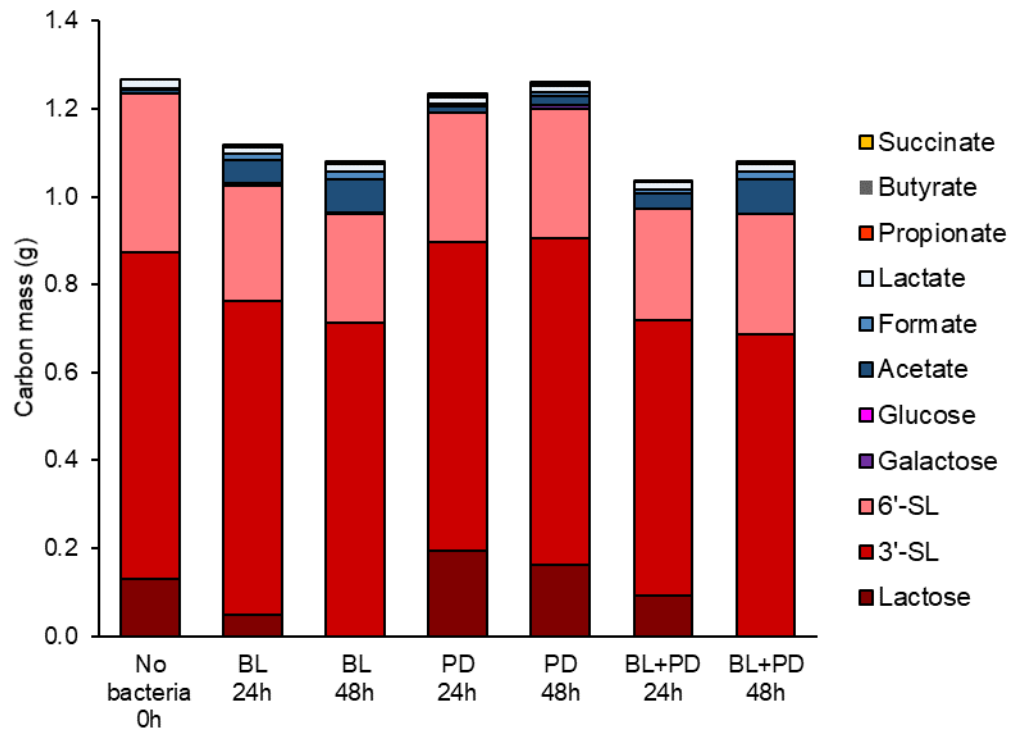


Supplementary Figure 1 Carbon mass balance after 24h or 48h fermentation of 1 % LAC by *Bifidobacterium longum* subsp. *longum* (BL), *Parabacteroides distasonis* (PD) or coculture (BL+PD). Carbon mass was calculated as: $\text{g substrate} \times \text{number of C-atoms} \times 12$ divided by the molecular weight of substrate. Each stacked segment of the bars represent a mean value from three biological replicates. LAC: lactose.



Supplementary Figure 2 Carbon mass balance after 24h or 48h fermentation of 1 % BMO by *Bifidobacterium longum* subsp. *longum* (BL), *Parabacteroides distasonis* (PD) or coculture (BL+PD). Carbon mass was calculated as: $\text{g substrate} \times \text{number of C-atoms} \times 12$ divided by the molecular weight of substrate. Each stacked segment of the bars represent a mean value from three biological replicates. BMO: bovine milk oligosaccharides.

Supplementary Table 1 Carbon mass after 24h or 48h fermentation of 1 % LAC by Bifidobacterium longum subsp. longum (BL), Parabacteroides distasonis (PD) or coculture (BL+PD). Carbon mass was calculated as: g substrate \times number of C-atoms \times 12 divided by the molecular weight of substrate. The data represent mean and SD is the standard deviation obtained from three biological replicates. LAC: lactose

Bacteria	No bacteria		BL				PD				BL+PD			
Time	0h		24h		48h		24h		48h		24h		48h	
	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD
Succinate	0.003	0.000	0.004	0.000	0.004	0.000	0.027	0.007	0.037	0.004	0.022	0.008	0.024	0.009
Butyrate	0.001	0.001	0.000	0.000	0.000	0.000	0.002	0.003	0.002	0.003	0.002	0.003	0.000	0.000
Propionate	0.000	0.000	0.002	0.000	0.001	0.001	0.005	0.001	0.006	0.001	0.004	0.000	0.004	0.001
Lactate	0.016	0.002	0.018	0.002	0.021	0.003	0.016	0.000	0.017	0.000	0.046	0.010	0.204	0.046
Formate	0.002	0.000	0.013	0.007	0.047	0.033	0.011	0.001	0.013	0.001	0.060	0.002	0.077	0.006
Acetate	0.006	0.001	0.048	0.023	0.189	0.126	0.024	0.002	0.029	0.001	0.281	0.019	0.538	0.050
GLU	0.006	0.008	0.000	0.000	0.001	0.002	0.064	0.011	0.159	0.056	0.009	0.008	0.000	0.000
GAL	0.000	0.000	0.008	0.003	0.027	0.020	0.078	0.027	0.160	0.054	0.087	0.008	0.091	0.012
6SL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3SL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
LAC	3.108	0.613	2.952	0.083	2.909	0.119	2.866	0.120	2.808	0.173	2.621	0.035	2.218	0.074
Sum of carbon mass in g	3.142		3.044		3.200		3.092		3.231		3.132		3.155	

Supplementary Table 2 Carbon mass after 24h or 48h fermentation of 1 % BMO by Bifidobacterium longum subsp. longum (BL), Parabacteroides distasonis (PD) or coculture (BL+PD). Carbon mass was calculated as: g substrate \times number of C-atoms \times 12 divided by the molecular weight of substrate. The data represent mean and SD is the standard deviation obtained from three biological replicates. BMO: Bovine milk oligosaccharides

Bacteria	No bacteria		BL				PD				BL+PD			
Time	0h		24h		48h		24h		48h		24h		48h	
	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD
Succinate	0.004	0.001	0.004	0.000	0.004	0.000	0.004	0.000	0.006	0.002	0.004	0.000	0.004	0.000
Butyrate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Propionate	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.003	0.003	0.006	0.000	0.000	0.002	0.003
Lactate	0.018	0.004	0.016	0.000	0.017	0.001	0.015	0.000	0.016	0.000	0.017	0.001	0.018	0.001
Formate	0.002	0.000	0.014	0.007	0.018	0.002	0.006	0.001	0.007	0.003	0.009	0.005	0.019	0.002
Acetate	0.007	0.001	0.054	0.032	0.077	0.003	0.015	0.002	0.020	0.008	0.034	0.025	0.078	0.004
GLU	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
GAL	0.000	0.000	0.004	0.003	0.002	0.003	0.000	0.000	0.009	0.009	0.000	0.000	0.001	0.001
6SL	0.322	0.046	0.262	0.023	0.250	0.025	0.295	0.047	0.295	0.023	0.256	0.017	0.271	0.032
3SL	0.667	0.052	0.712	0.052	0.712	0.031	0.701	0.061	0.745	0.011	0.627	0.055	0.690	0.051
LAC	0.115	0.009	0.049	0.085	0.000	0.000	0.194	0.024	0.161	0.011	0.093	0.084	0.000	0.000
Sum of carbon mass in g	1.135		1.114		1.080		1.233		1.263		1.039		1.083	

Supplementary Table 3 Carbon mass after 24h or 48h fermentation of 1 % BMO+LAC by Bifidobacterium longum subsp. longum (BL), Parabacteroides distasonis (PD) or coculture (BL+PD). Carbon mass was calculated as: g substrate \times number of C-atoms \times 12 divided by the molecular weight of substrate. The data represent mean and SD is the standard deviation obtained from three biological replicates. BMO: Bovine milk oligosaccharides, LAC: lactose

Bacteria	No bacteria		BL				PD				BL+PD			
Time	0h		24h		48h		24h		48h		24h		48h	
	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD	mean	SD
Succinate	0.003	0.001	0.005	0.000	0.004	0.002	0.021	0.023	0.063	0.029	0.010	0.005	0.007	0.010
Butyrate	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Propionate	0.000	0.000	0.000	0.000	0.000	0.000	0.063	0.073	0.147	0.042	0.018	0.025	0.017	0.025
Lactate	0.015	0.003	0.090	0.008	0.091	0.041	0.015	0.001	0.019	0.001	0.117	0.049	0.482	0.094
Formate	0.002	0.000	0.052	0.002	0.060	0.023	0.023	0.015	0.039	0.003	0.062	0.018	0.067	0.024
Acetate	0.005	0.001	0.317	0.013	0.346	0.129	0.050	0.032	0.090	0.007	0.384	0.036	0.833	0.073
GLU	0.000	0.000	0.006	0.006	0.000	0.000	0.081	0.105	0.294	0.161	0.000	0.000	0.000	0.000
GAL	0.000	0.000	0.058	0.008	0.054	0.018	0.129	0.160	0.371	0.127	0.047	0.044	0.052	0.041
6SL	0.140	0.006	0.139	0.015	0.114	0.055	0.129	0.004	0.120	0.005	0.131	0.027	0.118	0.020
3SL	0.321	0.059	0.359	0.025	0.268	0.104	0.334	0.010	0.326	0.033	0.334	0.008	0.348	0.000
LAC	1.550	0.376	1.064	0.012	0.854	0.307	1.223	0.423	0.586	0.480	0.979	0.112	0.196	0.093
Sum of carbon mass in g	2.035		2.090		1.792		2.068		2.055		2.082		2.121	

Supplementary Table 4 Growth (24h) (log copy numbers per mL culture) of Parabacteroides distasonis (PD), Bifidobacterium longum subsp. longum (BL) and Clostridium perfringens (CP) in 1 % treatments of bovine milk oligosaccharides (BMO), lactose (LAC), a combination of the two (BMO+LAC) or minimal media with no carbohydrate (MM). C. perfringens was grown on spent media from B. longum (BL,CP) and P. distasonis (PD,CP). The data represent mean and standard error, calculated from two biological replicates and two technical replicates each. Significant effect of carbon source on logCFU/mL culture was tested by ANOVA and Tukey HSD was used for multiple comparisons between groups. $P \leq 0.05$ indicates significant differences and different letters in each row indicate significant differences.

	BMO		BMO+LAC		LAC		MM		p-value
	<i>Mean</i>	<i>SE</i>	<i>Mean</i>	<i>SE</i>	<i>Mean</i>	<i>SE</i>	<i>Mean</i>	<i>SE</i>	
BL,-	6.00	0.278	7.27	0.278	6.56	0.278	6.00	0.278	0.0855
PD,-	7.06ab	0.467	8.76b	0.467	7.83ab	0.467	6.00a	0.467	0.0170
CP,-	8.11b	0.0787	7.55a	0.0787	8.05b	0.0787	7.37a	0.0787	0.0063
BL,CP	8.22	0.538	6.65	0.538	6.86	0.538	7.15	0.538	0.3076
PD,CP	8.25b	0.146	7.56ab	0.146	7.76ab	0.146	7.37a	0.146	0.0486