A Gut Feeling About Depression: Examining the Effect of Synbiotic Modification in the Gut-Brain Axis on Major Depressive Disorder Symptoms

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Major Depressive Disorder (MDD) affects over 280 million people worldwide, yet current treatments remain ineffective for nearly one-third of patients. Emerging research suggests that gut microbiota may influence neurochemical pathways linked to depression. This study investigates whether synbiotic supplementation, a combined use of prebiotics and probiotics, can modulate gut microbiome composition and alleviate MDD symptoms. A controlled longitudinal study spanning two weeks was conducted on 97 participants. The Patient Health Questionnaire-9 (PHQ-9) was used to assess depressive symptoms before and after consistently using synbiotics for two weeks, having been taken once before use and once after. Additionally, the Somatic Symptom Scale-8 assessed which specific somatic issues were addressed while synbiotics were used. Results indicated a significant decrease ($p < 0.0001$) in depressive symptoms attributed to the synbiotic intervention, correlating with a 31.14% reduction in depressive-like behaviors as measured by the PHQ-9. These findings support the gut-brain axis as a therapeutic target and suggest that synbiotics could be a novel adjunctive treatment for MDD. Future research will explore applications to varying severities of depressive symptoms and microbiome-specific treatment customization.

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