Makgeolli, Korean Rice Beer, is a Probiotics and Prebiotics-Rich Alcoholic Beverage

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Recent research in the area of prebiotics (non-digestible oligosaccharides), probiotics (health benefit microbiota) and their combination, synbiotics, is leading towards a more targeted development of functional food ingredients. Makgeolli is a traditional Korean unrefined rice wine brewed by a complex of microorganisms. Generally, cooked rice and nuruk would be used as a major raw material for making makgeolli. During makgeolli fermentation, nuruk microbiota such as fungi, *Bacillus subtilis*, and lactic acid bacteria (LAB) secrete various amylolytic enzymes for saccharification process converting starch into fermentable sugars (mono- and oligosaccharides). This study was performed to investigate the probiotics and prebiotics of makgeolli by analysis of microbial diversity and chemical compositions. Culture-independent analysis (PCR-DGGE) revealed presence of diverse probiotic LAB in makgeolli and they were mainly *Lactobacillus* spp. (*Lactobacillus plantarum*, *Lb. sakei*, *Lb. brevis*, and *Lb. hilgardii*) and *Leuconostoc* spp. (*Leuconostoc gasicomitatum* and *Leuc. pseudomesenteroides*). Considering the population sizes ($10^{7-10}$ CFU/ml, each) of yeast and LAB, makgeolli is regarded as a probiotic-rich alcoholic beverage. HPLC and HPIC analysis revealed the presence of mono- and oligosaccharides in makgeolli and they were mainly glucose, fructose, lactose, and maltooligosaccharides. This study demonstrates that makgeolli is probiotics and prebiotics-rich alcoholic beverage providing various health benefits.