

Supplementary Table S1. Recommendations of fruit intake according to a starch- and sucrose-reduced diet

| Well tolerated | Tolerated by some | Not tolerated |
|-----------------------|--------------------------|----------------------|
| Avocado | Persimmons | Apples |
| Blackberries | Plums | Apricots |
| Blueberries | Raisins | Bananas |
| Boysenberries | Watermelon | Cantaloupe |
| Cherries | | Dates |
| Cranberries | | Grapefruit |
| Currants | | Guava |
| Figs | | Honeydew melon |
| Gooseberries | | Mangos |
| Grapes | | Nectarines |
| Kiwi | | Oranges |
| Lemons | | Peaches |
| Limes | | Pineapple |
| Loganberries | | Tangelos |
| Olives | | Tangerines |
| Papaya | | |
| Pears | | |
| Pomegranates | | |
| Prunes | | |
| Raspberries | | |
| Rhubarb | | |
| Strawberries | | |

Supplementary Table S2. Recommendations of vegetable and legume intake according to a starch- and sucrose-reduced diet

| Well tolerated | Tolerated by some | Not tolerated |
|-----------------------|--------------------------|----------------------|
| Alfalfa sprouts | Edamame soybeans | Beets |
| Artichokes* | Jicamas | Black beans |
| Arugulas | Leeks | Black-eyed peas |
| Asparagus* | Okra | Butternut |
| Bamboo shoots | Pumpkin | Carrots |
| Bok choy | Snow peas | Cassava |
| Broccoli* | Tempeh | Chickpeas |
| Brussel sprouts* | Tofu | Corn |
| Cabbage* | Yellow wax beans | Garlic |
| Cauliflower* | | Green peas |
| Celery | | Lentils |
| Chard | | Kidney beans |
| Chicories | | Lima beans |
| Chives | | Navy beans |
| Collard greens | | Onion |
| Cress | | Parsnips |
| Cucumber | | Pinto beans |
| Eggplant | | Potatoes |
| Endive | | Soybeans |
| Green beans | | Split peas |
| Kale | | Sweet potatoes |
| Lettuce | | Yams |
| Mung bean sprouts | | |
| Mushrooms | | |
| Mustard green | | |
| Peppers | | |
| Radishes | | |
| Spaghetti squash | | |
| Spinach | | |
| Tomatoes | | |
| Turnips | | |
| Yellow squash | | |
| Zucchini | | |

*excess intake can cause bloating/flatulence in all individuals

Supplementary Table S3. Previous or present comorbidity and drug treatments

| Comorbidity | IBS N=155 |
|--------------------------------|----------------------|
| Allergy | 17 (11.0) |
| Anxiety | 7 (4.5) |
| Asthma bronchialis | 7 (4.5) |
| Burned out | 10 (6.5) |
| Depression | 10 (6.5) |
| Eczema | 19 (12.3) |
| Fibromyalgia | 9 (5.8) |
| Hypertension | 12 (7.7) |
| Hypothyroid disease | 6 (3.9) |
| Lactose intolerance | 10 (6.5) |
| Migraine/headache | 10 (6.5) |
| Reflux/hiatushernia | 18 (11.6) |
| | |
| Drug treatment | |
| Allergy medicines | 24 (15.5) |
| Antidepressants | 23 (14.8) |
| Asthma inhalators | 8 (5.2) |
| Hormonal treatment* | 24 (15.5) |
| Laxatives/bulking agents | 38 (24.5) |
| Levaxine | 6 (3.9) |
| NSAID | 50 (32.3) |
| Paracetamols | 54 (34.8) |
| Proton pump inhibitors | 48 (31.0) |
| | |
| Dietary supplements | |
| Iron | 7 (4.5) |
| Other minerals (Ca, Mg, Z, Si) | 26 (16.8) |
| Vitamin B/Folic acid | 14 (9.0) |
| Vitamin D | 26 (16.8) |
| Multivitamins | 23 (14.8) |
| Vitamin D and/or multivitamins | 39 (25.2) |
| Probiotics | 15 (9.7) |

IBS = irritable bowel syndrome. *= combination pills. Values are given as number (percentage).

Supplementary Table S4. Energy and nutrient intake

| | SSRD N = 77 | | | Low FODMAP N = 78 | | | P-value* |
|----------------------------|----------------|---------|----------------|----------------------|---------|-------------|----------|
| Variables | Values | P-value | Difference | | P-value | Difference | |
| Energy (kcal) | | | | | | | |
| Baseline | 1813±535 | | | 1783±510 | | | 0.718 |
| 4 weeks | 1534±478 | <0.001 | -284±549 | 1667±500 | 0.036 | -128±491 | 0.082 |
| 6 months | 1792±600 | 0.535 | -56±608 | 1676±739 | 0.069 | -192±705 | 0.323 |
| Carbohydrates (g) | | | | | | | |
| Baseline | 178±59 | | | 179±53 | | | 0.923 |
| 4 weeks | 90±38 | <0.001 | -88±61 | 155±54 | <0.001 | -25±46 | <0.001 |
| 6 months | 157±63 | 0.044 | -21±69 | 160±70 | 0.014 | -26±70 | 0.736 |
| Protein (g) | | | | | | | |
| Baseline | 71(54-81) | | | 66(52-80) | | | 0.316 |
| 4 weeks | 79(61-81) | 0.002 | 7(-4-27) | 68(51-81) | 0.471 | 2(-11-16) | 0.083 |
| 6 months | 74(54-86) | 0.573 | -3(-15-14) | 66(49-81) | 0.604 | -3±26 | 0.728 |
| Fat (g) | | | | | | | |
| Baseline | 76(60-93) | | | 73(54-93) | | | 0.656 |
| 4 weeks | 83(67-109) | 0.141 | 5(-12-34) | 76(52-93) | 0.308 | -7(-22-20) | 0.007 |
| 6 months | 88(54-112) | 0.922 | -2(-22-23) | 71(48-98) | 0.071 | -16(-27-19) | 0.111 |
| Fiber (g) | | | | | | | |
| Baseline | 18(12-23) | | | 18(15-22) | | | 0.745 |
| 4 weeks | 16(12-22) | 0.162 | -1(-6-3) | 15(11-20) | 0.001 | -3(8-2) | 0.162 |
| 6 months | 18(13-24) | 0.721 | 0 (-5-4) | 15(10-20) | <0.001 | -4(-7-2) | 0.026 |
| Whole grain (g) | | | | | | | |
| Baseline | 25(13-44) | | | 28(17-45) | | | 0.309 |
| 4 weeks | 22(8-39) | 0.244 | -6(-19-15) | 30(14-54) | 0.562 | 2(-13-17) | 0.190 |
| 6 months | 25(11-43) | 0.538 | 1(-19-17) | 25(13-44) | 0.575 | 3(-25-18) | 0.954 |
| Sucrose (g) | | | | | | | |
| Baseline | 25(14-40) | | | 26(15-41) | | | 0.405 |
| 4 weeks | 6(3-9) | <0.001 | -17 (-35-(-7)) | 18(12-36) | 0.027 | -5(-15-5) | <0.001 |
| 6 months | 17(11-32) | 0.011 | -4 (-15-3) | 22(10-36) | 0.080 | -6(-16-10) | 0.881 |
| Starch (g) | | | | | | | |
| Baseline | 46±23 | | | 51±25 | | | 0.197 |
| 4 weeks | 20±20 | <0.001 | -25±28 | 48±25 | 0.515 | -3±32 | <0.001 |
| 6 months | 41±25 | 0.298 | -5±33 | 42±28 | 0.008 | -13±32 | 0.243 |
| Monosaccharides (g) | | | | | | | |
| Baseline | 27(18-38) | | | 27(17-35) | | | 0.523 |
| 4 weeks | 17(10-34) | <0.001 | -5(-14-2) | 21(15-28) | 0.001 | -3(-12-2) | 0.375 |
| 6 months | 29(16-35) | 0.249 | -3(-12-6) | 24(15-35) | 0.216 | -3(-9-4) | 0.869 |
| Disaccharides (g) | | | | | | | |
| Baseline | 36(24-54) | | | 41(28-58) | | | 0.271 |
| 4 weeks | 16(12-27) | <0.001 | -17(-35-(-6)) | 31(23-49) | 0.119 | -2(-17-10) | <0.001 |
| 6 months | 29(20-45) | 0.017 | -5(-18-3) | 30(19-53) | 0.107 | -6(-21-12) | 0.918 |
| Added Sugar (g) | | | | | | | |
| Baseline | 33(16-46) | | | 32(17-52) | | | 0.955 |
| 4 weeks | 5(2-11) | <0.001 | -24(-43-(-10)) | 24(13-43) | 0.134 | -2(-17-6) | <0.001 |
| 6 months | 18(8-41) | 0.023 | -7(-21-8) | 24(9-53) | 0.472 | -4(-17-14) | 0.265 |
| Alcohol (g) | | | | | | | |
| Baseline | 4(0-16) | | | 3(0-11) | | | 0.551 |
| 4 weeks | 0(0-10) | 0.039 | 0(-6-0) | 3(0-11) | 0.760 | 0(-4-5) | 0.139 |
| 6 months | 3(0-16) | <0.001 | 0(-12-4) | 5(0-14) | <0.001 | 2(-2-9) | 0.103 |

SSRD = starch-and sucrose-reduced diet with 68 patients at week 4 and 46 at month 6. Low FODMAP = low content of fermentable oligo-, di-, and monosaccharides and polyols with 76 patients at baseline, 68 patients at week 4 and 47 at month 6. Diary habits were registered digitally [30]. Data normally distributed were presented as mean \pm standard deviation (SD) and calculated by Independent-Sample or Paired-Samples T Test*. Data not normally distributed were given as median and interquartile and calculated by Wilcoxon Signed Ranks for comparisons within the groups and Mann-Whitney U test* for comparison between baseline and the differences of the two groups. $P \leq 0.05$ was considered statistically significant.

Supplementary Table S5. Gastrointestinal symptoms before, during and after the dietary intervention

| | SSRD N = 77 | | | Low FODMAP N = 78 | | | P- value* |
|--------------------------------------------------------------|----------------|---------------|------------------|----------------------|---------------|------------------|--------------|
| <i>VAS-IBS (mm)</i> | Value | FDR- value | Difference | Value | FDR- value | Difference | |
| Abdominal pain 5 (1–13) | | | | | | | |
| Baseline | 47(28-64) | - | - | 50(32-65) | - | - | 0.368 |
| 2 weeks | 17(8-30) | 0.0015 | -27(-47-(-9)) | 22(13-40) | <0.001 | -19(-36-(-3)) | 0.252 |
| 4 weeks | 16(0-31) | 0.0015 | -24(-44-(-9)) | 13(0-27) | <0.001 | -30(-53-(-8)) | 0.425 |
| 6 months | 32(19-63) | 0.003 | -6(-28-3) | 30(16-54) | <0.001 | -16(-38-4) | 0.270 |
| Diarrhea 3 (0–10) | | | | | | | |
| Baseline | 53(19-73) | - | - | 37(4-74) | - | - | 0.245 |
| 2 weeks | 15(4-48) | <0.001 | -14(-51-0) | 10(0-37) | 0.0015 | -14(-38-0) | 0.793 |
| 4 weeks | 17(3-39) | <0.001 | -8(-48-2) | 8(0-24) | 0.0015 | -16(-53-0) | 0.633 |
| 6 months | 31(8-68) | <0.001 | -12(-39-0) | 11(3-44) | 0.008 | -8(-30-7) | 0.457 |
| Constipation 6 (2–16) | | | | | | | |
| Baseline | 53(6-72) | - | - | 54(10-76) | - | - | 0.439 |
| 2 weeks | 16(2-50) | 0.0015 | -12(-36-2) | 20(0-68) | 0.022 | -6(-28-4) | 0.510 |
| 4 weeks | 16(2-43) | 0.0015 | -8(-46-0) | 21(0-55) | 0.003 | -13(-33-0) | 0.815 |
| 6 months | 22(0-61) | 0.121 | -3(-24-12) | 42(2-70) | 0.022 | -4(-32-3) | 0.528 |
| Bloating and flatulence 10 (2–23) | | | | | | | |
| Baseline | 73(58-88) | - | - | 73(54-86) | - | - | 0.677 |
| 2 weeks | 34(18-53) | 0.0015 | -37(-53-(-9)) | 23(13-50) | <0.001 | -39(-56-(-16)) | 0.469 |
| 4 weeks | 24(10-54) | 0.0015 | -43(-63-(-11)) | 19(8-50) | <0.001 | -44(-61-(-25)) | 0.359 |
| 6 months | 62(30-75) | 0.002 | -15(-38-14) | 56(33-70) | <0.001 | -18(-33-(-3)) | 0.416 |
| Vomiting and nausea 2 (0–4) | | | | | | | |
| Baseline | 13(2-34) | - | - | 13(1-36) | - | - | 0.957 |
| 2 weeks | 6(0-12) | 0.0015 | -7(-20-0) | 4(0-12) | 0.0015 | -7(-22-0) | 0.773 |
| 4 weeks | 3(0-12) | 0.0015 | -6(-15-0) | 0(0-11) | 0.0015 | -7(-21-0) | 0.743 |
| 6 months | 8(1-21) | 0.002 | -4(-14-1) | 5(0-21) | 0.009 | -2(-17-1) | 0.892 |
| Intestinal symptom's influence on daily life 2 (0–14) | | | | | | | |
| Baseline | 74(57-84) | - | - | 70(54-84) | - | - | 0.694 |
| 2 weeks | 29(15-60) | <0.001 | -36(-52-(-11)) | 30(17-60) | <0.001 | -28(-50-(-15)) | 0.688 |
| 4 weeks | 24(12-62) | <0.001 | -30(-60-(-10)) | 22(10-50) | <0.001 | -33(-53-(-18)) | 0.593 |
| 6 months | 40(23-76) | <0.001 | -12(-45-0) | 48(24-68) | <0.001 | -26(-43-(-2)) | 0.492 |
| Psychological well-being 5 (2–15) | | | | | | | |
| Baseline | 39(15-65) | - | - | 45(16-59) | - | - | 0.708 |
| 2 weeks | 24(11-42) | 0.0015 | -7(-26-0) | 27(8-46) | 0.0315 | -4(-25-5) | 0.339 |
| 4 weeks | 20(5-32) | 0.0015 | -12(-29-(-2)) | 18(2-34) | 0.003 | -13(-32-1) | 0.788 |
| 6 months | 22(11-50) | 0.009 | -6(-20-4) | 26(8-39) | 0.043 | -2(-30-7) | 0.911 |
| IBS-SSS | | | | | | | |
| Total IBS-SSS | | | | | | | |
| Baseline | 301(233-348) | - | - | 300(238-360) | - | - | 0.845 |
| 2 weeks | 136(87-223) | <0.001 | -138(-212-(-82)) | 151(100-232) | <0.001 | -110(-188-(-68)) | 0.310 |
| 4 weeks | 119(66-230) | <0.001 | -146(-240-(-88)) | 116(63-176) | <0.001 | -153(-231-(-90)) | 0.585 |
| 6 months | 204(146-234) | <0.001 | -55(-130-4) | 220(144-301) | <0.001 | -93(-181-(-20)) | 0.069 |

SSRD = starch-and sucrose-reduced diet with 72 patients at week 2 and 4 and 53 at month 6. Low FODMAP = low content of fermentable oligo-, di-, and monosaccharides and polyols with 77 patients at baseline, 71 patients at week 2 and 4 and 49 at month 6. Gastrointestinal symptoms estimated by irritable bowel syndrome -severity scoring system (IBS-SSS) [26]. and visual analog scale for irritable bowel syndrome (VAS-IBS) [27]. Reference values for healthy within brackets [32]. Values are given as median and interquartile. Wilcoxon Signed Ranks for comparisons within the groups and Mann-Whitney U test* for comparison between baseline and the differences of the two groups. P-values adjusted for false discovery rate (FDR) set at 5% according to the Benjamini-Hochberg method [33] were performed for the calculations within the group. $P \leq 0.05$ was considered statistically significant.

Supplementary Table S6. The effect of dietary intervention at week 4 depending on IBS subgroup

| | Δ Mean \pm SD | n | ANOVA with Bonferroni for IBS subgroups/FBD | | |
|---------------------|---------------------------|----|------------------------------------------------|-------|-------|
| | | | IBS-C | IBS-M | FBD |
| SSRD | | | | | |
| Diarrhea | | | | | |
| IBS-D | -42 \pm 39 | 27 | 0.010 | 0.022 | 0.103 |
| IBS-C | -7 \pm 19 | 13 | | 1.000 | 1.000 |
| IBS-M | -14 \pm 31 | 21 | | | 1.000 |
| FBD | -12 \pm 20 | 9 | | | |
| Constipation | | | | | |
| IBS-D | -4 \pm 28 | 27 | 0.478 | 0.016 | 0.233 |
| IBS-C | -22 \pm 38 | 13 | | 1.000 | 1.000 |
| IBS-M | -31 \pm 29 | 21 | | | 1.000 |
| FBD | -28 \pm 32 | 9 | | | |
| Low FODMAP | | | | | |
| Diarrhea | | | | | |
| IBS-D | -39 \pm 38 | 15 | 0.009 | 1.000 | 0.139 |
| IBS-C | -1 \pm 12 | 11 | | 0.020 | 1.000 |
| IBS-M | -32 \pm 30 | 28 | | | 0.339 |
| FBD | -13 \pm 23 | 12 | | | |
| Constipation | | | | | |
| IBS-D | -5 \pm 13 | 15 | 0.778 | 0.704 | 1.000 |
| IBS-C | -22 \pm 29 | 12 | | 1.000 | 1.000 |
| IBS-M | -19 \pm 29 | 28 | | | 1.000 |
| FBD | -13 \pm 35 | 12 | | | |

SSRD = starch-and sucrose-reduced diet with 77 patients at baseline, 72 at week 4, and 53 at month 6. Low FODMAP = low content of fermentable oligo-, di-, and monosaccharides and polyols with 78 patients at baseline, 72 at week 4, and 49 at month 6. IBS-D = diarrhea-predominated irritable bowel syndrome (IBS), IBS-M = mixed IBS, IBS-C = constipation -predominated IBS, FBD = unspecific functional bowel disorder. Values are given as mean \pm standard deviation (SD) and numbers (n). $P \leq 0.05$ was considered statistically significant.

Supplementary table S7. Extraintestinal symptoms before, during and after the dietary intervention

| | SSRD N = 77 | | | Low FODMAP N = 78 | | | P-value* |
|-----------------------------------------|-----------------------|------------------|-------------------|-----------------------------|------------------|-------------------|-----------------|
| <i>Extraintestinal IBS-SSS</i> | Value | FDR-value | Difference | Value | FDR-value | Difference | |
| Difficulties to eat a whole meal | | | | | | | |
| Baseline | 10(2-26) | - | - | 6(0-22) | - | - | 0.267 |
| 2 weeks | 4(0-12) | 0.003 | -3(-13-3) | 3(0-13) | 0.003 | -2(-11-0) | 0.951 |
| 4 weeks | 2(0-13) | 0.003 | -4(-16-1) | 0(0-9) | 0.0075 | -3(-12-0) | 0.629 |
| 6 months | 4(0-14) | 0.074 | -2(-13-4) | 2(0-18) | 0.053 | -1(-10-0) | 0.940 |
| Headache | | | | | | | |
| Baseline | 33(10-66) | - | - | 27(9-58) | - | - | 0.737 |
| 2 weeks | 14(5-36) | 0.0015 | -5(-30-2) | 15(2-47) | <0.001 | -6(-22-0) | 0.993 |
| 4 weeks | 14(2-32) | 0.0015 | -9(-27-2) | 12(0-35) | <0.001 | -9(-31-0) | 0.855 |
| 6 months | 24(10-55) | 0.185 | -1(-21-8) | 20(4-50) | 0.001 | -4(-21-2) | 0.324 |
| Back pain | | | | | | | |
| Baseline | 20(4-50) | - | - | 28(4-65) | - | - | 0.395 |
| 2 weeks | 6(0-29) | 0.0015 | -6(-21-0) | 14(0-39) | 0.0015 | -2(-26-2) | 0.409 |
| 4 weeks | 6(0-30) | 0.0015 | -7(-22-0) | 4(0-35) | 0.0015 | -7(-32-0) | 0.998 |
| 6 months | 23(4-58) | 0.157 | -4(-18-8) | 24(4-70) | 0.675 | 0(-14-12) | 0.501 |
| Fatigue | | | | | | | |
| Baseline | 57(30-81) | - | - | 74(48-84) | - | - | 0.055 |
| 2 weeks | 33(16-68) | 0.0015 | -14(-27-0) | 47(19-70) | <0.001 | -12(-32-0) | 0.660 |
| 4 weeks | 27(9-56) | 0.0015 | -18 (-32-(-2)) | 37(14-60) | <0.001 | -19(-38-(-3)) | 0.712 |
| 6 months | 49(18-68) | 0.004 | -7(-20-4) | 48(19-69) | <0.001 | -13(-27-0) | 0.128 |
| Belching/excess wind | | | | | | | |
| Baseline | 72(48-85) | - | - | 75(52-87) | - | - | 0.621 |
| 2 weeks | 24(10-66) | <0.001 | -21(-51-(-6)) | 37(14-66) | <0.001 | -23(-44-(-6)) | 0.804 |
| 4 weeks | 14(6-40) | <0.001 | -41(-67-(-6)) | 21(8-45) | <0.001 | -41(-59-(-19)) | 0.878 |
| 6 months | 47(20-68) | <0.001 | -13(-33-(-2)) | 48(22-70) | <0.001 | -15(-37-(-2)) | 0.599 |
| Reflux | | | | | | | |
| Baseline | 20(7-50) | - | - | 20(2-60) | - | - | 0.678 |
| 2 weeks | 5(0-18) | 0.0015 | -12(-27-0) | 7(0-35) | 0.0015 | -6(-30-0) | 0.274 |
| 4 weeks | 4(0-20) | 0.0015 | -12(-28-0) | 3(0-26) | 0.0015 | -10(-30-0) | 0.945 |
| 6 months | 11(4-26) | 0.002 | -6(-20-2) | 21(2-54) | 0.013 | -3(-18-2) | 0.727 |
| Urinary urgency | | | | | | | |
| Baseline | 14(2-64) | - | - | 22(4-64) | - | - | 0.491 |
| 2 weeks | 7(0-24) | 0.0015 | -7(-24-0) | 7(0-33) | 0.0015 | -8(-29-0) | 0.598 |
| 4 weeks | 4(0-23) | 0.0015 | -6(-34-0) | 3(0-22) | 0.0015 | -13(-44-0) | 0.290 |
| 6 months | 18(0-44) | 0.003 | -7(-22-1) | 16(0-53) | 0.003 | -7(-19-0) | 0.975 |
| Leg pain | | | | | | | |
| Baseline | 2(0-9) | - | - | 0(0-18) | - | - | 0.995 |
| 2 weeks | 1(0-15) | 0.422 | 0(-4-2) | 0(0-10) | 0.015 | 0(-3-0) | 0.776 |
| 4 weeks | 0(0-7) | 0.072 | 0(-4-0) | 0(0-5) | 0.054 | 0(-4-0) | 0.564 |
| 6 months | 2(0-12) | 0.774 | 0(-2-2) | 0(0-14) | 0.573 | 0(-2-2) | 0.682 |
| Muscle/joint pain | | | | | | | |
| Baseline | 25(5-56) | - | - | 30(4-72) | - | - | 0.506 |
| 2 weeks | 11(0-46) | 0.003 | -5(-20-1) | 18(0-57) | 0.021 | -1(-20-4) | 0.616 |
| 4 weeks | 13(0-30) | 0.003 | -10(-27-0) | 12(0-39) | 0.003 | -3(-35-1) | 0.699 |
| 6 months | 23(5-53) | 0.032 | -3(-17-4) | 19(4-70) | 0.084 | -2(-18-7) | 0.755 |
| Total extraintestinal IBS-SSS | | | | | | | |

| | | | | | | | |
|----------|--------------|--------|-----------------|--------------|--------|-----------------|-------|
| Baseline | 160(110-208) | - | - | 172(120-242) | - | - | 0.268 |
| 2 weeks | 96(50-154) | <0.001 | -60(-89-(-20)) | 115(55-156) | <0.001 | -54(-82-(-30)) | 0.852 |
| 4 weeks | 91(28-140) | <0.001 | -72(-112-(-41)) | 77(44-136) | <0.001 | -83(-118-(-44)) | 0.408 |
| 6 months | 127(71-191) | <0.001 | -44(-75-2) | 133(78-214) | <0.001 | -36(-59-(-10)) | 0.977 |

SSRD = starch-and sucrose-reduced diet with 72 patients at week 2 and 4 and 53 at month 6. Low FODMAP = low content of fermentable oligo-, di-, and monosaccharides and polyols with 77 patients at baseline, 71 patients at week 2 and 4 and 49 at month 6. Symptoms estimated by irritable bowel syndrome -severity scoring system (IBS-SSS) [26]. Values are given as median and interquartile. Wilcoxon Signed Ranks for comparisons within the groups and Mann-Whitney U test* for comparison between baseline and the differences of the two groups. P-values adjusted for false discovery rate (FDR) set at 5% according to the Benjamini-Hochberg method [33] were performed for the calculations within the group. $P \leq 0.05$ was considered statistically significant.

Supplementary Table S8. Correlations between improvements of gastrointestinal and extraintestinal symptoms

| | Diff_Total IBS_SSS_2 weeks | Diff_Total IBS_SSS_4 weeks | Diff_Total IBS_SSS_6 months |
|--------------------------------------------|-------------------------------------------|-------------------------------------------|--------------------------------------------|
| Diff_Total Extraintestinal symptoms | r=0.390 p<0.001 FDR<0.001 | r=0.409 p<0.001 FDR<0.001 | r=0.439 p<0.001 FDR<0.001 |
| Diff_vomiting | r=0.151 p=0.073 FDR=0.073 | r=0.275 p<0.001 FDR=0.003 | r=0.262 p=0.008 FDR=0.012 |
| Diff_difficulties to eat a whole meal | r=0.252 p=0.003 FDR=0.009 | r=0.184 p=0.028 FDR=0.028 | r=0.234 p=0.018 FDR=0.027 |
| Diff_headache | r=0.177 p=0.036 FDR=0.054 | r=0.224 p=0.011 FDR=0.033 | r=0.164 p=0.100 FDR=1.00 |
| Diff_back pain | r=0.094 p=0.268 | r=0.094 p=0.266 | r=0.043 p=0.669 |
| Diff_fatigue | r=0.363 p<0.001 FDR=0.0015 | r=0.431 p<0.001 FDR=0.0015 | r=0.204 p=0.040 FDR=0.040 |
| Diff_belching/excess wind | r=0.239 p=0.004 FDR=0.004 | r=0.419 p<0.001 FDR=0.0015 | r=0.324 p<0.001 FDR=0.0015 |
| Diff_reflux | r=0.225 p=0.007 FDR=0.021 | r=0.137 p=0.102 FDR=0.102 | r=0.234 p=0.018 FDR=0.027 |
| Diff_urinary urgency | r=0.108 p=0.204 FDR=0.204 | r=0.198 p=0.018 FDR=0.054 | r=0.184 p=0.064 FDR=0.096 |
| Diff_leg pain | r=0.025 p=0.765 | r=0.091 p=0.279 | r=0.023 p=0.817 |
| Diff_muscle/joint pain | r=-0.012 p=0.890 FDR=0.890 | r=0.175 p=0.037 FDR=0.111 | r=0.168 p=0.091 FDR=0.1365 |
| Diff_psychological well-being | r=0.272 p=0.001 FDR=0.001 | r=0.309 p<0.001 FDR<0.001 | r=0.366 p<0.001 FDR<0.001 |
| Diff_weight | - | r=0.041 p=0.625 FDR=0.625 | r=0.257 p=0.010 FDR=0.020 |
| Diff_BMI | - | r=0.022 p=0.792 FDR=0.792 | r=0.247 p=0.013 FDR=0.026 |
| Diff_waist circumference | - | r=-0.086 p=0.312 | r=0.021 p=0.838 |
| Diff_systolic blood pressure | - | r=0.115 p=0.171 | r=0.172 p=0.086 |
| Diff_diastolic blood pressure | - | r=0.025 p=0.769 | r=0.176 p=0.079 |
| Diff_sugar cravings | - | r=-0.070 p=0.408 | r=0.119 p=0.237 |

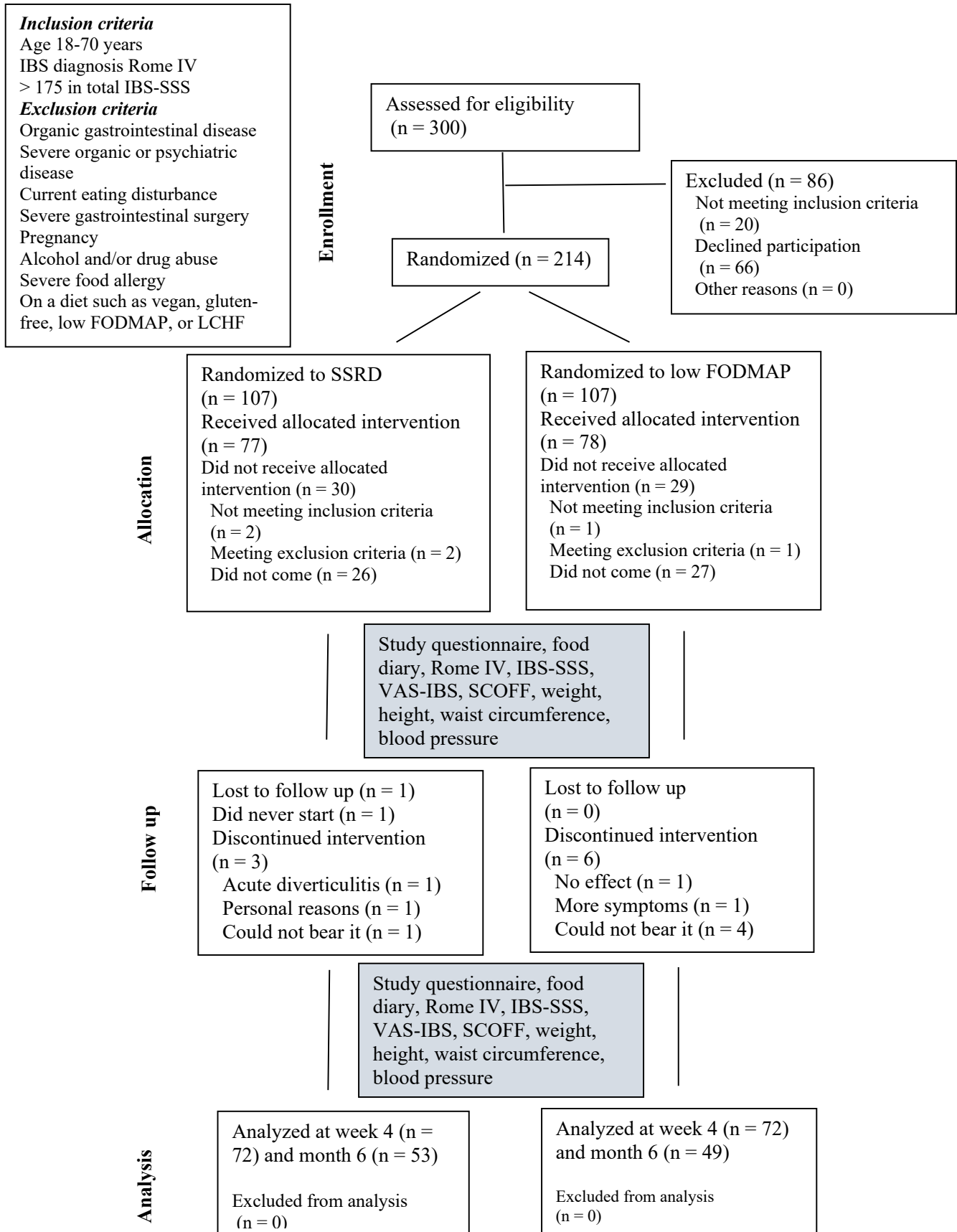
Correlations between decreases in specific and total extraintestinal symptoms and decreases of total gastrointestinal symptoms (total IBS-SSS) at week 2, week 4, and month 6 [26]. 155 patients at baseline (154 for symptoms), 144 patients at week 4 for BMI, waist circumference, and blood pressure and 143 for symptoms, and 102 patients at month 6. Spearman's correlation test performed in the whole cohort. Variables with significant p-values were adjusted for false discovery rate (FDR) set at 5% according to the Benjamini-Hochberg method [33]. P≤0.05 was considered statistically significant.

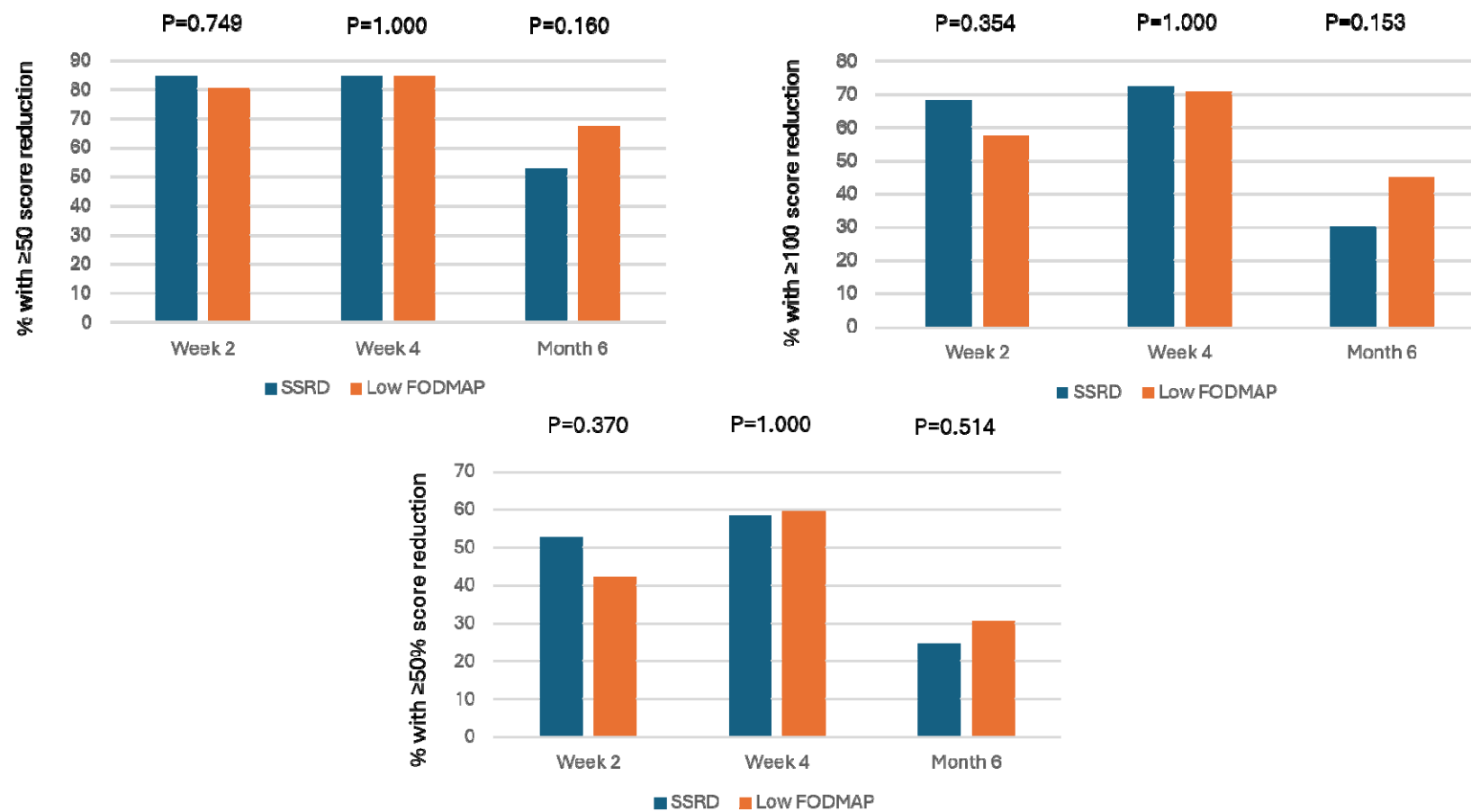
Supplementary Table S9. Anthropometric data

| | SSRD N = 77 | | | Low FODMAP N = 78 | | | P-value* |
|----------------------------------------|-----------------------|------------------|----------------------|-----------------------------|------------------|----------------------|-----------------|
| Variables | Value | FDR-value | Difference | Value | FDR-value | Difference | |
| Weight (kg) | | | | | | | |
| Baseline | 71.5(63.6-82.8) | - | - | 68.6(63-83.4) | - | - | 0.513 |
| 4 weeks | 70(63.2-81) | 0.002 | -1.6(-2.4-(-0.4)) | 67.8(62.5-82.7) | 0.002 | -0.8(-1.6-(-0.1)) | 0.006 |
| 6 months | 74.1(66.6-85.7) | 0.516 | -0.2(-1.4-1.2) | 68.6(62.8-80.8) | 0.079 | -0.3(-1.6-0.6) | 0.438 |
| BMI (kg/m²) | | | | | | | |
| Baseline | 25.14(22.64-28.45) | - | - | 24.68(22.13-27.64) | - | - | 0.538 |
| 4 weeks | 24.8(21.97-27.6) | 0.002 | -0.55(-0.86-(-0.15)) | 24.63(22-27.32) | 0.002 | -0.26(-0.56-(-0.03)) | 0.005 |
| 6 months | 25.95(22.66-28.57) | 0.504 | -0.07(-0.53-0.44) | 25.08(22.05-26.76) | 0.089 | -0.11(-0.54-0.23) | 0.526 |
| Waist circumference (cm) | | | | | | | |
| Baseline | 88(76-97) | - | - | 86(79-94.8) | - | - | 0.831 |
| 4 weeks | 86(75-94) | 0.002 | -2(-4-0) | 85(79-93) | 0.002 | -2(-3-1) | 0.981 |
| 6 months | 89(77.5-97) | 0.022 | -1(-4-1) | 85.5(80-93.5) | 0.038 | -1(-3-1) | 0.758 |
| Systolic Blood Pressure (mmHg) | | | | | | | |
| Baseline | 125(114-139) | - | - | 126(116-139) | - | - | 0.657 |
| 4 weeks | 123(114-135) | 0.194 | -2(-10-6) | 124(113-135) | 0.048 | -3(-8-3) | 0.762 |
| 6 months | 127(116-138) | 0.588 | -1(-7-6) | 126(117-136) | 0.138 | -3(-12-8) | 0.399 |
| Diastolic Blood Pressure (mmHg) | | | | | | | |
| Baseline | 81(72-88) | - | - | 81(74-90) | - | - | 0.403 |
| 4 weeks | 78(70-84) | 0.012 | -3(-6-3) | 80(73-85) | 0.002 | -4(-8-2) | 0.225 |
| 6 months | 80(76-86) | 0.575 | -2(-6-5) | 80(72-86) | 0.044 | -1(-10-3) | 0.190 |
| Sugar craving (mm) | | | | | | | |
| Baseline | 66(40-85) | - | - | 60(29-80) | - | - | 0.384 |
| 4 weeks | 34(17-67) | 0.002 | -15(-41-0) | 41(22-69) | 0.002 | -8(-23-5) | 0.050 |
| 6 months | 53(31-72) | 0.058 | -7(-23-10) | 48(28-72) | 0.246 | -2(-10-8) | 0.448 |
| Saturation (mm) | | | | | | | |
| Baseline | 74(52-93) | - | - | 77(68-86) | - | - | 0.833 |
| 4 weeks | 83(69-93) | 0.214 | 4(-12-24) | 80(62-90) | 0.688 | 1(-10-12) | 0.261 |
| 6 months | 77(69-90) | 0.473 | 0(-12-16) | 72(62-87) | 0.688 | -2(-13-16) | 0.275 |

BMI = body mass index. SSRD = starch-and sucrose-reduced diet with 77 patients at baseline, 72 at week 4, and 53 at month 6. Low FODMAP = low content of fermentable oligo-, di-, and monosaccharides and polyols 72 patients at week 2 and 4 (except sugar craving and saturation with 77 at baseline and 71 at week 2 and 4) and 49 at month 6. Sugar craving and saturation estimated on visual analog scales of 100 mm, with higher scores meaning most craving and saturation. Values are given as median and interquartile. Wilcoxon Signed Ranks for comparisons within the groups and Mann-Whitney U test* for comparison between baseline and the differences of the two groups. P-values adjusted for false discovery rate (FDR) set at 5% according to the Benjamini-Hochberg method [33] were performed for the calculations within the group. $P \leq 0.05$ was considered statistically significant.

Supplementary Figure S1





Supplementary Figure S2