

Table S1 Formula of feed for each experimental animal group.

Ingredient	Feed ratio (g/kg)				
	NC AIN-93G	MC AIN-93G	L-SWFP	M-SWFP	H-SWFP
Casein	200	200	198.4	196.8	193.2
L-Cystine	3	3	3	3	3
Corn starch	397.5	397.5	393.2	388.7	378.7
Maltodextrin	132	132	132	132	132
Sucrose	100	100	93.8	87.4	73
Cellulose	50	50	24.8	0	0
Soybean	70	70	69.7	69.4	68.8
SWFP	0	0	45.5	92	197.8
Vitamin mix V10037	10	10	10	10	10
Mineral mix S10022G	35	35	35	35	35
Choline bitartrate	2.5	2.5	2.5	2.5	2.5
FD&C red dye #40	0	0	0	0.05	0
FD&C yellow dye #5	0	0	0.05	0	0
FD&C blue dye #1	0	0	0	0	0.05
----- Feed heat ratio (%)					
	NC	MC	L-SWFP	M-SWFP	H-SWFP
Protein (%)	20.3	20.3	20.3	20.3	20.3
Carbohydrate (%)	63.95	63.95	63.95	63.95	63.95
Fat (%)	15.75	15.75	15.75	15.75	15.75
----- Feed heat (Kcal/g)					
	NC	MC	L-SWFP	M-SWFP	H-SWFP
	4	4	3.97	3.93	3.66

Table S2 Primer sequences of genes for qRT-PCR analysis

Gene name	Forward primer	Reverse primer
Tph1	GATCCCAAGATTGCCTGTAAAC	TTCTCCTTTGCATCTTCAAAGC
SLC6A5	TATCCAATGGGTACTCCGCAG	CCGTTCCCCTTGGTGAATCT
5-HT4r	GATGCTAATGTGAGTTCCAACG	AGGCGAGAGACACAATGAAATA
Occludin	CTCCCATCCGAGTTTCAGGT	GCTGTCGCCTAAGGAAAGAG
Claudin-1	GACTGTGGATGTCCTGCGTTTC	CAATTACCATCAAGGCTCGGG
Zo-1	GGGGCCTACACTGATCAAGA	TGGAGATGAGGCTTCTGCTT
TLR-4	5'- ATGGCATGGCTTACACCACC-3'	5'-GAGGCCAATTTTGTCTCCACA-3'
IL-1 β	GCAACTGTTCTGAACTCAACT	ATCTTTTGGGGTCCGTCAACT
TNF α	CCCTCACACTCAGATCATCTTCT	GCTACGACGTGGGCTACAG
FFAR2	CACCCCTGTCCATCTTGGTC	TACTGATCCGCAATCCTGCC
FFAR3	GGCTGGTCTGGTCAGTGTAGTC	CCCCTGGCTGTAGGTTGC

Table S3 Nutritional composition of SWFP.

Nutritional composition	Contents (g/100 g DW)	IDF/SDF
Water	12.5 ± 0.3	-
Protein	3.44 ± 0.07	-
Soluble sugar	13.7 ± 0.3	-
Fat	0.61 ± 0.01	-
Starch	9.52 ± 0.13	-
Ash	3.24 ± 0.02	-
TDF	54.8 ± 0.8	7.4 ± 0.2
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Flavonoid components	Contents (mg/ g DW)	
Naringin	16.9± 0.8	-
Cigranoside B	11.8 ± 1.0	-
Melitidin	7.70 ± 0.44	-
Bergamjuicin	1.83 ± 0.04	-
Cigranoside A	0.44 ± 0.04	-
Cigranoside C	0.47± 0.05	-
Cigranoside F	0.15 ± 0.00	-
Cigranoside D	0.04 ± 0.00	-
Rhoifolin	0.21 ± 0.01	-
Sum	39.6 ± 2.3	-

Figure S1 The correlation among fecal butyric acid contents with constipation related indicators (A, B) and serum biochemical indexes (C-F).

