

Supplementary Information

Potassium sorbate suppresses intestinal microbial activity and triggers immune regulation in zebrafish (*Danio rerio*)

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Table S1. Relative abundance changes of intestinal genera with significant differences in the control and PS exposure groups.

Genus	Abundance (%) control group					Average abundance (%)	Abundance (%) 0.1 g/L group				Average abundance (%)	Abundance (%) 1 g/L group					Average abundance (%)	Trend
	Sample1	Sample2	Sample3	Sample4	Sample5		Sample1	Sample2	Sample3	Sample4		Sample1	Sample2	Sample3	Sample4	Sample5		
<i>Aeromonas</i>	2.940	11.912	1.026	1.838	12.797	6.103	0.437	1.111	8.306	0.056	2.477	0.514	0.052	0.095	0.164	0.589	0.283	decreased
<i>Sphingomonas</i>	1.451	1.552	1.350	1.297	0.748	1.280	0.454	0.588	0.217	1.071	0.582	1.036	0.679	0.890	1.356	0.121	0.817	decreased
<i>Bosea</i>	0.453	1.903	0.493	3.607	1.132	1.518	0.744	0.298	1.414	0.402	0.714	0.371	0.294	0.134	0.479	0.143	0.284	decreased
<i>Microbacterium</i>	0.112	0.320	0.113	12.352	0.216	2.623	0.065	0.091	0.147	0.091	0.098	0.194	0.074	0.112	0.108	0.009	0.099	decreased
<i>Brevundimonas</i>	1.114	1.384	1.229	0.714	0.138	0.916	0.242	0.281	0.169	0.626	0.330	0.419	0.052	0.367	0.276	0.117	0.246	decreased
<i>Methylobacterium</i>	1.153	0.597	0.671	0.389	0.259	0.614	0.285	0.186	0.026	0.332	0.207	0.242	0.320	0.246	0.380	0.009	0.239	decreased
<i>Faecalibacterium</i>	0.177	0.086	0.389	0.048	0.004	0.141	0.026	0.073	0.039	0.000	0.035	0.004	0.013	0.004	0.000	0.013	0.007	decreased
<i>Reyranella</i>	0.350	0.112	0.160	1.587	0.264	0.495	0.017	0.069	0.009	0.047	0.036	0.164	0.000	0.000	0.043	0.030	0.048	decreased
<i>Rhizobacter</i>	0.069	0.048	0.035	0.082	0.035	0.054	0.277	0.458	0.139	0.544	0.354	0.617	0.325	0.670	0.514	0.113	0.448	increased

Table S2. Metabolic pathways with the average relative abundance greater than 0.01 in the control and PS exposure groups

Metabolic Pathways	Abundance control group					Average	Abundance 0.1 g/L group				Average	<i>p</i> -value
	Sample1	Sample2	Sample3	Sample4	Sample5	Abundance	Sample1	Sample2	Sample3	Sample4	Abundance	
Membrane Transport	0.163	0.155	0.157	0.160	0.136	0.154	0.135	0.138	0.126	0.140	0.135	0.0500
Amino Acid Metabolism	0.099	0.099	0.100	0.108	0.097	0.100	0.095	0.100	0.096	0.099	0.098	0.4624
Carbohydrate Metabolism	0.096	0.093	0.094	0.107	0.101	0.098	0.092	0.093	0.102	0.091	0.095	0.1416
Replication and Repair	0.066	0.064	0.064	0.066	0.073	0.067	0.080	0.067	0.076	0.066	0.072	0.0864
Energy Metabolism*	0.053	0.052	0.052	0.051	0.055	0.053	0.056	0.056	0.058	0.055	0.056	0.0143
Poorly Characterized	0.051	0.052	0.052	0.049	0.053	0.051	0.050	0.051	0.051	0.051	0.051	0.2207
Translation	0.040	0.037	0.037	0.038	0.046	0.040	0.052	0.040	0.049	0.039	0.045	0.1416
Metabolism of Cofactors and Vitamins	0.039	0.040	0.040	0.039	0.041	0.040	0.040	0.041	0.042	0.040	0.041	0.0864
Cellular Processes and Signaling	0.038	0.041	0.040	0.034	0.041	0.039	0.037	0.039	0.038	0.040	0.039	0.6242
Xenobiotics Biodegradation and Metabolism	0.037	0.037	0.036	0.038	0.032	0.036	0.035	0.040	0.034	0.041	0.037	0.6242

Lipid Metabolism	0.035	0.035	0.035	0.034	0.033	0.034	0.033	0.035	0.033	0.035	0.034	0.6242
Cell Motility	0.030	0.035	0.034	0.023	0.028	0.030	0.035	0.038	0.027	0.040	0.035	0.2207
Nucleotide Metabolism	0.031	0.030	0.030	0.031	0.035	0.031	0.036	0.030	0.036	0.030	0.033	0.3272
Genetic Information Processing	0.026	0.025	0.026	0.022	0.026	0.025	0.025	0.025	0.026	0.025	0.025	0.6242
Signal Transduction	0.021	0.024	0.024	0.020	0.024	0.023	0.024	0.025	0.024	0.026	0.025	0.0864
Transcription*	0.023	0.024	0.024	0.024	0.023	0.024	0.022	0.022	0.021	0.022	0.022	0.0143
Folding, Sorting and Degradation	0.021	0.022	0.022	0.021	0.023	0.022	0.024	0.023	0.024	0.023	0.023	0.0500
Metabolism of Other Amino Acids	0.019	0.019	0.019	0.019	0.018	0.019	0.018	0.019	0.018	0.019	0.019	1.0000
Metabolism of Terpenoids and Polyketides	0.019	0.019	0.018	0.020	0.018	0.019	0.018	0.020	0.018	0.019	0.019	0.8065
Enzyme Families	0.017	0.018	0.018	0.018	0.019	0.018	0.017	0.018	0.018	0.018	0.018	0.8065
Glycan Biosynthesis and Metabolism	0.015	0.017	0.017	0.015	0.018	0.016	0.015	0.017	0.019	0.017	0.017	0.6242

Metabolic Pathways	Abundance control group					Average	Abundance 1 g/L group					Average	p-value
	Sample1	Sample2	Sample3	Sample4	Sample5		Sample1	Sample2	Sample3	Sample4	Sample5		

Membrane Transport*	0.163	0.155	0.157	0.160	0.136	0.154	0.143	0.129	0.132	0.136	0.120	0.132	0.0163
Amino Acid Metabolism	0.099	0.099	0.100	0.108	0.097	0.100	0.100	0.093	0.098	0.097	0.083	0.094	0.1745
Carbohydrate Metabolism*	0.096	0.093	0.094	0.107	0.101	0.098	0.091	0.090	0.090	0.090	0.095	0.091	0.0283
Replication and Repair	0.066	0.064	0.064	0.066	0.073	0.067	0.065	0.083	0.068	0.068	0.113	0.079	0.1172
Energy Metabolism*	0.053	0.052	0.052	0.051	0.055	0.053	0.054	0.056	0.055	0.055	0.058	0.056	0.0163
Poorly Characterized	0.051	0.052	0.052	0.049	0.053	0.051	0.052	0.050	0.052	0.052	0.048	0.051	0.7540
Translation	0.040	0.037	0.037	0.038	0.046	0.040	0.038	0.054	0.040	0.040	0.083	0.051	0.0758
Metabolism of Cofactors and Vitamins	0.039	0.040	0.040	0.039	0.041	0.040	0.040	0.040	0.041	0.040	0.038	0.040	0.6015
Cellular Processes and Signaling	0.038	0.041	0.040	0.034	0.041	0.039	0.041	0.038	0.042	0.041	0.029	0.038	0.4647
Xenobiotics Biodegradation and Metabolism	0.037	0.037	0.036	0.038	0.032	0.036	0.040	0.036	0.039	0.039	0.025	0.036	0.3472
Lipid Metabolism	0.035	0.035	0.035	0.034	0.033	0.034	0.035	0.032	0.034	0.034	0.030	0.033	0.2506
Cell Motility	0.030	0.035	0.034	0.023	0.028	0.030	0.038	0.038	0.043	0.042	0.023	0.037	0.0758
Nucleotide Metabolism	0.031	0.030	0.030	0.031	0.035	0.031	0.030	0.036	0.031	0.031	0.049	0.035	0.6015
Genetic Information Processing	0.026	0.025	0.026	0.022	0.026	0.025	0.025	0.025	0.024	0.025	0.028	0.025	0.4647

Signal Transduction	0.021	0.024	0.024	0.020	0.024	0.023	0.026	0.025	0.028	0.027	0.018	0.025	0.1172
Folding, Sorting and Degradation*	0.021	0.022	0.022	0.021	0.023	0.022	0.023	0.025	0.024	0.024	0.027	0.024	0.0163
Transcription**	0.023	0.024	0.024	0.024	0.023	0.024	0.022	0.022	0.022	0.022	0.021	0.022	0.0090
Metabolism of Other Amino Acids	0.019	0.019	0.019	0.019	0.018	0.019	0.019	0.018	0.019	0.019	0.017	0.018	0.2506
Metabolism of Terpenoids and Polyketides	0.019	0.019	0.018	0.020	0.018	0.019	0.019	0.018	0.019	0.019	0.014	0.018	0.9168
Enzyme Families	0.017	0.018	0.018	0.018	0.019	0.018	0.017	0.017	0.018	0.018	0.017	0.018	0.3472
Glycan Biosynthesis and Metabolism	0.015	0.017	0.017	0.015	0.018	0.016	0.017	0.015	0.017	0.017	0.012	0.016	0.6015

* $P < 0.05$, ** $P < 0.01$.