

Supporting Information

Tables:

Table S1. Average values of molecular weights and radius of CP, WRP and DWRP

	Mw (kDa)	Mn (kDa)	Polydispersity(Mw/Mn)	Rz(nm)
CP	496.2 (±0.94%)	35.1(±5.40%)	14.128(±5.407%)	44.6(±1.6%)
WRP	531.5 (±1.31%)	38.1(±7.16%)	13.965(±7.271%)	36.4(±3.4%)
DWRP	12.1 (±1.95%)	3.1(±10.32%)	4.609(±14.441%)	na

Table S2. The compositions and energy densities of the standard chow diets

Compositions	g%	kcal%
Crude fiber	1.80	0.00
Crude protein	19.20	20.60
Crude fat	4.90	12.00
Crude ash	4.80	0.00
Moisture	9.92	0.00
Calcium	1.08	0.00
Total phosphorus	0.71	0.00
Vitamin Mix, V10001	0.01	0.20
Nitrogen free extract	58.00	67.20
Energy(kcal/g diet)	3.62	

Groups	Richness		Diversity		Observed Species	Goods Coverage
	Chao1	Shannon indices	Simpson indices			
CD	1831±245 ^b	7.54±0.22 ^b	0.983±0.002 ^a		1255±149 ^b	0.97099±0.00390 ^a
CD+CP	1856±109 ^b	7.67±0.15 ^b	0.983±0.003 ^a		1332±77 ^b	0.97108±0.00231 ^b
CD+WRP	1795±198 ^b	7.38±0.38 ^b	0.975±0.012 ^a		1258±139 ^b	0.97211±0.00392 ^b
CD+DWRP	1341±409 ^a	6.93±0.41 ^a	0.975±0.005 ^a		918±278 ^a	0.97986±0.00733 ^a

Table S3. CP, WRP and DWRP supplements alter the diversity and richness of cecal microbiota in CD-fed mice

CD: chow diet, CP: commercial pectin, WRP: RG-I enriched recovered from citrus canning water, DWRP: degraded WRP. Data are expressed as the mean ± SD (n=6). The means with different superscript represent statistically significant results ($p < 0.05$) based on one-way analysis of variance (ANOVA) with Duncan's range tests, whereas means labeled with the same superscript correspond to results that show no statistically significant differences.

Table S4. The cecal SCFA content of CD-CP, CD-WRP and CD-DWRP

Cecal SCFA(umol/g)	Total SCFA	Acetate	Propionate	I-Butyrate	Butyrate	I-Valerate	Valerate
CD	26.68±4.52	12.51±2.46	4.94±0.86	1.53±0.87	15.48±8.62	1.00±0.11	1.41±0.62
CD-CP	41.49±12.24	30.32±3.23	3.92±0.07	2.04±1.05	23.73±5.78	5.88±4.68	3.23±1.79
CD-WRP	27.69±2.85	13.98±2.45	3.21±0.12	2.23±0.13	22.28±1.30	1.63±0.19	3.01±0.55

CD-DWRP	31.01±5.59	16.17±5.23	3.35±0.38	1.92±0.39	19.24±3.98	1.38±0.40	3.78±0.45
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Table S4 describes the specific data corresponding to Fig. 7A, the significant difference has been given in the Figure.

Colonic SCFA(umol/g)	Total SCFA	Acetate	Propionate	I-Butyrate	Butyrate	I-Valerate	Valerate
CD	20.43±2.09	13.69±1.58	2.37±0.64	0.33±0.05	3.40±0.77	0.32±0.03	0.32±0.04
CD-CP	18.56±1.57	13.94±3.71	2.75±0.71	0.17±0.03	1.29±0.26	0.18±0.06	0.21±0.05
CD-WRP	28.35±4.65	20.57±2.09	3.35±1.20	0.22±0.04	3.95±0.82	0.24±0.12	0.21±0.05
CD-DWRP	23.27±3.12	16.57±3.37	2.83±1.20	0.17±0.06	3.46±0.56	0.19±0.02	0.18±0.02

Table S5. The colonic SCFA content of CD-CP, CD-WRP and CD-DWRP

Table S5 describes the specific data corresponding to Fig. 7B, the significant difference has been given in the Figure.

Table S6. Effects of CP, WRP and DWRP on the serum biochemical parameters of C57BL/6J mice

Groups	CD	CD-CP	CD-WRP	CD-DWRP
TC (mmol/L)	4.99±0.65 ^a	5.33±1.12 ^a	6.18±1.07 ^a	6.12±0.67 ^a
TG (mmol/L)	1.15±0.27 ^a	1.27±0.21 ^a	1.21±0.06 ^a	1.23±0.25 ^a
HDL-C (mmol/L)	1.52±0.27 ^a	2.59±1.01 ^a	2.71±1.11 ^a	2.34±0.97 ^a
LDL-C (mmol/L)	1.99±0.45 ^b	1.18±0.27 ^a	1.38±0.38 ^a	0.91±0.31 ^a
Insulin (ng/mL)	0.38±0.12 ^a	0.33±0.08 ^a	0.50±0.26 ^a	0.49±0.19 ^a
LPS (EU/mL)	0.44±0.02 ^c	0.37±0.03 ^{bc}	0.27±0.08 ^a	0.33±0.05 ^{ab}
TNF- α (pg/mL)	1567.9±331.6 ^b	969.3±236.8 ^a	793.9±233.8 ^a	874.6±292.7 ^a
HDL-C/LDL-C	0.78±0.11 ^a	2.50±0.25 ^b	2.29±0.28 ^b	2.77±1.54 ^b

The means with different superscript represent statistically significant results ($p < 0.05$) based on one-way analysis of variance (ANOVA) with Duncan's range tests, whereas means labeled with the same superscript correspond to results that show no statistically significant differences.

Figures:

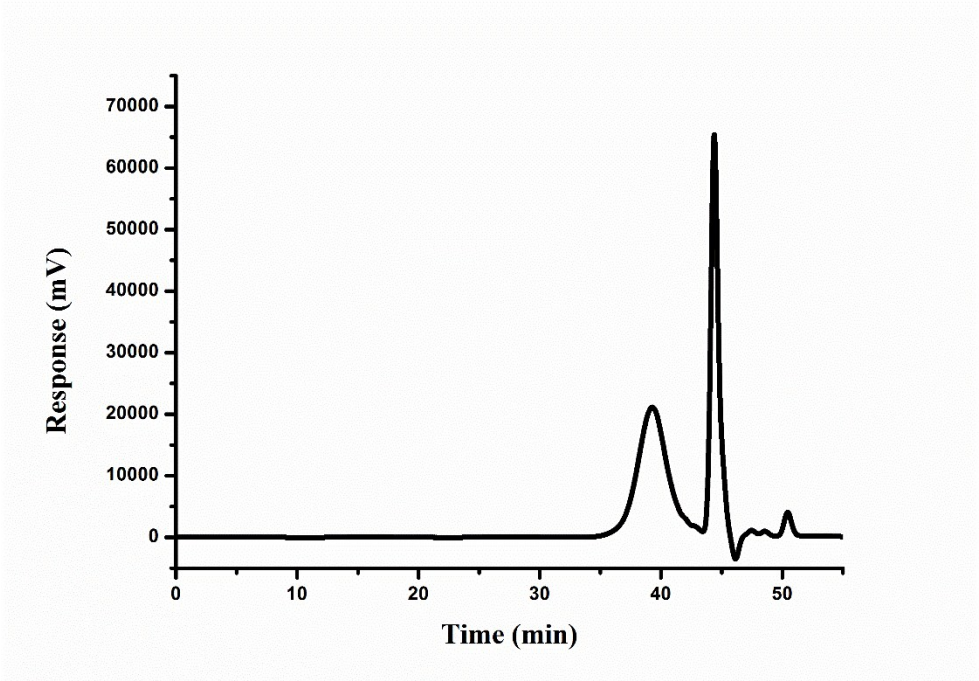


Fig S1. HPSEC profile of DWRP. Molecular weight distribution by HPLC on a Shodex SB-804 HQ column with 0.2 M NaCl at 0.5 mL/min

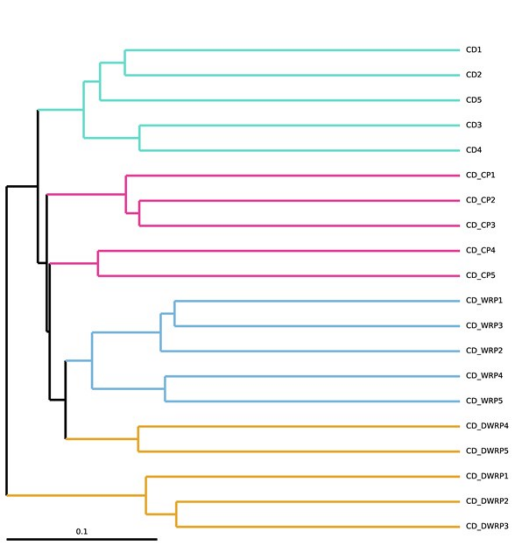


Fig S2. Unweighted Pair Group Method with Arithmetic Mean (UPGMA) cluster of cecal microbiota

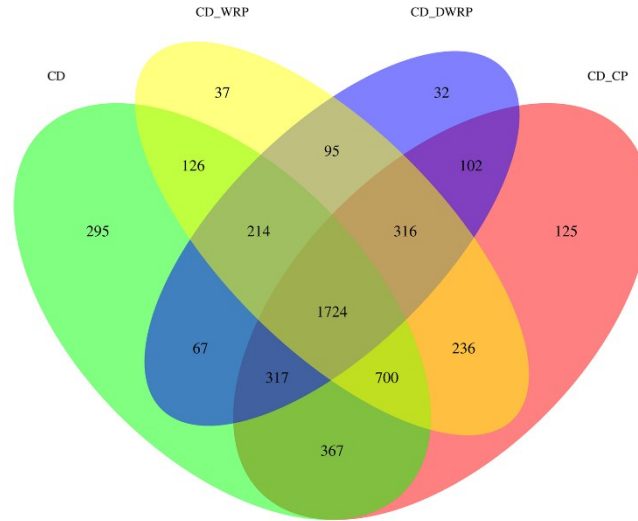
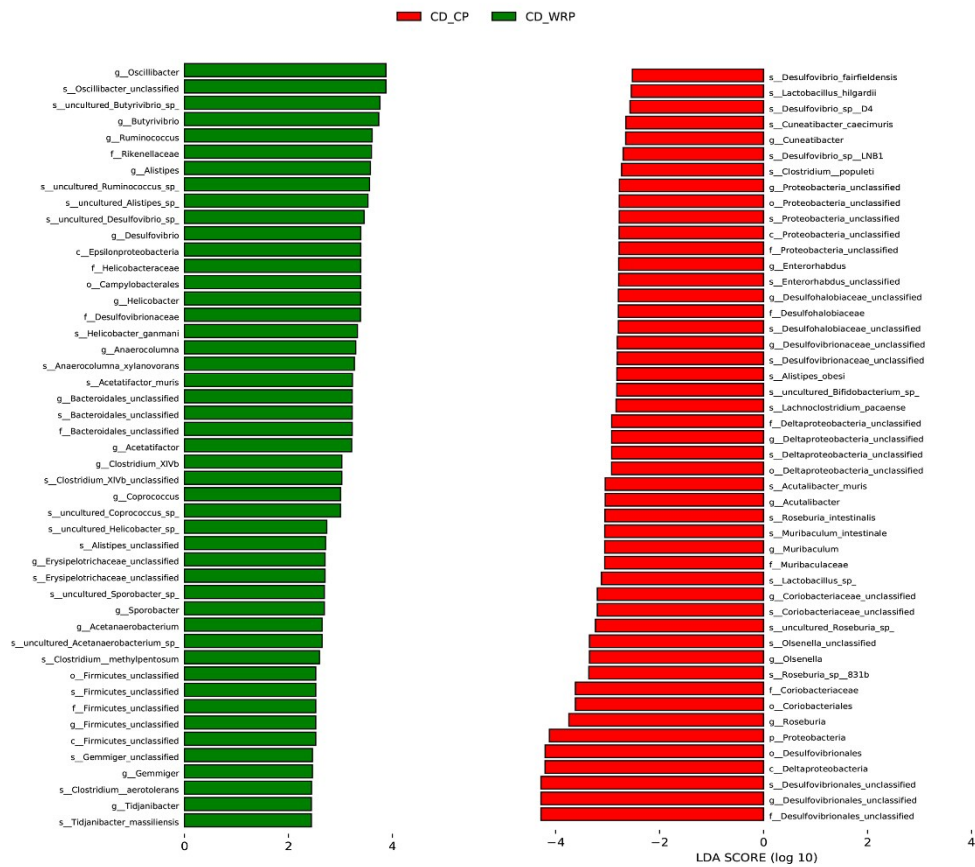


Fig S3. Venn diagram representation of shared/unique OTUs in the cecal microbiota of the CD, CD-CP, CD-WRP and CD-DWRP groups.

A



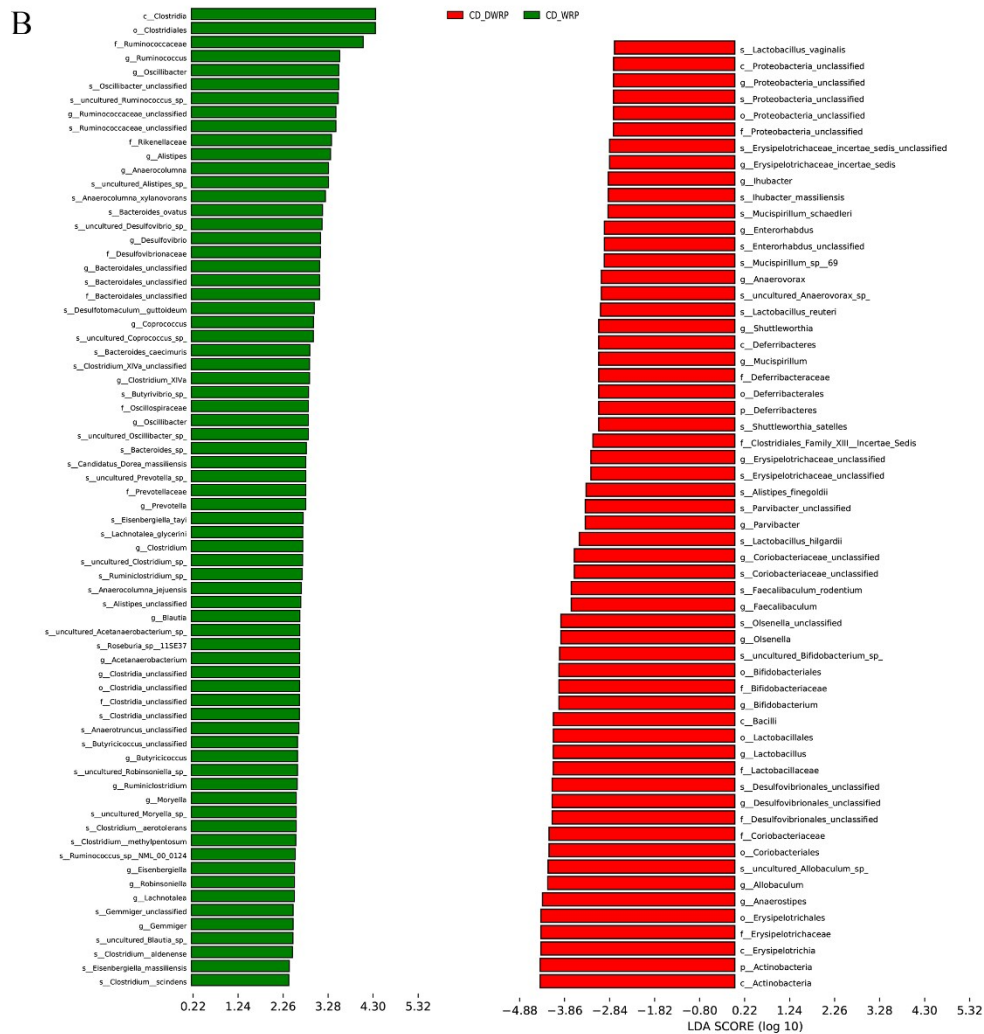


Fig S4 LEfSe comparison of gut microbiota. LDA score of cecal microbiota between the CD-CP and CD-WRP groups (A), the CD-WRP and CD-DWRP groups (B). Only taxa meeting an LDA score threshold > 2.5 are listed

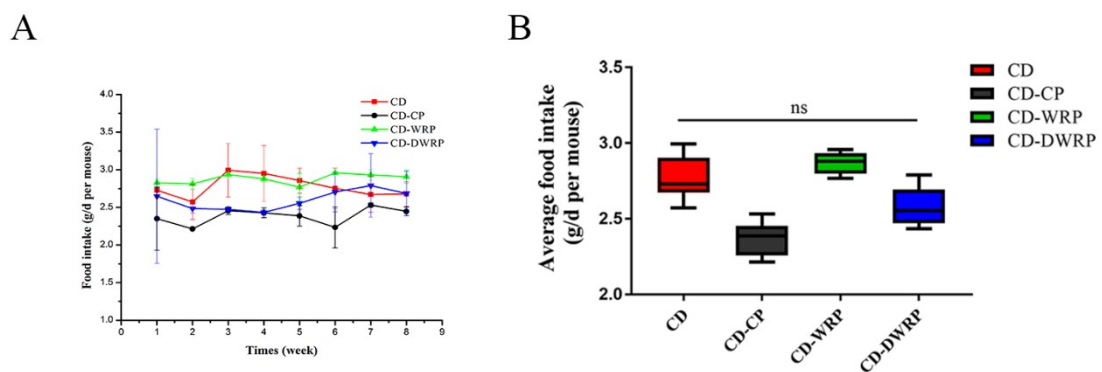


Fig S5 Weekly food intake (A) and average food intake (B) of mice in response to dietary CP, WRP and DWRP.

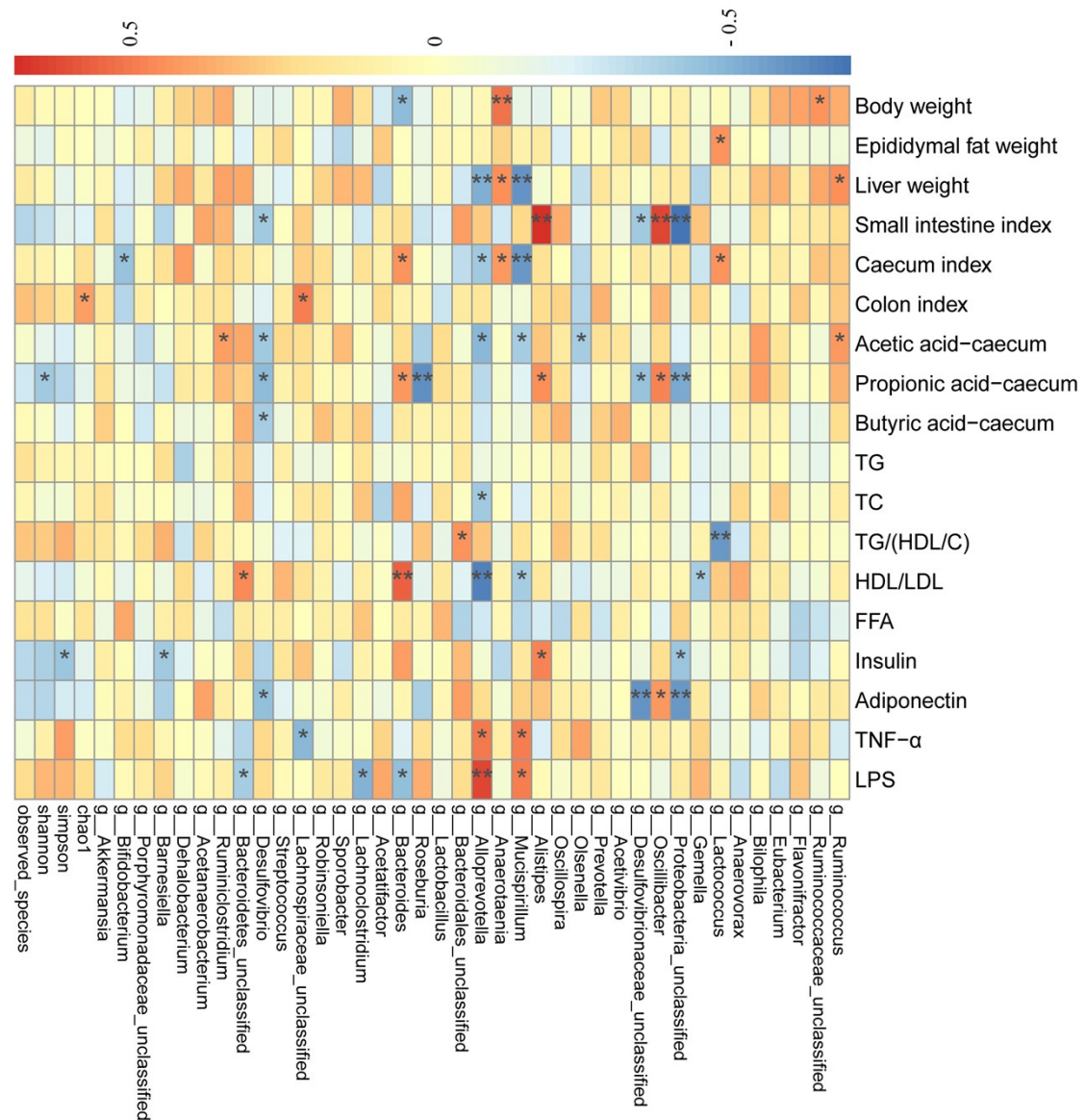


Fig S6 Heatmap of Spearman's correlation between the cecal microbiota and health-related indexes. The indexes of α diversity including observed species; the Shannon, Simpson, and Chao1 indexes; The colors range from blue (negative correlation) to red (positive correlation). Significant correlations are marked by * $p < 0.05$ and ** $p < 0.01$