However, the effects and mechanism of LGG on bowel function remains unclear. 5-Hydroxytryptamine4 Receptor is a critical receptor relating to the intestine motility and secretion function. In this study, we aimed to investigate whether LGG could improve the defeaction function via upregulating 5-HT4R and modulating gut microbiota in mice.

Methods Male C57BL/6 mice 6–8 weeks in age were randomly divided into 3 groups: MRS group (n=10), Tegaserod group (positive control, n=15) and LGG group (n=15), and MRS broth, tegaserod maleate and LGG supernatant were gavaged respectively for 7 days. YAMC cells and Caco2 cells were used for experiment in vitro. Defecation parameter including the number of pellets in 2 hours, fecal weight, fecal dry weight, fecal water content, and the gastrointestinal transit time (GITT) were detected. PAS and AB-PAS staining were used to evaluate goblet cell numbers in mice colon, and 5-HT4R and MUC2 expression were determined Real-time PCR and Western blotting in vitro and in vitro. Gut microbiota and short-chain fatty acid were analyzed by 16 sRNA pyrosequencing analysis and gas chromatography method.

Results The number of defeaction pellets in 2 h, fecal weight, fecal dry weight and fecal water content in the Tegasromide group and LGG group were significantly increased compared with those in the MRS group. PAS staining showed that the average number of goblet cells in Tegasromide group and LGG group were significantly increased in mice colon sections compared with MRS group. AB-PAS showed increased ciliated goblet cells in the LGG group, and the mRNA and protein levels of 5-HT4R and MUC2 were upregulated both in vitro and in vivo. In this study, increased levels of Alstistes, Allobaculum, and Desulfovibrio were found in the LGG group which have been reported to be involved in intestine motility, intestinal barrier.

Conclusions LGG supernatant could improve defeaction function in mice accompanied by upregulating 5-HT4R and MUC2 production, and modulating gut microbiota. Thus, this study will provide a better understanding of probiotics for the prevention and treatment of constipation.