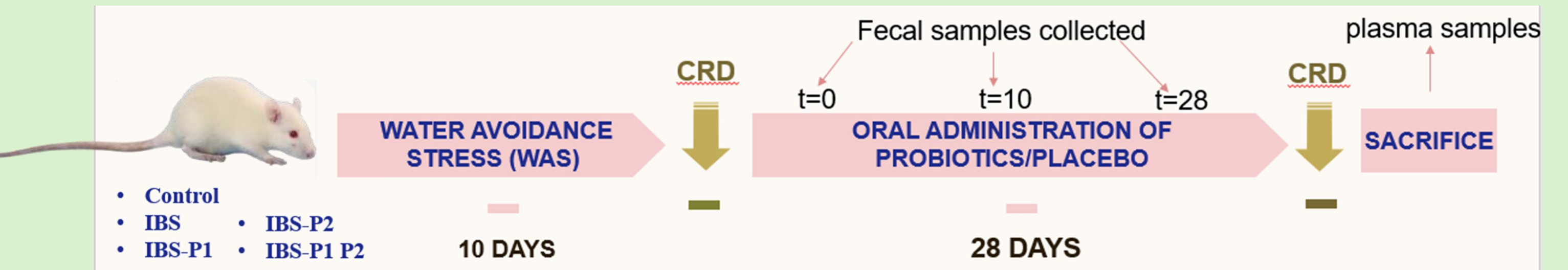


Introduction

Irritable bowel syndrome (IBS) is the most common gastrointestinal disorder associated with chronic abdominal pain and altered bowel habits. Disrupted gastrointestinal motility, altered gut-brain axis, and other factors linked to the gut microbiome may cause IBS. Recent studies have shown that probiotics can effectively alleviate symptoms of IBS and change metabolomic characteristics. Therefore, a proton nuclear magnetic resonance (¹HNMR)-based metabolomics approach was used to discover probiotic-derived metabolites in fecal and plasma samples of a rat IBS model.



Method

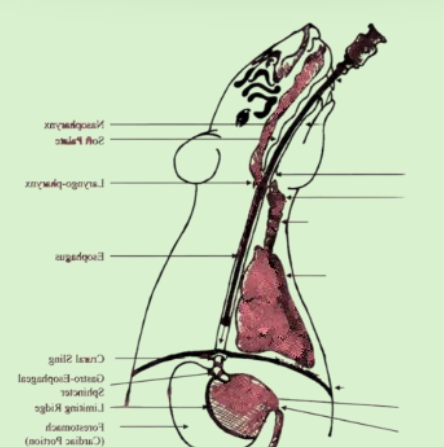
25 female Wistar rats were exposed to repeated Water Avoidance Stress (rWAS), divided into Control, IBS, IBS-P1 (*Bifidobacterium animalis* subsp. *Lactis* BB12), IBS-P2 (*Lactobacillus plantarum* ATCC 14917), and IBS-P1P2 groups (both P1 and P2).

For quantification of metabolites in plasma, a mix containing filtrate (310 μl), sodium phosphate buffer (150 μl, 0.4 M, pH 7), D₂O (45 μl), Millipore water (65 μl), and TSP-d4 (30 μl, 5.8 mmol/L United States) was prepared for each sample, and 560 μL of the final mixture added to a 5-mm NMR tube



WAS

1



2

Colorectal distention (CRD)



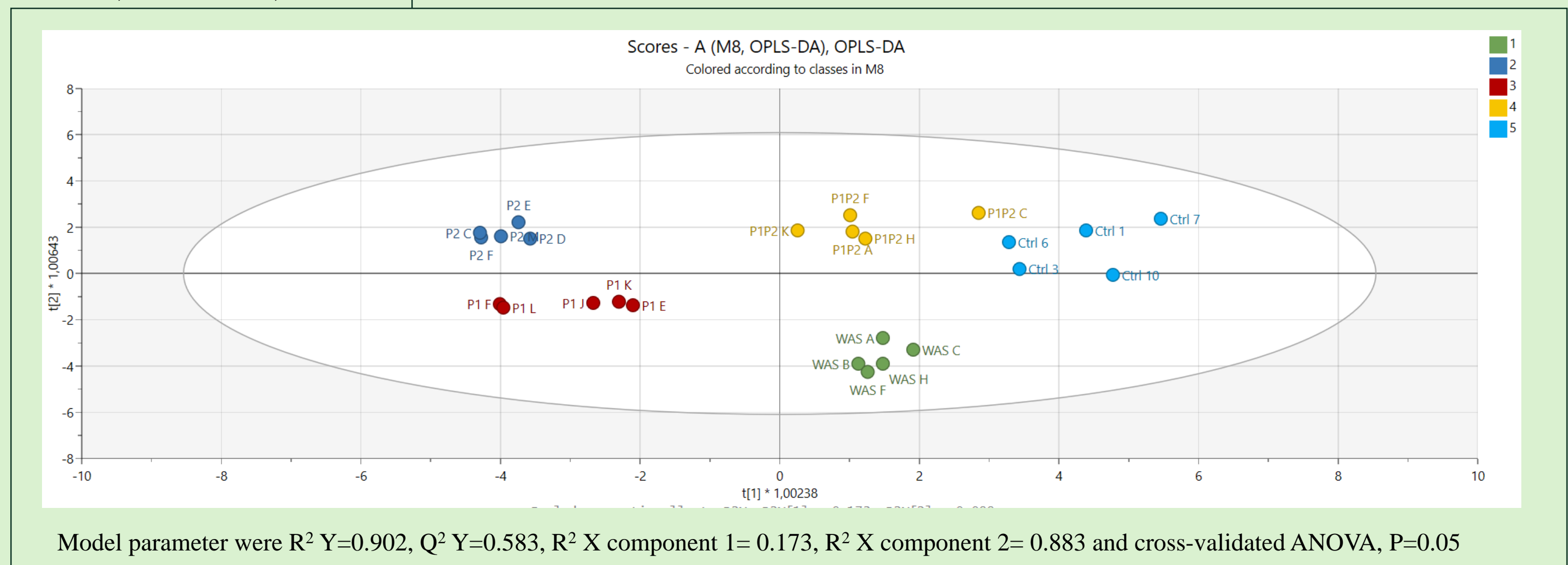
3

Preliminary Results

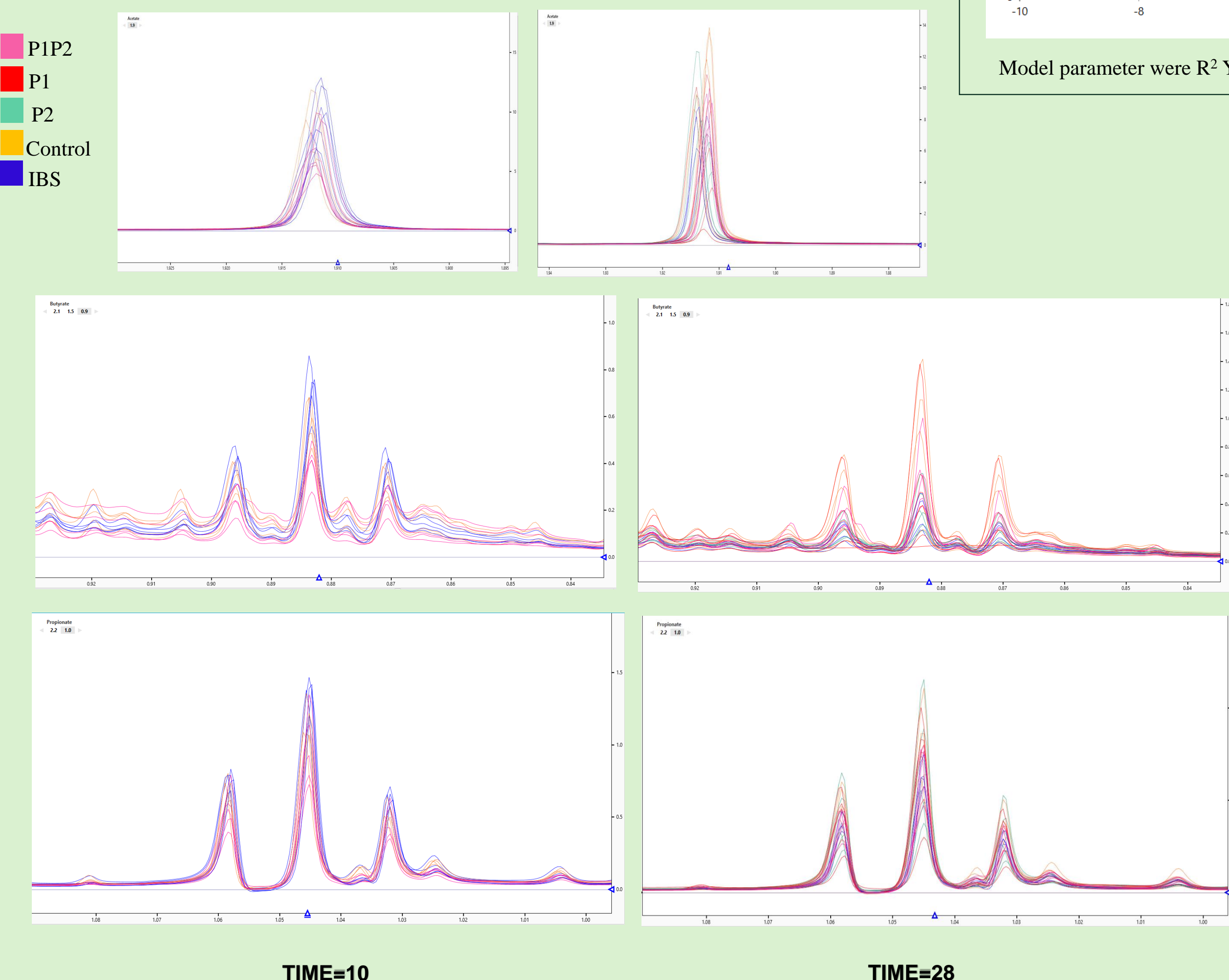
The administration of mixed probiotics significantly reduces CRD pressure threshold values at 60 and 40 mmHg. However, a single probiotic administration is less effective.

OPLS-DA model for plasma metabolites of five groups separated along the first predictive component. 54 plasma metabolites were identified and 15 metabolites were found discriminative.

After intervention in the IBS group received probiotics:
 Acetoacetate, Myoinositol, Sarcosine, Taurine, and Acetate ↓
 Arginine, Methionine, Choline, Phenylalanine, Leucine, Valine, Isoleucine, Threonine, Lactate, and Carnitine ↑



SCFAs changes in rat feces Acetate, Butyrate, and Propionate



Conclusion

Our findings demonstrated that probiotic treatment reversed one-carbon metabolism and altered amino acid metabolism in the plasma and fecal samples of the IBS rat model.