Enhancing Butyrate Production Using a Gut Bacteria–Derived EPS-Blend: Implications for Type 2 Diabetes

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Type 2 diabetes is associated with chronic inflammation and poor blood glucose control. Some gut bacteria produce butyrate, a short-chain fatty acid that may support gut health and metabolism. This project investigated a more stable postbiotic product, EPS-Blend, made from extracellular polysaccharides produced by co-culturing Clostridium butyricum (CB) and Roseburia intestinalis (RI). Different CB:RI ratios were compared to identify the most effective condition. EPS-Blend was then evaluated using a simulated gastrointestinal digestion process. Cell-based experiments examined markers related to butyrate sensing and insulin signaling, including GPR43, p-AKT, and GLUT4. Previously collected animal data were also analyzed to evaluate possible metabolic effects. The CB:RI 2:1 co-culture showed the strongest butyrate-related result and was selected for further analysis. After simulated digestion, EPS-Blend retained strong carbohydrate signals with low protein residue, suggesting good digestion stability. In cell experiments, EPS-Blend increased GPR43 expression and improved insulin-related signaling. Analysis of previously collected animal data showed associations with healthier weight trends, improved insulin tolerance, and higher butyrate levels in gut-related samples. These findings suggest that a 2:1 CB:RI-derived EPS-Blend is digestion-stable and may help support metabolic health.

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