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## Application of Gut Microbiome Health Index (GMHI) to Measure Prebiotic Indices of Foods

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Measuring prebiotic activities of foods on human microbiome and providing dietary guideline into one's health status are emerging issues in food science research. However, there were difficulties and doubts in directly comparing different foods by using the prebiotic index (PI) proposed in 2003 for determination of their prebiotic activities. This ambiguity can be resolved with the gut microbiome health index (GMHI) newly built by Sung's group in 2020 using a consortium of 50 microbial species associated with human health. As a translational application of this index, we took advantage of this formula for predicting the PI of several prebiotics using *in vitro* human fecal fermentation. For calculation of the GMHI-based PI values, we analyzed the microbial community changes at the species level using shotgun sequencing during fermentation of commercial prebiotics, such as fructooligosaccharides, galactooligosaccharides, xylooligosaccharides, inulin, and 2'-fucosyllactose. Additionally, we analyzed PI values of diets using the human metagenome datasets from published studies to access the prebiotic effects of diets on gut microbiome and health. As results, all commercial prebiotics exhibited positive PI values compared to the control group which has no carbon source. This study demonstrates that GMHI-based PI can be used to measure the prebiotic activities of several bifidogenic oligosaccharides and possibly to predict health-beneficial effects of diets after collection of a substantial amounts of population-scale meta-dataset.