

S1_Minor bacteria ASV detected in butter samples.

1. *Ochrobactrum* sp.;
2. *Dickeya dianthicola*;
3. *Shewanella japonica*;
4. *Chryseobacterium anthropi*;
5. *Pseudomonas simiae*;
6. *Trabulsiella odontotermitis*;
7. *Kangiella aquimarina*;
8. *Salinivibrio proteolyticus*;
9. *Achromobacter marplatensis*;
10. *Streptophyta* sp.;
11. *Lactococcus plantarum*;
12. *Lactobacillus kisonensis*;
13. *Massilia varians*;
14. *Enterococcus* sp.
15. *Geobacillus caldoxylosilyticus*;
16. *Stenotrophomonas rhizophila*;
17. *Chryseobacterium haifense*;
18. *Serratia* sp.;
19. *Pedobacter nutrimenti*;
20. *Tatumella terrea*;
21. *Pseudoxanthomonas wuyuanensis*;
22. *Pseudocitrobacter* sp.;
23. *Leuconostoc pseudomesenteroides*;
24. *Anoxybacillus salavatliensis*;
25. *Staphylococcus petrasii*;
26. *Cronobacter dublinensis*;
27. *Pantoea rwandensis*;
28. *Achromobacter pulmonis*;
29. *Pseudomonas* sp.;
30. *Bacillus smithii*;
31. *Pseudomonas granadensis*;
32. *Klebsiella singaporensis*;
33. *Klebsiella pneumoniae*
34. *Brevundimonas aurantiaca*;
35. *Ochrobactrum pectoris*;
36. *Macrococcus caseolyticus*;

37. *Aeromonas australiensis*;
38. *Brevundimonas mediterranea*;
39. *Pseudomonas prosekii*;
40. *Lactobacillus senioris*;
41. *Geobacillus icigianus*;
42. *Chryseobacterium bovis*;
43. *Streptococcus hongkongensis*;
44. *Anoxybacillus thermarum*;
45. *Aeromonas bestiarum*;
46. *Listeria innocua*
47. *Ochrobactrum* sp.;
48. *Anoxybacillus voinovskiensis*;
49. *Lonsdalea quercina*;
50. *Pseudomonas palleroniana*;
51. *Staphylococcus agnetis*;
52. *Micrococcus flavus*;
53. *Escherichia coli*
54. *Pedobacter panaciterrae*;
55. *Citrobacter* sp.;
56. *Phyllobacterium myrsinacearum*;
57. *Pseudomonas amygdale*;
58. *Morganella* sp.;
59. *Geobacillus thermantarcticus*.

S2_Relative abundance (%) of lactic acid bacteria (order Lactobacillales) ASV in all butter samples.

Bacteria	Butter Sample																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
<i>Lactobacillus kisonensis</i>	0	0	0	0	0	0	0	0.1	0.1	0	3.8	0.2	<0.1	4.6	0	0	0	0	0	0.1	0
<i>Lactobacillus senioris</i>	<0.1	<0.1	0	0	0	0	0	0.1	0.1	0	1.3	0.2	<0.1	1.7	<0.1	0	<0.1	<0.1	<0.1	0.1	<0.1
<i>Lactobacillus diolivorans</i>	<0.1	<0.1	<0.1	0	<0.1	<0.1	0.4	0.2	0.3	<0.1	6.7	0.4	0.2	6.5	<0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1
<i>Lactobacillus kefir</i>	<0.1	<0.1	<0.1	0	0	<0.1	0.4	0.6	0.6	<0.1	20.0	1.0	0.5	19.0	<0.1	<0.1	<0.1	<0.1	<0.1	0.7	<0.1
<i>Lactobacillus parakefir</i>	<0.1	<0.1	0	0	0	0	2.2	1.7	1.8	0	46.8	2.8	1.4	49.7	<0.1	2.8	<0.1	<0.1	<0.1	1.9	<0.1
<i>Lactobacillus delbrueckii</i>	<0.1	8.1	<0.1	12.3	<0.1	<0.1	0	0	<0.1	0.5	0	0	<0.1	0	<0.9	0	<0.1	0.1	0.1	0	1.0
<i>Lactococcus taiwanensis</i>	2.0	2.6	3.1	<0.1	0.7	1.5	7.3	4.1	2.8	10.5	3.3	6.5	1.9	2.5	2.6	14.2	71.3	6.7	8.4	34.2	4.8
<i>Lactococcus chungangensis</i>	0	0	0	0	0	0	1.5	0.8	0.6	0	0.7	1.4	0.4	0.5	0	0	0	0	0	7.2	0
<i>Lactococcus plantarum</i>	0.3	0.4	0.3	<0.1	0.4	0.2	0	<0.1	<0.1	1.2	0	0	0	<0.1	0.4	1.2	2.2	0.3	2.2	0	0.4
<i>Lactococcus raffinolactis</i>	0.1	0.2	0.2	<0.1	0.3	0.1	9.9	7.0	4.3	0.5	5.6	10.8	2.0	3.7	0.2	0.8	1.7	0.3	1.1	46.6	0.1
<i>Streptococcus infantarius</i>	<0.1	0.2	<0.1	0	<0.1	<0.1	0.4	2.1	1.8	<0.1	4.0	3.1	72.3	2.1	0.2	0.4	<0.1	0.1	0.2	2.3	0.1
<i>Streptococcus vestibularis</i>	0.3	0.6	0.1	<0.1	0.1	<0.1	3.6	0.3	0.5	3.0	0.2	0.5	0.3	0.3	0.6	0.7	0.2	0.1	0.3	0.4	0.2
<i>Streptococcus porcorum</i>	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.4	0.5	0.4	<0.1	0.7	0.7	15.3	0.5	<0.1	0.1	<0.1	<0.1	0.1	0.4	<0.1
<i>Streptococcus hongkongensis</i>	0.2	0.5	0.1	<0.1	<0.1	<0.1	0	<0.1	<0.1	1.0	0	<0.1	<0.1	<0.1	0.5	0.6	0.2	0.1	0.4	<0.1	0.2

<i>Leuconostoc</i>																					
<i>pseudomesenteroid</i>	0.1	0.1	0.3	0	0.3	0.1	0	0	0	0.3	0	0	0	0	3.1	0.2	3.2	0.6	0.4	0	0.2
<i>es</i>																					