FODZYME®

In Vitro Efficacy of Targeted Fermentable Oligosaccharides, Disaccharides, Monosaccharides, and Polyols Enzymatic Digestion in a High-Fidelity Simulated Gastrointestinal Environment

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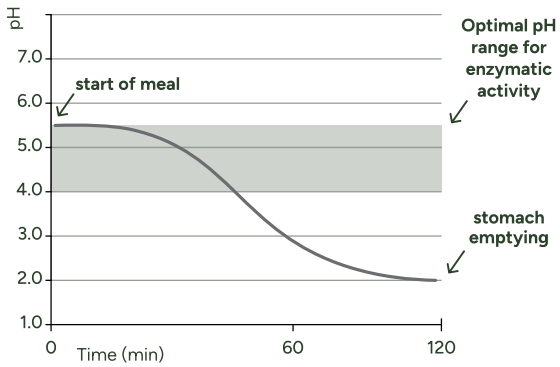
Background and aims

Irritable bowel syndrome (IBS) is characterized by abdominal pain and changes in bowel habits. Fermentable oligosaccharides, disaccharides, monosaccharides, and polyols (FODMAPs) are poorly absorbed short-chain carbohydrates that may drive commensal microbial gas production, promoting abdominal pain in IBS. Low-FODMAP diet can result in symptomatic improvement in 50%-80% of IBS patients. However, this diet is not meant to be sustained long term, with concern for downstream nutrition and microbial issues. In this study, we evaluate the function of a targeted FODMAP enzymatic digestion food supplement FODMAP enzymatic digestion (FODZYME) containing a fructan-hydrolase enzyme (with significant inulinase activity) in a simulated gastrointestinal environment.

Methods

Using SHIME (Simulator of the Human Intestinal Microbial Ecosystem), a multi-compartment simulator of the human gut, FODZYME dose finding assay in modeled gastrointestinal conditions assessed enzymatic ability to hydrolyze 3 g of inulin. Full intestinal modeling assessing digestion of inulin, absorption of fructose, gas production, and other measures of commensal microbial behavior was completed using 1.125 g of FODZYME.

POST-PRANDIAL GASTRIC PH

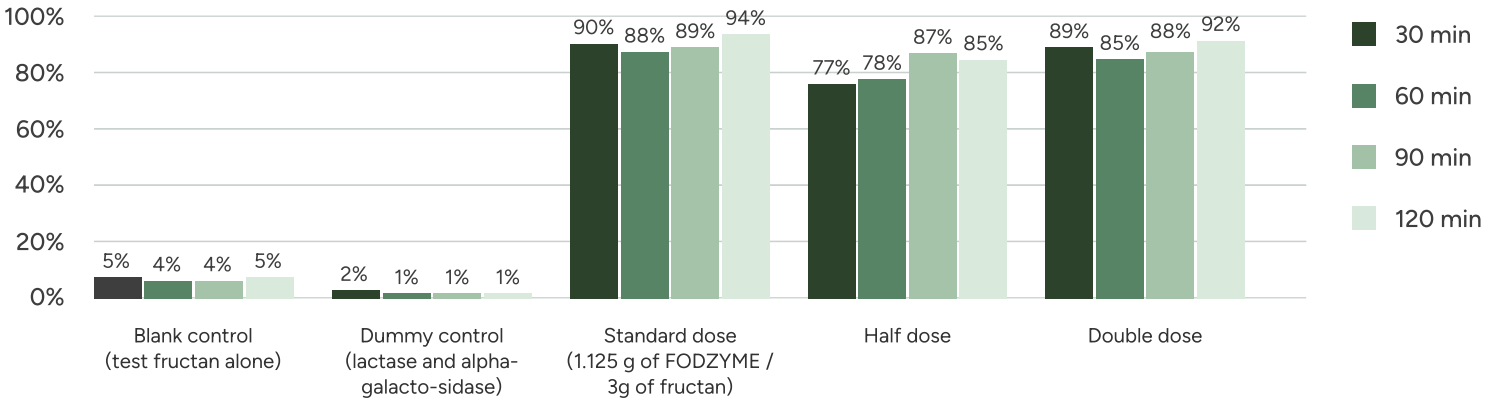


Results

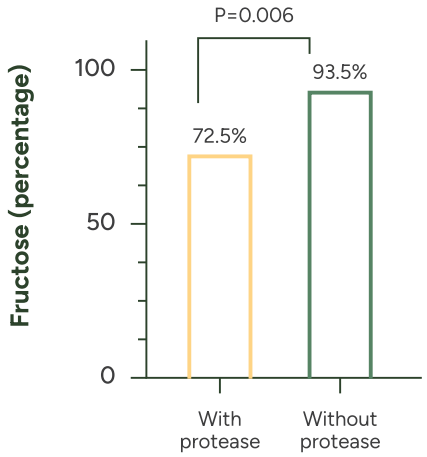
After 30 minutes, 90% of the inulin was converted to fructose by 1.125 g of FODZYME. Doubling dosage showed no significant improvement in conversion, whereas a half dose decreased performance to 77.2%. Seventy percent of released fructose was absorbed during simulated small intestinal transit, with a corresponding decrease in microbial gas production, and a small decrease in butyrate and short-chain fatty acid (SCFA) production.

90% OF A 3G DOSE OF FRUCTAN IS BROKEN DOWN BY FODZYME

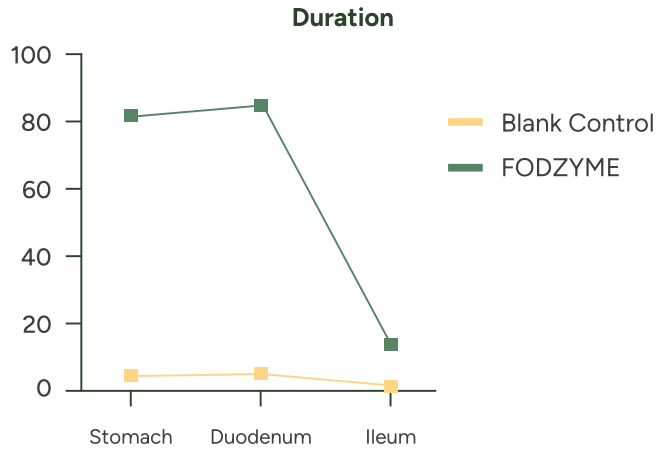
% test fructan (3g of inulin, Jarrow® Inulin FOS) liberated as fructose at different time points



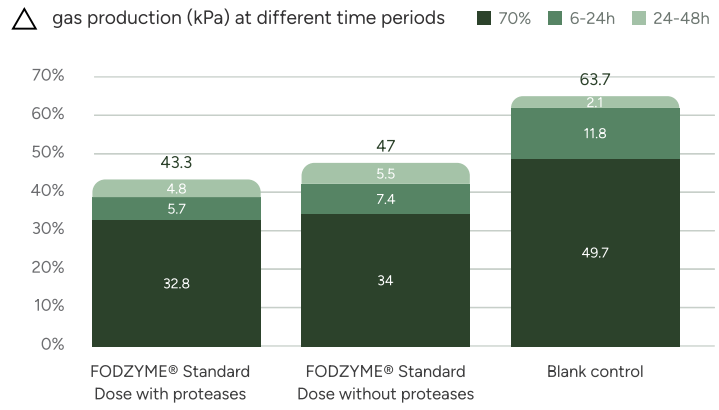
ENZYMATIC ACTIVITY REMAINS DESPITE THE PRESENCE OF PROTEASE



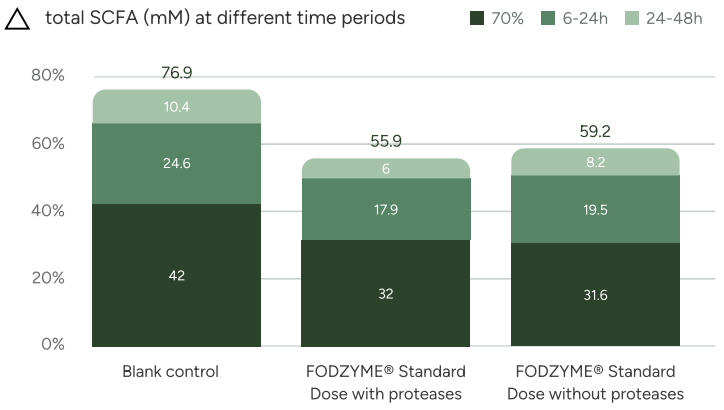
FRUCTOSE RELEASED FROM FRUCTAN BREAKDOWN IS ABSORBED IN THE SMALL INTESTINE



FODZYME DECREASES GAS PRODUCTION



SCFA PRODUCTION IS LOWER BUT PRESERVED



Conclusion:

FODZYME specifically breaks down inulin in representative gastrointestinal conditions, resulting in decreased gas production while substantially preserving short-chain fatty acid and butyrate production in the model colon. Our results suggest dietary supplementation with FODZYME would decrease intestinal FODMAP burden and gas production.