

Supplementary Table S1. Bacteria fingerprinting and identification

Bacterial Rep-PCR Cluster	Identification by 16S rDNA sequencing	Number of isolates	Staka sample
C1	<i>Leuconostoc pseudomesenteroides</i>	5	2, 3
C2	<i>Pseudomonas</i> spp.	1	1
C3	<i>Leuconostoc pseudomesenteroides</i>	4	1, 2, 3
C4	<i>Leuconostoc pseudomesenteroides</i>	1	2
C5	<i>Leuconostoc pseudomesenteroides</i>	3	1
C6	<i>Leuconostoc pseudomesenteroides</i>	1	3
C7	<i>Enterococcus faecium</i>	1	1
C8	<i>Leuconostoc pseudomesenteroides</i>	1	2
C9	<i>Leuconostoc pseudomesenteroides</i>	4	1
C10	<i>Pseudomonas</i> spp.	2	1
C11	<i>Enterococcus faecium</i>	1	2
C12	<i>Enterococcus faecium</i>	10	1, 2
C13	<i>Enterococcus faecium</i>	15	1, 2
C14	<i>Enterococcus faecium</i>	6	2
C15	<i>Enterococcus faecalis</i>	4	3
C16	<i>Enterococcus faecalis</i>	2	2, 3
C17	<i>Enterococcus faecalis</i>	2	3
C18	<i>Enterococcus faecalis</i>	1	3
C19	<i>Lactacaseibacillus paracasei</i>	5	2, 3, 4
C20	<i>Enterococcus faecalis</i>	3	4
C21	<i>Leuconostoc pseudomesenteroides</i>	1	3
C22	<i>Enterococcus faecalis</i>	2	3
C23	<i>Enterococcus faecium</i>	1	3
C24	<i>Enterococcus faecalis</i>	1	3
C25	<i>Enterococcus faecalis</i>	1	3

C26	<i>Hafnia paralvei</i>	6	3
C27	<i>Enterococcus faecium</i>	6	3
C28	<i>Enterococcus faecium</i>	7	2, 3
C29	<i>Enterococcus faecalis</i>	2	3
C30	<i>Leuconostoc pseudomesenteroides</i>	1	1
C31	<i>Hafnia paralvei</i>	1	1
C32	<i>Enterococcus faecalis</i>	1	2
C33	<i>Serratia liquefaciens</i>	1	1
C34	<i>Serratia liquefaciens</i>	5	1
C35	<i>Enterococcus faecium</i>	7	1, 3
C36	<i>Pseudomonas spp.</i>	2	1
C37	<i>Loigolactobacillus coryniformis</i>	1	2
C38	<i>Bacillus subtilis</i>	6	4
C39	<i>Latilactobacillus curvatus</i>	1	2
C40	<i>Hafnia paralvei</i>	1	1
C41	<i>Streptococcus thermophilus</i>	1	2
C42	<i>Companilactobacillus versmoldensis</i>	3	4
C43	<i>Hafnia paralvei</i>	1	3
C44	<i>Enterococcus faecalis</i>	2	3
C45	<i>Latilactobacillus curvatus</i>	1	2
C46	<i>Enterococcus faecalis</i>	1	3
C47	<i>Hafnia paralvei</i>	4	1, 3
C48	<i>Enterococcus faecalis</i>	1	3
C49	<i>Enterococcus faecalis</i>	1	1

Supplementary Table S2. Antimicrobial activity of the Staka bacterial isolates against 20 indicator strains

Producer strain ACA-DC number	Target strain (growth medium-mm inhibition zone)		
	LAB	Pathogenic streptococci	Other spoilage and pathogenic bacteria
<i>L. paracasei</i> 1119	nd	nd	<i>P. aeruginosa</i> FMCC B-26 (mye-bl)
<i>L. curvatus</i> 1135	<i>S. thermophilus</i> ACA-DC 4 (MRS-11)	<i>S. pneumoniae</i> LMG 14545 ^T (MRS-9)	nd
<i>L. paracasei</i> 1260	<i>L. sakei</i> ACA-DC 2313 (MRS-9); <i>S. thermophilus</i> ACA-DC 4 (MRS-12)	<i>S. oralis</i> LMG 14532 ^T (MRS-8t)	nd
<i>C. versmoldensis</i> 1262	<i>S. thermophilus</i> ACA-DC 4 (MRS-12)	<i>S. oralis</i> LMG 14532 ^T (MRS-9t)	nd
<i>L. coryniformis</i> 1251	<i>S. thermophilus</i> ACA-DC 4 (MRS-12)	<i>S. oralis</i> LMG 14532 ^T (MRS-7t); <i>S. pneumoniae</i> LMG 14545 ^T (MRS-8t, mye-10t)	nd
<i>L. pseudomesenteroides</i> 1128	<i>S. thermophilus</i> ACA-DC 4 (MRS-11)	<i>S. pneumoniae</i> LMG 14545 ^T (MRS-9t)	nd
<i>L. pseudomesenteroides</i> 1130	<i>S. thermophilus</i> ACA-DC 4 (MRS-11)	<i>S. oralis</i> LMG 14532 ^T (MRS-9t); <i>S. pneumoniae</i> LMG 14545 ^T (MRS-9)	nd
<i>L. pseudomesenteroides</i> 1131	<i>S. thermophilus</i> ACA-DC 4 (MRS-11)	<i>S. pneumoniae</i> LMG 14545 ^T (MRS-9t)	nd
<i>L. pseudomesenteroides</i> 1145	nd	nd	<i>P. aeruginosa</i> FMCC B-26 (mye-9)
<i>L. pseudomesenteroides</i> 1249	<i>S. thermophilus</i> ACA-DC 4 (MRS-12)	<i>S. pneumoniae</i> LMG 14545 ^T (MRS-7t)	nd
<i>E. faecium</i> 1117	<i>S. thermophilus</i> ACA-DC 4 (M17-9)	nd	<i>P. aeruginosa</i> FMCC B-26 (M17-bl, mye-bl)
<i>E. faecium</i> 1138	<i>L. sakei</i> ACA-DC 2313 (MRS-18; mye-15); <i>S. thermophilus</i> ACA-DC 4 (MRS-11)	nd	<i>L. innocua</i> LMG 11387 ^T (MRS-20, mye-15); <i>L. innocua</i> LMG 13568 (MRS-20, mye-15);

			<i>L. welshimeri</i> 15008 (MRS-15, mye-12)
<i>E. faecium</i> 1154	<i>L. sakei</i> ACA-DC 2313 (MRS-18; mye-18); <i>S. thermophilus</i> ACA-DC 4 (MRS-15); <i>E. faecalis</i> LMG 11396 (MRS-9; mye-9)	nd	<i>L. innocua</i> LMG 11387 ^T (MRS-12, mye-12); <i>L. innocua</i> LMG 13568 (MRS-13, mye-13); <i>L. welshimeri</i> 15008 (MRS-11, mye-12)
<i>E. faecalis</i> 1168	<i>S. thermophilus</i> ACA-DC 4 (M17-15); <i>E. faecalis</i> LMG 11396 (M17-11)	nd	nd
<i>E. faecalis</i> 1169	<i>S. thermophilus</i> ACA-DC 4 (M17-15); <i>E. faecalis</i> LMG 11396 (M17-11)	nd	nd
<i>E. faecalis</i> 1172	<i>S. thermophilus</i> ACA-DC 4 (M17-15); <i>E. faecalis</i> LMG 11396 (M17-11)	nd	nd
<i>E. faecium</i> 1187	<i>L. sakei</i> ACA-DC 2313 (MRS-15, mye-18); <i>S. thermophilus</i> ACA-DC 4 (M17-15); <i>E. faecalis</i> LMG 11396 (mye-9)	nd	<i>L. innocua</i> LMG 11387 ^T (MRS-12, mye-11); <i>L. innocua</i> LMG 13568 (MRS-14, mye-11); <i>L. welshimeri</i> 15008 (MRS-10, mye-12)
<i>E. faecalis</i> 1188	<i>L. sakei</i> ACA-DC 2313 (MRS-15, mye-18); <i>S. thermophilus</i> ACA-DC 4 (M17-15); <i>E. faecalis</i> LMG 11396 (mye-11)	nd	<i>L. innocua</i> LMG 11387 ^T (MRS-13, mye-10); <i>L. innocua</i> LMG 13568 (MRS-14, mye-11); <i>L. welshimeri</i> 15008 (MRS-10, mye-12)
<i>E. faecalis</i> 1189	<i>L. sakei</i> ACA-DC 2313 (MRS-12, mye-14); <i>S. thermophilus</i> ACA-DC 4 (M17-15); <i>E. faecalis</i> LMG 11396 (M17-9, mye-11)	nd	<i>L. innocua</i> LMG 11387 ^T (MRS-12, mye-16); <i>L. innocua</i> LMG 13568 (MRS-13, mye-16); <i>L. welshimeri</i> 15008 (MRS-9, mye-12)
<i>E. faecalis</i> 1190	<i>S. thermophilus</i> ACA-DC 4 (M17-15); <i>E. faecalis</i> LMG 11396 (M17-11)	nd	

<i>E. faecalis</i> 1191	<i>S. thermophilus</i> ACA-DC 4 (M17-15); <i>E. faecalis</i> LMG 11396 (M17-9)	nd	nd
<i>E. faecium</i> 1197	<i>S. thermophilus</i> ACA-DC 4 (M17-12)	<i>S. oralis</i> LMG 14532 ^T (MRS 10; mye-10t)	<i>L. welshimeri</i> 15008 (mye-7)
<i>E. faecium</i> 1198	<i>S. thermophilus</i> ACA-DC 4 (M17-12)	<i>S. oralis</i> LMG 14532 ^T (MRS-10t)	<i>L. welshimeri</i> 15008 (mye-9)
<i>E. faecium</i> 1200	<i>S. thermophilus</i> ACA-DC 4 (M17-12)	<i>S. oralis</i> LMG 14532 ^T (MRS-10; mye-10t)	<i>P. aeruginosa</i> FMCC B-26 (M17-bl)
<i>E. faecium</i> 1201	<i>S. thermophilus</i> ACA-DC 4 (M17-12)	nd	<i>P. aeruginosa</i> FMCC B-26 (mye-bl)
<i>E. faecalis</i> 1203	<i>L. sakei</i> ACA-DC 2313 (M17-17; mye-14); <i>E. faecalis</i> LMG 11396 (M17-8, mye-8)	nd	<i>L. innocua</i> LMG 11387 ^T (MRS-18, mye-11); <i>L. innocua</i> LMG 13568 (MRS-19, mye-12); <i>L. welshimeri</i> 15008 (MRS-13, mye-9)
<i>E. faecalis</i> 1204	<i>S. thermophilus</i> ACA-DC 4 (M17-7)	nd	<i>P. aeruginosa</i> FMCC B-26 (mye-bl)
<i>E. faecium</i> 1214	<i>S. thermophilus</i> ACA-DC 4 (M17-12)	<i>S. oralis</i> LMG 14532 ^T (M17-9t)	nd
<i>E. faecium</i> 1216	<i>S. thermophilus</i> ACA-DC 4 (M17-12)	nd	<i>P. aeruginosa</i> FMCC B-26 (mye-bl)
<i>E. faecium</i> 1217	<i>S. thermophilus</i> ACA-DC 4 (M17-12)	<i>S. sanguinis</i> DSM 20068 (M17-9t); <i>S. oralis</i> LMG 14532 ^T (M17-9t)	nd
<i>E. faecium</i> 1218	<i>L. sakei</i> ACA-DC 2313 (M17-17, mye-15); <i>S. thermophilus</i> ACA-DC 44 (17-10); <i>E. faecalis</i> LMG 11396 (M17-9, mye-9)	<i>S. sanguinis</i> DSM 20068 (M17-9t)	<i>L. innocua</i> LMG 11387 ^T (M17-15, mye-7); <i>L. innocua</i> LMG 13568 (M17-15, mye-9); <i>L. welshimeri</i> 15008 (M17-10, mye-8)
<i>E. faecium</i> 1219	<i>L. sakei</i> ACA-DC 2313 (M17-17, mye-15); <i>S. thermophilus</i> ACA-DC 44 (17-10); <i>E. faecalis</i> LMG 11396 (M17-9, mye-9)	nd	<i>L. innocua</i> LMG 11387 ^T (M18-15, mye-12); <i>L. innocua</i> LMG 13568 (M17-15, mye-12); <i>Li. welshimeri</i> 15008 (M17-12, mye-9)

<i>E. faecium</i> 1220	<i>L. sakei</i> ACA-DC 2313 (M17-15, mye-15); <i>S. thermophilus</i> ACA-DC 4 (M17-10); <i>E. faecalis</i> LMG 11396 (M17-9, mye-9)	nd	<i>L. innocua</i> LMG 11387 ^T (M17-16, mye-14) <i>L. innocua</i> LMG 13568 (M17-16, mye-13); <i>L. welshimeri</i> 15008 (M17-12, mye-12)
<i>E. faecium</i> 1221	<i>L. sakei</i> ACA-DC 2313 (M17-20, mye-15); <i>S. thermophilus</i> ACA-DC 4 (M17-10); <i>E. faecalis</i> LMG 11396 (M17-9, mye-9)	nd	<i>L. innocua</i> LMG 11387 ^T (M17-16, mye-12) <i>L. innocua</i> LMG 13568 (M17-15, mye-12); <i>L. welshimeri</i> 15008 (M17-12, mye-9)
<i>E. faecium</i> 1222	<i>L. sakei</i> ACA-DC 2313 (M17-15, mye-15); <i>S. thermophilus</i> ACA-DC 4 (M17-10); <i>E. faecalis</i> LMG 11396 (M17-9, mye-9)	nd	<i>L. innocua</i> LMG 11387 ^T (M17-14, mye-12); <i>L. innocua</i> LMG 13568 (M17-14, mye-10); <i>L. welshimeri</i> 15008 (M17-11, mye-9)
<i>E. faecium</i> 1233	<i>S. thermophilus</i> ACA-DC 4 (MRS-12)	<i>S. oralis</i> LMG 14532 ^T (M17-10t)	nd
<i>E. faecium</i> 1235	<i>S. thermophilus</i> ACA-DC 4 (MRS-12)	<i>S. oralis</i> LMG 14532 ^T (M17-10t)	nd
<i>E. faecium</i> 1268	<i>S. thermophilus</i> ACA-DC 4 (M17-12)	<i>S. pneumoniae</i> LMG 14545 ^T (M17-7)	nd
<i>H. paralvei</i> 1123	nd	<i>S. mutans</i> LMG 14558 ^T (MRS-9t); <i>S. oralis</i> LMG 14532 ^T (MRS-9t)	<i>L. innocua</i> LMG 11387 ^T (MRS-14, mye-10); <i>L. innocua</i> LMG 13568 (MRS-11, mye-9)
<i>H. paralvei</i> 1124	<i>L. sakei</i> ACA-DC 2313 (MRS-15); <i>S. thermophilus</i> ACA-DC 4 (MRS-9)	nd	<i>L. innocua</i> LMG 11387 ^T (MRS 18, mye-8); <i>L. innocua</i> LMG 13568 (MRS 18, mye-9); <i>L. welshimeri</i> 15008 (MRS-7)
<i>H. paralvei</i> 1125	nd	nd	<i>L. innocua</i> LMG 11387 ^T (MRS 15, mye-10); <i>L. innocua</i> LMG 13568 (MRS 12, mye-9)
<i>H. paralvei</i> 1126	<i>S. thermophilus</i> ACA-DC 4 (MRS-11)	<i>S. oralis</i> LMG 14532 ^T (MRS-8t)	

<i>H. paralvei</i> 1127	<i>L. sakei</i> ACA-DC 2313 (MRS-18, mye-14); <i>S. thermophilus</i> (MRS-11)	<i>S. oralis</i> LMG 14532 ^T (MRS-8t); <i>S. pneumoniae</i> LMG 14545 ^T (MRS-8t)	<i>L. innocua</i> LMG 11387 ^T (MRS 20, mye-15); <i>L. innocua</i> LMG 13568 (MRS 20, mye-15); <i>L. welshimeri</i> 15008 (MRS 14, mye-12)
<i>Pseudomonas</i> spp. 1146	nd	nd	<i>B. subtilis</i> FMCC B-109 (MRS-11); <i>B. cereus</i> LMG 6923 ^T (mye-10t)
<i>Pseudomonas</i> spp. 1192	<i>L. lactis</i> LMG 6890 ^T (MRS-7, mye-9); <i>S. thermophilus</i> ACA-DC 4 (MRS-11, mye-9); <i>E. faecalis</i> LMG 11396 (MRS-9, mye-9)	<i>S. salivarius</i> LMG 11489 ^T (MRS-8, mye-10); <i>S. sanguinis</i> DSM 20068 (MRS-13, mye-14); <i>S. sobrinus</i> LMG 14641 ^T (MRS-10, mye-11); <i>S. gordonii</i> LMG 14518 ^T (MRS-12, mye-13); <i>S. mutans</i> LMG 14558 ^T (MRS-10, mye-11); <i>S. oralis</i> LMG 14532 ^T (MRS-10, mye-12); <i>S. agalactiae</i> LMG 14694 ^T (MRS-10, mye-12); <i>S. anginosus</i> LMG 14502 ^T (MRS-9, mye-11); <i>S. pneumoniae</i> LMG 14545 ^T (MRS-11, mye-12); <i>S. pyogenes</i> LMG 21599 ^T (MRS-11, mye-13);	<i>L. welshimeri</i> 15008 (MRS-7, mye-9); <i>B. subtilis</i> FMCC B-109 (mye-8); <i>B. cereus</i> LMG 6923 ^T (mye-15)
<i>Pseudomonas</i> spp. 1195	<i>L. sakei</i> ACA-DC 2313 (mye-7); <i>L. lactis</i> LMG 6890 ^T (MRS-7, mye-9); <i>S. thermophilus</i> ACA-DC 4 (MRS-12, mye-10); <i>E. faecalis</i> LMG 11396 (mye-8)	<i>S. salivarius</i> LMG 11489 ^T (MRS-10, mye-12); <i>S. sanguinis</i> DSM 20068 (MRS-10, mye-13); <i>S. sobrinus</i> LMG 14641 ^T (MRS-10, mye-12); <i>S. gordonii</i> LMG 14518 ^T (MRS-9, mye-13); <i>S. mutans</i> LMG 14558 ^T (MRS-10, mye14); <i>S. oralis</i> LMG 14532 ^T (MRS-14, mye-15);	<i>L. welshimeri</i> 15008 (MRS-9, mye-12)

		<i>S. agalactiae</i> LMG 14694 ^T (MRS-10, mye-14); <i>S. anginosus</i> LMG 14502 ^T (MRS-8, mye-11); <i>S. pneumoniae</i> LMG 14545 ^T (MRS-11, mye-13); <i>S. pyogenes</i> LMG 21599 ^T (MRS-10, mye-13);	
<i>Pseudomonas</i> spp. 1212	<i>S. thermophilus</i> ACA-DC 4 (M17-12)	<i>S. sanguinis</i> DSM 20068 (MRS-10t); <i>S. sobrinus</i> LMG 14641 ^T (MRS-8t); <i>S. pneumoniae</i> LMG 14545 ^T (MRS-10)	nd
<i>B. subtilis</i> 1176	<i>L. lactis</i> LMG 6890 ^T (mye-12t); <i>S. thermophilus</i> ACA-DC 4 (MRS-15)	<i>S. agalactiae</i> LMG 14694 ^T (MRS-8); <i>S. pneumoniae</i> LMG 14545 ^T (MRS-10t)	nd
<i>B. subtilis</i> 1225	<i>S. thermophilus</i> ACA-DC 4 (MRS-12)	<i>S. pneumoniae</i> LMG 14545 ^T (MRS-10)	nd
<i>B. subtilis</i> 1241	<i>L. sakei</i> ACA-DC 2313 (MRS-14); <i>S. thermophilus</i> ACA-DC 4 (MRS-12)	<i>S. oralis</i> LMG 14532 ^T (MRS-7t)	<i>L. welshimeri</i> 15008 (MRS-8)
<i>B. subtilis</i> 1242	<i>L. sakei</i> ACA-DC 2313 (MRS-12); <i>S. thermophilus</i> ACA-DC 4 (MRS-12)	<i>S. oralis</i> LMG 14532 ^T (MRS 8); <i>S. pneumoniae</i> LMG 14545 ^T (MRS-11)	nd
<i>B. subtilis</i> 1243	<i>S. thermophilus</i> ACA-DC 4 (MRS-12)	<i>S. pneumoniae</i> LMG 14545 ^T (MRS-9)	nd
<i>B. subtilis</i> 1244	<i>L. sakei</i> ACA-DC 2313 (MRS-17); <i>S. thermophilus</i> ACA-DC 4 (MRS-12)	<i>S. oralis</i> LMG 14532 ^T (MRS-8)	nd

bl: border line inhibition, t: turbid inhibition zone, mye: milk supplemented with yeast extract, nd: not detected.