.06002464062521244	ns	Classical
DOC	Time vs T0 within Treatment	CM	T3 vs T0	0.3565225776060419	0.7130451552120838	ns	Classical
DOC	Time vs T0 within Treatment	CM	T7 vs T0	0.5987507820605824	0.7130451552120838	ns	Classical
DOC	Time vs T0 within Treatment	OF	T15 vs T0	0.6802863843273742	0.746832918765524	ns	Classical
DOC	Time vs T0 within Treatment	OF	T3 vs T0	0.006788855648286425	0.02036656694485928	significant	Classical
DOC	Time vs T0 within Treatment	OF	T7 vs T0	0.373416459382762	0.746832918765524	ns	Classical
DOC	Time vs T0 within Treatment	ST	T15 vs T0	0.9668294578013489	0.9668294578013489	ns	Classical
DOC	Time vs T0 within Treatment	ST	T3 vs T0	0.04448457999672048	0.1334537399901614	ns	Classical
DOC	Time vs T0 within Treatment	ST	T7 vs T0	0.4580962164401614	0.9161924328803228	ns	Classical
pH	Time vs T0 within Treatment	BC	T15 vs T0	1.054883410459447e-11	3.164650231378341e-11	significant	Classical
pH	Time vs T0 within Treatment	BC	T3 vs T0	0.6105467935048887	0.6105467935048887	ns	Classical
pH	Time vs T0 within Treatment	BC	T7 vs T0	0.05826694559703097	0.1165338911940619	ns	Classical
pH	Time vs T0 within Treatment	CA	T15 vs T0	9.342889990961929e-10	2.802866997288579e-09	significant	Classical
pH	Time vs T0 within Treatment	CA	T3 vs T0	0.5444665289582257	0.5444665289582257	ns	Classical
pH	Time vs T0 within Treatment	CA	T7 vs T0	0.000142057836807408	0.000284115673614816	significant	Classical
pH	Time vs T0 within Treatment	CK	T15 vs T0	1.274128565244393e-09	3.822385695733177e-09	significant	Classical
pH	Time vs T0 within Treatment	CK	T3 vs T0	0.3577347591722561	0.3577347591722561	ns	Classical

Response	Comparison family	By level	Contrast	Raw P	Adjusted P	significance	Inference covariance
pH	Time vs T0 within Treatment	CK	T7 vs T0	0.1482269150732218	0.2964538301464436	ns	Classical
pH	Time vs T0 within Treatment	CM	T15 vs T0	1.17133770001064e-11	3.514013100031921e-11	significant	Classical
pH	Time vs T0 within Treatment	CM	T3 vs T0	0.4241415095905029	0.4241415095905029	ns	Classical
pH	Time vs T0 within Treatment	CM	T7 vs T0	2.086573609322265e-05	4.173147218644531e-05	significant	Classical
pH	Time vs T0 within Treatment	OF	T15 vs T0	4.075851374872146e-10	1.222755412461644e-09	significant	Classical
pH	Time vs T0 within Treatment	OF	T3 vs T0	0.3331506250504052	0.3331506250504052	ns	Classical
pH	Time vs T0 within Treatment	OF	T7 vs T0	0.02650121839704269	0.05300243679408539	ns	Classical
pH	Time vs T0 within Treatment	ST	T15 vs T0	1.82742034704303e-08	5.482261041129091e-08	significant	Classical
pH	Time vs T0 within Treatment	ST	T3 vs T0	0.383454888071196	0.383454888071196	ns	Classical
pH	Time vs T0 within Treatment	ST	T7 vs T0	0.00261809434799115	0.005236188695982301	significant	Classical
ACP	Time vs T0 within Treatment	BC	T15 vs T0	0.993304603225721	0.993304603225721	ns	HC3
ACP	Time vs T0 within Treatment	BC	T3 vs T0	0.1565212936213499	0.4695638808640498	ns	HC3
ACP	Time vs T0 within Treatment	BC	T7 vs T0	0.4655265971062368	0.9310531942124736	ns	HC3
ACP	Time vs T0 within Treatment	CA	T15 vs T0	0.1145781236459793	0.1145781236459793	ns	HC3
ACP	Time vs T0 within Treatment	CA	T3 vs T0	2.990548200437387e-05	8.971644601312161e-05	significant	HC3
ACP	Time vs T0 within Treatment	CA	T7 vs T0	0.0338695740384928	0.0677391480769856	ns	HC3
ACP	Time vs T0 within Treatment	CK	T15 vs T0	0.00320645448211865	0.00320645448211865	significant	HC3
ACP	Time vs T0 within Treatment	CK	T3 vs T0	2.01149951710276e-23	6.03449855130828e-23	significant	HC3
ACP	Time vs T0 within Treatment	CK	T7 vs T0	1.048597780378849e-07	2.097195560757698e-07	significant	HC3
ACP	Time vs T0 within Treatment	CM	T15 vs T0	0.3513158424946892	0.7026316849893783	ns	HC3
ACP	Time vs T0 within Treatment	CM	T3 vs T0	0.0009779823400373915	0.002933947020112175	significant	HC3
ACP	Time vs T0 within Treatment	CM	T7 vs T0	0.5305447743663096	0.7026316849893783	ns	HC3
ACP	Time vs T0 within Treatment	OF	T15 vs T0	0.02386391762299123	0.03384738274547201	significant	HC3
ACP	Time vs T0 within Treatment	OF	T3 vs T0	0.004360794873109823	0.01308238461932947	significant	HC3
ACP	Time vs T0 within Treatment	OF	T7 vs T0	0.016923691372736	0.03384738274547201	significant	HC3
ACP	Time vs T0 within Treatment	ST	T15 vs T0	2.386854193497922e-13	7.160562580493765e-13	significant	HC3
ACP	Time vs T0 within Treatment	ST	T3 vs T0	1.707773774952933e-09	3.415547549905866e-09	significant	HC3
ACP	Time vs T0 within Treatment	ST	T7 vs T0	4.755676539360367e-08	4.755676539360367e-08	significant	HC3
Eh	Time vs T0 within Treatment	BC	T15 vs T0	4.213024145638009e-09	8.426048291276018e-09	significant	Classical
Eh	Time vs T0 within Treatment	BC	T3 vs T0	0.005879945195853982	0.005879945195853982	significant	Classical
Eh	Time vs T0 within Treatment	BC	T7 vs T0	1.377634000882226e-10	4.132902002646677e-10	significant	Classical
Eh	Time vs T0 within Treatment	CA	T15 vs T0	1.801575603347217e-09	5.40472681004165e-09	significant	Classical
Eh	Time vs T0 within Treatment	CA	T3 vs T0	0.0005832071821687538	0.0005832071821687538	significant	Classical
Eh	Time vs T0 within Treatment	CA	T7 vs T0	1.562226486612395e-07	3.12445297322479e-07	significant	Classical
Eh	Time vs T0 within Treatment	CK	T15 vs T0	8.927737086484757e-09	2.678321125945427e-08	significant	Classical
Eh	Time vs T0 within Treatment	CK	T3 vs T0	0.3683237276499681	0.3683237276499681	ns	Classical
Eh	Time vs T0 within Treatment	CK	T7 vs T0	4.139696399997157e-08	8.279392799994314e-08	significant	Classical
Eh	Time vs T0 within Treatment	CM	T15 vs T0	0.0004350633744005503	0.001305190123201651	significant	Classical
Eh	Time vs T0 within Treatment	CM	T3 vs T0	0.0411950565970395	0.0411950565970395	significant	Classical
Eh	Time vs T0 within Treatment	CM	T7 vs T0	0.001803800787999266	0.003607601575998532	significant	Classical
Eh	Time vs T0 within Treatment	OF	T15 vs T0	2.570532971045107e-07	7.711598913135322e-07	significant	Classical
Eh	Time vs T0 within Treatment	OF	T3 vs T0	0.003190254706968031	0.003190254706968031	significant	Classical
Eh	Time vs T0 within Treatment	OF	T7 vs T0	1.597765793046539e-05	3.195531586093078e-05	significant	Classical
Eh	Time vs T0 within Treatment	ST	T15 vs T0	1.135961328165161e-07	3.407883984495484e-07	significant	Classical
Eh	Time vs T0 within Treatment	ST	T3 vs T0	0.4699006164206402	0.4699006164206402	ns	Classical
Eh	Time vs T0 within Treatment	ST	T7 vs T0	2.160883481116048e-06	4.321766962232096e-06	significant	Classical
TP	Time vs T0 within Treatment	BC	T15 vs T0	0.8745467630543065	0.8745467630543065	ns	HC3
TP	Time vs T0 within Treatment	CA	T15 vs T0	0.9168807434565271	0.9168807434565271	ns	HC3
TP	Time vs T0 within Treatment	CK	T15 vs T0	0.910598366274056	0.910598366274056	ns	HC3

Response	Comparison family	By level	Contrast	Raw P	Adjusted P	significance	Inference covariance
TP	Time vs T0 within Treatment	CM	T15 vs T0	0.9751409356629452	0.9751409356629452	ns	HC3
TP	Time vs T0 within Treatment	OF	T15 vs T0	0.9471775479963103	0.9471775479963103	ns	HC3
TP	Time vs T0 within Treatment	ST	T15 vs T0	0.9440643561925743	0.9440643561925743	ns	HC3

Supplementary Table S2 — Part C

Part C3. Time-versus-T0 contrasts: confidence intervals and adjustment

Response	Comparison family	By level	Contrast	95% CI lower	95% CI upper	Adjustment method
Bray-P	Time vs T0 within Treatment	BC	T15 vs T0	-0.9925905376105137	-0.2822505132274204	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	BC	T3 vs T0	-0.7268076121988539	-0.01646758781576008	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	BC	T7 vs T0	-0.5181908549122115	0.1921491694708819	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	CA	T15 vs T0	-0.415351226140582	0.2949887982425118	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	CA	T3 vs T0	-0.4109326520009771	0.2994073723821168	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	CA	T7 vs T0	-0.04911494306994701	0.6612250813131468	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	CK	T15 vs T0	-1.001181960239288	-0.2908419358561937	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	CK	T3 vs T0	-1.335532721398738	-0.625192697015645	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	CK	T7 vs T0	-0.1678462159215793	0.5424938084615151	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	CM	T15 vs T0	-0.5303277235490222	0.1800123008340716	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	CM	T3 vs T0	-0.5288454526644775	0.1814945717186164	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	CM	T7 vs T0	0.1334490938520355	0.8437891182351294	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	OF	T15 vs T0	-0.91294485638414	-0.2026048320010458	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	OF	T3 vs T0	-1.077071572135855	-0.3667315477527607	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	OF	T7 vs T0	-0.1447464318775917	0.5655935925055017	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	ST	T15 vs T0	-0.4568786479327422	0.2534613764503516	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	ST	T3 vs T0	-0.7541168260950548	-0.04377680171196058	Holm-adjusted within the prespecified comparison family
Bray-P	Time vs T0 within Treatment	ST	T7 vs T0	0.1024093808527779	0.8127494052358717	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	BC	T15 vs T0	-19.58115086950755	-3.564849130492448	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	BC	T3 vs T0	-0.9066508695075299	15.10965086950758	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	BC	T7 vs T0	-11.49615086950752	4.520150869507585	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	CA	T15 vs T0	-12.32615086950753	3.690150869507574	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	CA	T3 vs T0	-6.029150869507536	9.987150869507577	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	CA	T7 vs T0	-13.15365086950758	2.862650869507527	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	CK	T15 vs T0	-4.07615086950781	11.9401508695073	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	CK	T3 vs T0	7.037515797158996	23.0538175361741	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	CK	T7 vs T0	-7.916150869507591	8.100150869507521	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	CM	T15 vs T0	-17.72865086950753	-1.712349130492424	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	CM	T3 vs T0	-4.21665086950776	11.79965086950735	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	CM	T7 vs T0	-5.848650869507523	10.16765086950759	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	OF	T15 vs T0	-9.698650869507334	6.31765086950778	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	OF	T3 vs T0	3.380849130492486	19.39715086950759	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	OF	T7 vs T0	-4.34865086950726	11.66765086950785	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	ST	T15 vs T0	-8.178650869508065	7.837650869507043	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	ST	T3 vs T0	0.3483491304924566	16.36465086950757	Holm-adjusted within the prespecified comparison family
DOC	Time vs T0 within Treatment	ST	T7 vs T0	-11.05615086950761	4.960150869507496	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	BC	T15 vs T0	-1.031162091911529	-0.6288379080884721	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	BC	T3 vs T0	-0.1486620919115281	0.2536620919115288	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	BC	T7 vs T0	-0.398662091911528	0.003662091911528415	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	CA	T15 vs T0	-0.923662091911528	-0.5213379080884716	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	CA	T3 vs T0	-0.2636620919115281	0.1386620919115288	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	CA	T7 vs T0	-0.6136620919115283	-0.2113379080884715	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	CK	T15 vs T0	-0.9161620919115275	-0.5138379080884706	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	CK	T3 vs T0	-0.1061620919115271	0.2961620919115293	Holm-adjusted within the prespecified comparison family

Response	Comparison family	By level	Contrast	95% CI lower	95% CI upper	Adjustment method
pH	Time vs T0 within Treatment	CK	T7 vs T0	-0.3511620919115271	0.05116209191152973	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	CM	T15 vs T0	-1.028662091911529	-0.6263379080884718	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	CM	T3 vs T0	-0.2836620919115284	0.1186620919115285	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	CM	T7 vs T0	-0.6686620919115285	-0.2663379080884716	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	OF	T15 vs T0	-0.9436620919115288	-0.5413379080884719	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	OF	T3 vs T0	-0.1011620919115285	0.3011620919115284	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	OF	T7 vs T0	-0.4336620919115285	-0.03133790808847209	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	ST	T15 vs T0	-0.8511620919115287	-0.4488379080884718	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	ST	T3 vs T0	-0.2911620919115286	0.1111620919115282	Holm-adjusted within the prespecified comparison family
pH	Time vs T0 within Treatment	ST	T7 vs T0	-0.5211620919115286	-0.1188379080884717	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	BC	T15 vs T0	-4375.660319640415	4413.420736307035	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	BC	T3 vs T0	-8072.86649148748	1257.11128315409	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	BC	T7 vs T0	-6273.284593816041	2855.966885482635	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	CA	T15 vs T0	-6012.794810145965	613.0552268126248	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	CA	T3 vs T0	-10533.40641514167	-4098.755043191679	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	CA	T7 vs T0	-6891.931744982449	-339.1880466842531	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	CK	T15 vs T0	-6311.571259261927	-1372.673532404828	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	CK	T3 vs T0	-14279.33738787622	-10925.74073712386	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	CK	T7 vs T0	-7567.74777584968	-3798.137639081741	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	CM	T15 vs T0	-6590.846321960526	2323.91923862718	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	CM	T3 vs T0	-12020.70932562455	-3291.1396327088	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	CM	T7 vs T0	-7643.4013660575	3924.000324390856	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	OF	T15 vs T0	-11608.34627700781	-946.9922646588657	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	OF	T3 vs T0	-13429.34780697365	-2694.350109693023	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	OF	T7 vs T0	-12040.93466414802	-1326.252835851977	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	ST	T15 vs T0	-11376.55211681797	-7295.973924848702	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	ST	T3 vs T0	-12013.5438700674	-6696.742588265939	Holm-adjusted within the prespecified comparison family
ACP	Time vs T0 within Treatment	ST	T7 vs T0	-8792.873708379046	-4517.673166620951	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	BC	T15 vs T0	-193.3416149654387	-105.6583850345613	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	BC	T3 vs T0	-107.3416149654387	-19.65838503456133	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	BC	T7 vs T0	-211.3416149654387	-123.6583850345613	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	CA	T15 vs T0	-197.8416149654388	-110.1583850345615	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	CA	T3 vs T0	-124.3416149654387	-36.65838503456132	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	CA	T7 vs T0	-173.8416149654387	-86.15838503456132	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	CK	T15 vs T0	-189.3416149654389	-101.6583850345615	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	CK	T3 vs T0	-64.09161496543888	23.59161496543844	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	CK	T7 vs T0	-181.0916149654389	-93.4083850345615	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	CM	T15 vs T0	-126.3416149654387	-38.65838503456138	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	CM	T3 vs T0	-90.34161496543868	-2.658385034561363	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	CM	T7 vs T0	-116.3416149654387	-28.65838503456132	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	OF	T15 vs T0	-171.0916149654388	-83.4083850345614	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	OF	T3 vs T0	-112.0916149654387	-24.40838503456138	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	OF	T7 vs T0	-147.3416149654388	-59.65838503456144	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	ST	T15 vs T0	-175.5916149654387	-87.90838503456132	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	ST	T3 vs T0	-60.09161496543871	27.59161496543868	Holm-adjusted within the prespecified comparison family
Eh	Time vs T0 within Treatment	ST	T7 vs T0	-159.0916149654387	-71.40838503456135	Holm-adjusted within the prespecified comparison family
TP	Time vs T0 within Treatment	BC	T15 vs T0	-160.8691839407032	136.725483411958	Holm-adjusted within the prespecified comparison family
TP	Time vs T0 within Treatment	CA	T15 vs T0	-238.9048084154827	214.5876850444701	Holm-adjusted within the prespecified comparison family
TP	Time vs T0 within Treatment	CK	T15 vs T0	-213.5561238199931	190.2592326248993	Holm-adjusted within the prespecified comparison family

Response	Comparison family	By level	Contrast	95% CI lower	95% CI upper	Adjustment method
TP	Time vs T0 within Treatment	CM	T15 vs T0	-415.8880587223065	402.7815772507365	Holm-adjusted within the prespecified comparison family
TP	Time vs T0 within Treatment	OF	T15 vs T0	-312.5610517698722	291.9833357823041	Holm-adjusted within the prespecified comparison family
TP	Time vs T0 within Treatment	ST	T15 vs T0	-302.7442075975665	281.6770809344413	Holm-adjusted within the prespecified comparison family

Notes. Supplementary Table S2 provides inferential statistics supporting Fig. 1. Part A reports overall factorial tests for Bray-P, DOC, pH, ACP, Eh, and TP. Part B reports treatment-versus-CK planned contrasts within each time point. Part C reports time-versus-T0 planned contrasts within each treatment. T0, T3, T7 and T15 correspond to incubation days 0, 3, 7 and 15, respectively. Abbreviations: Bray-P, Bray-extractable phosphorus; DOC, dissolved organic carbon; ACP, acid phosphatase activity; Eh, redox potential; TP, total phosphorus.

Supplementary Table S3

Supplementary Table S3. Rhizosphere soil total phosphorus concentrations under different amendment treatments across rice growth stages. Values are means $\pm$ SE (n = 4), in mg kg⁻¹. Samples at all three growth stages were rhizosphere soils. Data were analyzed using the final linear mixed-effects model, with Tukey adjustment for pairwise treatment comparisons. No significant differences in rhizosphere soil total P were detected among treatments at tillering, heading, or maturity.

Treatment	Tillering	Heading	Maturity
CK	1034.80 $\pm$ 90.76	1032.71 $\pm$ 22.48	1023.88 $\pm$ 33.47
OF	1035.88 $\pm$ 82.76	1027.22 $\pm$ 107.20	1018.13 $\pm$ 25.51
CM	1041.12 $\pm$ 53.39	1028.72 $\pm$ 29.99	1019.60 $\pm$ 13.94
BC	1036.70 $\pm$ 53.38	1037.30 $\pm$ 47.22	1002.13 $\pm$ 22.79
ST	1039.85 $\pm$ 43.29	1045.24 $\pm$ 23.38	993.12 $\pm$ 34.65
SD	1034.85 $\pm$ 12.36	1044.18 $\pm$ 20.14	982.06 $\pm$ 48.94
CA	1042.41 $\pm$ 43.38	1042.86 $\pm$ 30.64	954.52 $\pm$ 39.73

Supplementary Table S4

Supplementary Table S4. Robustness and collinearity diagnostics for the prespecified recursive association model.

Part A. Treatment/Block sensitivity							
Adjustment	HCl-P $\rightarrow$ Bray-P β	SE	P	R ²	Main indirect IE	95% percentile CI	IE support
Primary / unadjusted	1.03311219349735	0.236124849959327	<0.001	0.550706053002934	0.284412428124165	0.114–0.594	Supported
+Treatment	0.94905148843757	0.47833070913432	0.063	0.709183193135438	-0.00401716817426798	-0.113–0.065	Not supported
+Block	0.974545708358224	0.223238531934483	<0.001	0.660664618302396	0.274904931668281	0.072–0.652	Supported
+Treatment + Block	0.50334333439043	0.436868970845454	0.267	0.825703784440647	0.00911038232447525	-0.172–0.192	Not supported
Part B. VIF diagnostics							
Equation	Predictor	VIF					
HCl-P $\sim$ pH + Citrate-P	pH	1.40634751397608					
HCl-P $\sim$ pH + Citrate-P	Citrate-P	1.40634751397608					
Bray-P $\sim$ pH + Citrate-P + HCl-P	pH	1.92145457659941					
Bray-P $\sim$ pH + Citrate-P + HCl-P	Citrate-P	2.18754578239363					
Bray-P $\sim$ pH + Citrate-P + HCl-P	HCl-P	2.97826997978296					

β , standardized recursive path coefficient; SE, standard error; R², coefficient of determination; IE, indirect effect for pH $\rightarrow$ Citrate-P $\rightarrow$ HCl-P $\rightarrow$ Bray-P; CI, 95% percentile bootstrap confidence interval based on 5,000 plot-row resamples; Treatment and Block adjustments were included as covariates in the corresponding recursive equations; IE support refers only to the main indirect effect and is determined by whether its 95% percentile bootstrap CI excludes zero; it does not indicate the significance of the individual HCl-P $\rightarrow$ Bray-P path coefficient; VIF, variance inflation factor. VIF was evaluated only for multi-predictor equations. The recursive model is an association-based, non-causal framework.

Display values are rounded for presentation only; no analytical recomputation was performed for this table.