Figure S1

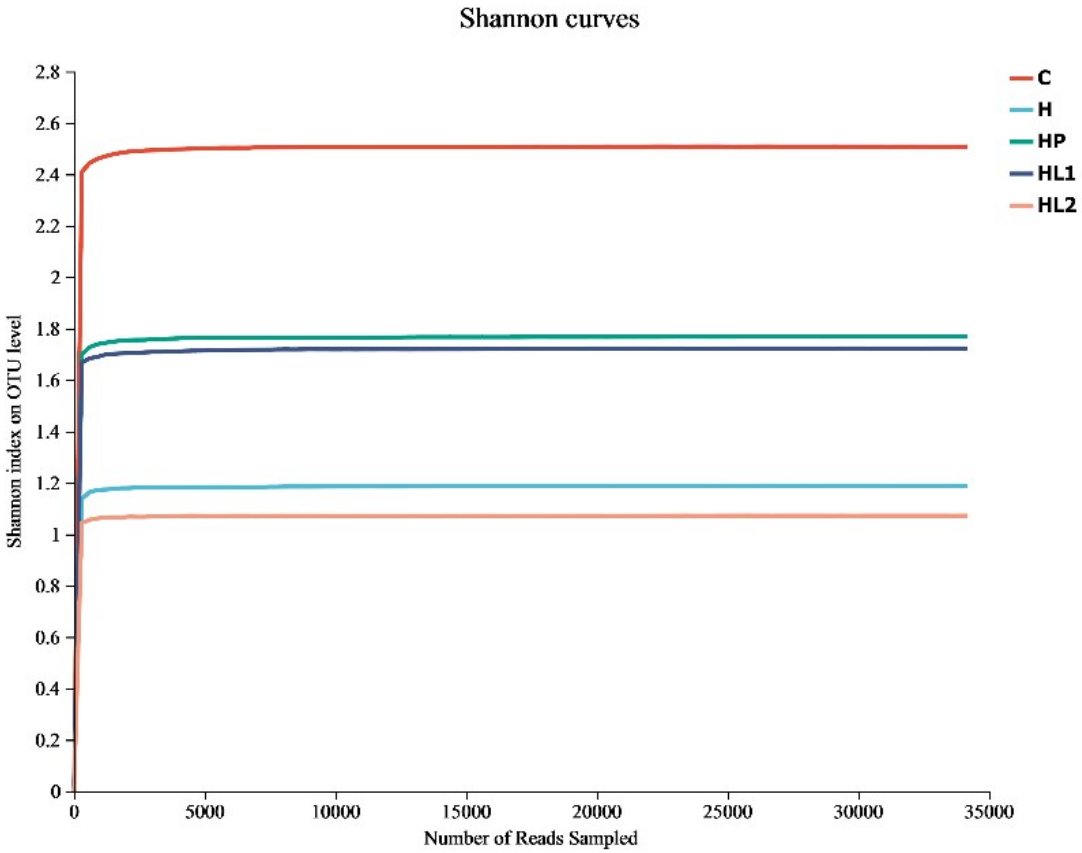

Figure S1. Shannon curves

Table S1. Strain Basic Information

NO.	Strains	Latin scientific name	Strain source
1	B.s2	*Bacillus subtilis*	Laboratory storage
2	B.t1	*Bacillus tequilensis*	Laboratory storage
3	B.v1	*Bacillus velezensis*	Laboratory storage
4	E.f1	*Enterococcus faecium*	Laboratory storage
5	GM4	*Lactiplantibacillus plantarum*	Laboratory storage
6	L.c1	*Lactilactobacillus curvatus*	Laboratory storage
7	L.c3	*Lactilactobacillus curvatus*	Laboratory storage
8	Leu.cit2	*Leuconostoc citreum*	Laboratory storage
9	L.m2	*Leuconostoc mesenteroides*	Laboratory storage
10	LP6	*Lacticaseibacillus paracasei*	Laboratory storage
11	L.p8	*Lactiplantibacillus plantarum*	Laboratory storage
12	L.p10	*Lactiplantibacillus plantarum*	Laboratory storage
13	L.p11	*Lactiplantibacillus plantarum*	Laboratory storage
14	L.p12	*Lactiplantibacillus plantarum*	Laboratory storage
15	L.p14	*Lactiplantibacillus plantarum*	Laboratory storage
16	L.p17	*Lactiplantibacillus plantarum*	Laboratory storage
17	L.p19	*Lactiplantibacillus plantarum*	Laboratory storage
18	L.p20	*Lactiplantibacillus plantarum*	Laboratory storage
19	LP21	*Lacticaseibacillus paracasei*	Laboratory storage
20	L.sakei2	*Latilactobacillus sakei*	Laboratory storage
21	P.a2	*Pediococcus acidilactici*	Laboratory storage
22	P.a3	*Pediococcus acidilactici*	Laboratory storage
23	P.p1	*Pediococcus pentosaceus*	Laboratory storage
24	P.p2	*Pediococcus pentosaceus*	Laboratory storage
25	P.p3	*Pediococcus pentosaceus*	Laboratory storage
26	P.p4	*Pediococcus pentosaceus*	Laboratory storage
27	P.p5	*Pediococcus pentosaceus*	Laboratory storage
28	P.p6	*Pediococcus pentosaceus*	Laboratory storage
29	P.p7	*Pediococcus pentosaceus*	Laboratory storage
30	B.a1	*Bacillus amyloliquefaciens*	Laboratory storage
31	B.a2	*Bacillus amyloliquefaciens*	Laboratory storage
32	L.b1	*Levilactobacillus brevis*	Laboratory storage
33	Leu.cit6	*Leuconostoc citreum*	Laboratory storage
34	L.f1	*Leuconostoc fallax*	Laboratory storage
35	L.m4	*Leuconostoc mesenteroides*	Laboratory storage
36	L.m5	*Leuconostoc mesenteroides*	Laboratory storage

37	LP4	*Lacticaseibacillus paracasei*	Laboratory storage
38	L.p4	*Lactiplantibacillus plantarum*	Laboratory storage
39	L.p15	*Lactiplantibacillus plantarum*	Laboratory storage
40	L.p16	*Lactiplantibacillus plantarum*	Laboratory storage
41	L.p23	*Lactiplantibacillus plantarum*	Laboratory storage
42	P.a1	*Pediococcus acidilactici*	Laboratory storage
43	P.ary2	*Priestia aryabhattai*	Laboratory storage
44	P.p5	*Pediococcus pentosaceus*	Laboratory storage
45	P.p11	*Pediococcus pentosaceus*	Laboratory storage
46	P.p15	*Pediococcus pentosaceus*	Laboratory storage
47	P.p16	*Pediococcus pentosaceus*	Laboratory storage
48	R.k1	*Rothia kristinae*	Laboratory storage
49	S.h1	*Staphylococcus hominis*	Laboratory storage
50	S.h2	*Staphylococcus hominis*	Laboratory storage
51	S.sap2	*Staphylococcus saprophyticus*	Laboratory storage
52	S.sap3	*Staphylococcus saprophyticus*	Laboratory storage
53	W.cib1	*Weissella cibaria*	Laboratory storage
54	W.cib2	*Weissella cibaria*	Laboratory storage
55	W.con1	*Weissella confusa*	Laboratory storage
56	W.con2	*Weissella confusa*	Laboratory storage
57	W.con3	*Weissella confusa*	Laboratory storage
58	PP18	*Pediococcus pentosaceus*	Laboratory storage
59	FS5	*Fructilactobacillus sanfranciscensis*	Laboratory storage
60	FS8	*Fructilactobacillus sanfranciscensis*	Laboratory storage
61	FS9	*Fructilactobacillus sanfranciscensis*	Laboratory storage
62	FS10	*Fructilactobacillus sanfranciscensis*	Laboratory storage
63	FS16	*Fructilactobacillus sanfranciscensis*	Laboratory storage
64	FS17	*Fructilactobacillus sanfranciscensis*	Laboratory storage
65	FS20	*Fructilactobacillus sanfranciscensis*	Laboratory storage
66	FS22	*Fructilactobacillus sanfranciscensis*	Laboratory storage
67	FS25	*Fructilactobacillus sanfranciscensis*	Laboratory storage
68	FS28	*Fructilactobacillus sanfranciscensis*	Laboratory storage
69	Leu.cit1	*Leuconostoc citreum*	Laboratory storage
70	Leu.cit4	*Leuconostoc citreum*	Laboratory storage
71	L.m1	*Leuconostoc mesenteroides*	Laboratory storage
72	L.m3	*Leuconostoc mesenteroides*	Laboratory storage
73	L.m5	*Leuconostoc mesenteroides*	Laboratory storage
74	LP1	*Lactiplantibacillus plantarum*	Laboratory storage

75	FS2	*Fructilactobacillus sanfranciscensis*	Laboratory storage
76	FS3	*Fructilactobacillus sanfranciscensis*	Laboratory storage
77	FS4	*Fructilactobacillus sanfranciscensis*	Laboratory storage
78	FS6	*Fructilactobacillus sanfranciscensis*	Laboratory storage
79	P.p8	*Pediococcus pentosaceus*	Laboratory storage
80	LP25	*Lactiplantibacillus plantarum*	Laboratory storage

the maximum tolerated concentration test

Methods

Determination of the maximum tolerated concentration in zebrafish

A total of 390 zebrafish at 3 days after fertilization were selected and divided into the following groups: normal control group, PP18 inactivated cell intervention group (K-PP18), LP1 inactivated cell intervention group (K-LP1), and LP25 inactivated cell intervention group (K-LP25). zebrafish in the normal control group were fed fish water normally, and the inactivated bacteria somatic cells were resuspended in fish water at final concentrations of 10^9 CFU/mL, 10^8 CFU/mL, 10^7 CFU/mL, and 10^6 CFU/mL, respectively. The fish water was added to the 6-well plate at volume of 3 mL per well, with 30 zebrafish per well. The fish water was changed daily for 3 days. After the treatment, the mortality of zebrafish was observed and recorded to determine the maximum tolerated concentration.

Results

Maximum tolerance concentration selection

Larval zebrafish were exposed to various concentration gradients of postbiotics for 3 days after fertilization. The mortality of the zebrafish was observed to determine the maximum tolerated concentration of postbiotics. The results are presented in Table S2. PP18 and L.p1 inactivated cells were treated with 10^8 CFU/mL for three days, and the mortality rate of zebrafish was 0. The maximum tolerance concentration of zebrafish to PP18 and LP1 inactivated cells was 10^8 CFU/mL, while LP25 inactivated cells were treated with 10^7 CFU/mL, resulting in a 0% mortality rate for the zebrafish. The maximum tolerance concentration of LP25 inactivated somatic

cells for zebrafish was 10^7 CFU/mL.

Table S2. Selection of the optimal concentration for metagenetic intervention

Group	Concentration (CFU/mL)	Total (tail)	Number of deaths (tail)	Mortality rate (%)
Control	——	30	0	0
PP18	10^9	30	12	40
PP18	10^8	30	0	0
PP18	10^7	30	0	0
PP18	10^6	30	0	0
LP1	10^9	30	3	10
LP1	10^8	30	0	0
LP1	10^7	30	0	0
LP1	10^6	30	0	0
LP25	10^9	30	7	23.3
LP25	10^8	30	7	23.3
LP25	10^7	30	0	0
LP25	10^6	30	0	0

Note: The yellow highlights indicate the concentration applied to zebrafish experiment.