Supplementary Table S1. Macronutrient composition of the intervention foods.

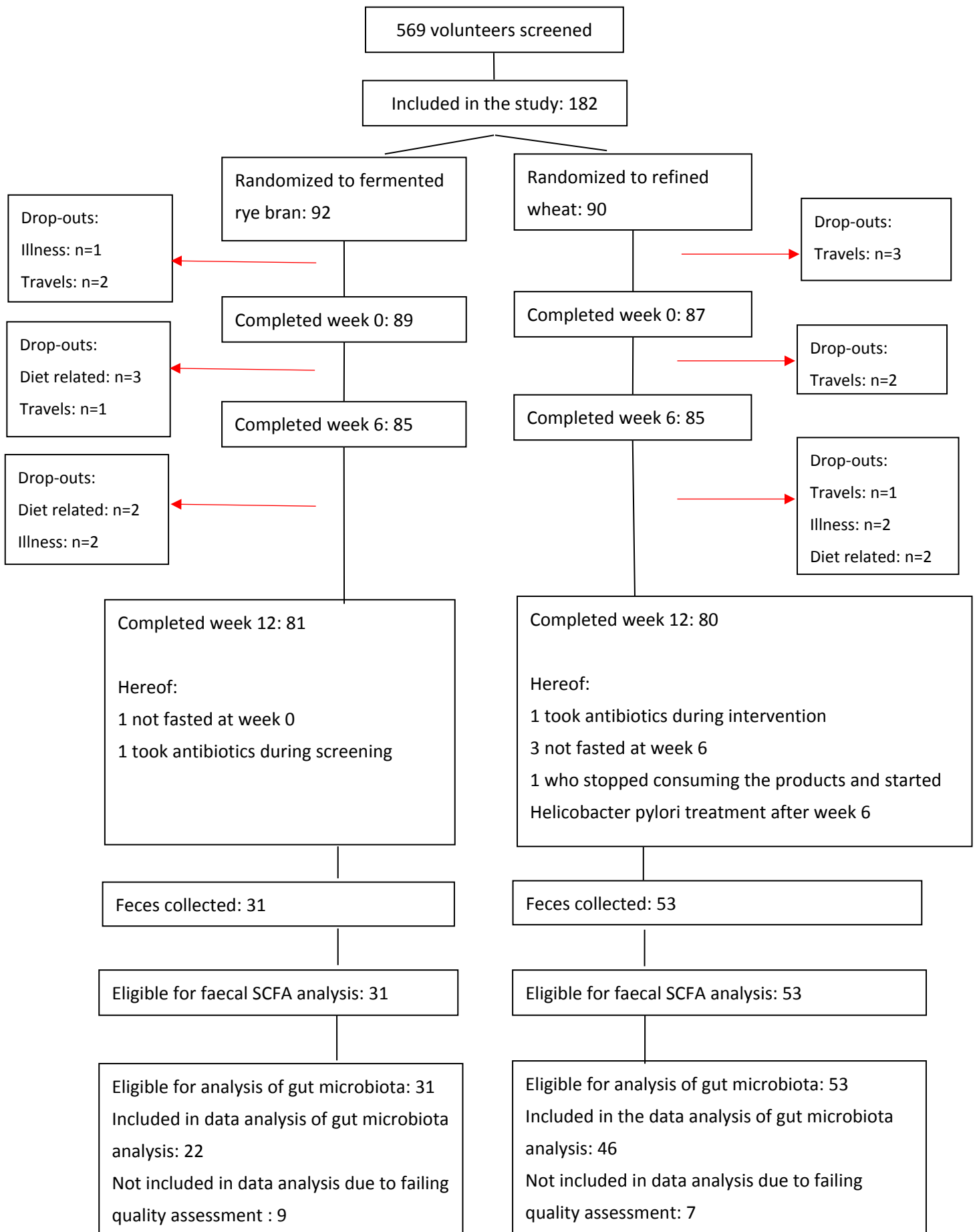| Nutrients (g/100g)	Fermented rye bran products (FRB)		Refined wheat products (RW)	
	Crisp bread	Puffs	Crisp bread	Puffs
Fat	1.9	3.4	2.7	2.2
Protein	12.4	11.2	10.2	12.2
Dietary Fiber[1]	22.0	23.2	5.8	5.8
Soluble Fiber	7.8	3.5	1.5	2.7
Insoluble Fiber	14.2	14.9	4.3	3.1
Carbohydrates	61	59.5	79.5	78.3
Ash	2.6	2.6	1.8	1.5

[1]Fiber content as analyzed by the Uppsala method with inclusion of fructans.

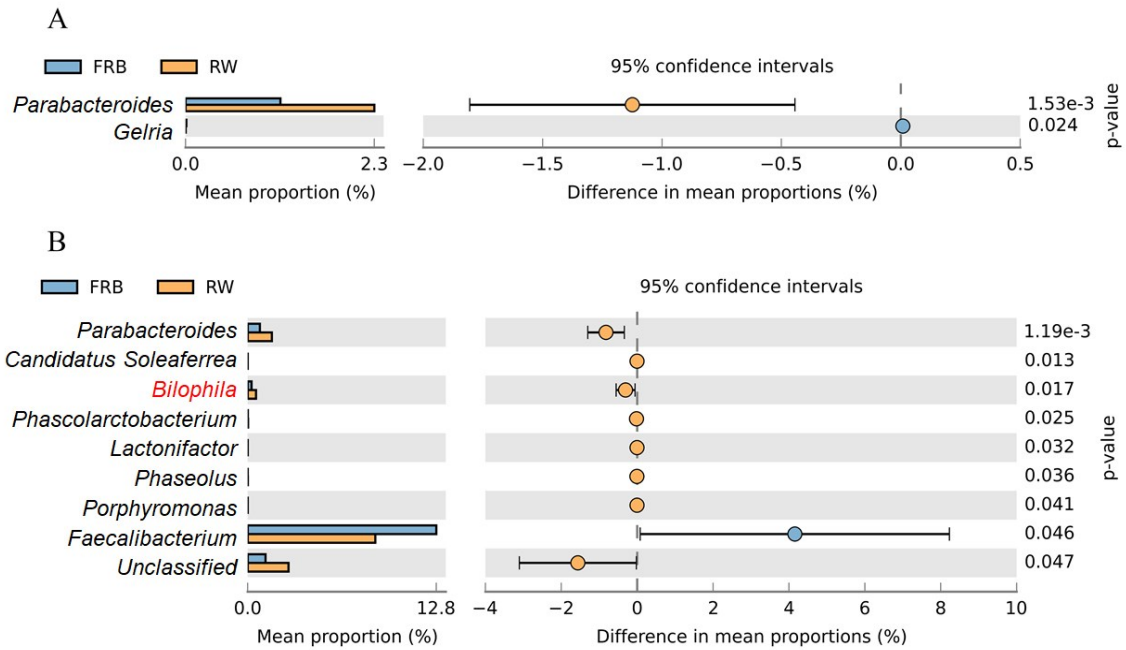**Supplementary Table S2.** Blood lipids associated with fecal SCFAs among all participants (n = 84) at week 12.

Lipids	SCFAs[1] (μg/mg)	β[6]	SE	*P*-value
TC[2] (mmol/L)	Acetic acid	0.011	0.014	0.418
	Propanoic acid	0.011	0.011	0.333
	Butyric acid	0.005	0.007	0.522
	Isobutyric acid	0.034	0.035	0.337
	Isovaleric acid	0.021	0.023	0.367
	2-Methylbutyric acid	0.023	0.030	0.430
	Valeri acid	0.006	0.020	0.743
	Total SCFAs	0.004	0.004	0.225
HDL-C[3] (mmol/L)	Acetic acid	0.015	0.014	0.277
	Propanoic acid	0.055	0.049	0.261
	Butyric acid	-0.007	0.030	0.982
	Isobutyric acid	-0.249	0.184	0.176
	Isovaleric acid	-0.126	0.116	0.278
	2-Methylbutyric acid	-0.169	0.148	0.261
	Valeri acid	-0.059	0.089	0.507
	Total SCFAs	0.003	0.015	0.857
LDL-C[4] (mmol/L)	Acetic acid	0.016	0.026	0.532
	Propanoic acid	0.020	0.020	0.319
	Butyric acid	0.009	0.013	0.478
	Isobutyric acid	0.072	0.066	0.275
	Isovaleric acid	0.040	0.043	0.352
	2-Methylbutyric acid	0.050	0.055	0.361
	Valeri acid	0.015	0.037	0.693
	Total SCFAs	0.008	0.007	0.214
TG[5] (mmol/L)	Acetic acid	0.110	0.169	0.514
	Propanoic acid	0.131	0.093	0.159
	Butyric acid	0.044	0.096	0.650
	Isobutyric acid	-0.499	0.526	0.342
	Isovaleric acid	-0.212	0.313	0.497
	2-Methylbutyric acid	-0.369	0.402	0.358
	Valeri acid	-0.647	0.359	0.072
	Total SCFAs	0.007	0.047	0.878

[1] SCFAs: short-chain fatty acids; [2]TC: total cholesterol; [3]HDL-C: high density lipoprotein cholesterol; [4]LDL-C: low density lipoprotein cholesterol; [5]TG: total triglycerides;

[6] β according to GENMOD (Generalized linear model) adjusted for sex, age and BMI in SAS.

Supplementary Figure S1. Flow sheet of participant.

Supplementary Figure S2. Extended error bar plots illustrating mean proportions of the bacterial genera in FRB and RW groups at baseline (A) and week 12 (B). Taxa were ranked by respective *P*-values with 0.05 thresholds in STAMP. Circles represented the differences between the mean proportions of bacteria (the effect size), adjacent to their respective CI (error bars). Samples from FRB and RW groups were in blue and yellow, respectively. FRB: fermented rye bran; RW: refined wheat.