IN VITRO BIOCONVERSION OF TEA AND WINE POLYPHENOLS IN THE SIMULATOR OF THE HUMAN INTESTINAL MICROBIAL ECOSYSTEM

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Introduction and Aims. Dietary intake of polyphenols has been associated with various health benefits. Upon ingestion, a major fraction of the phenolic compounds passes to the large intestine and is metabolized by the colonic microbiota, followed by possible absorption of bacterial degradation products. Positive effects of polyphenol-rich foods might be dependent on biotransformation by intestinal bacteria and would therefore vary between individuals due to differences in gut microbiota composition. Furthermore, effects of polyphenol administration on intestinal bacteria are not yet fully understood. These complex interactions are addressed in the EU-Transfer of Knowledge project GUTSYSTEM.

Materials and Methods. Intestinal microbial bioconversion of polyphenols from black tea or red wine/grape juice was studied *in vitro* using the Simulator of the Human Intestinal Microbial Ecosystem (TWINSHIME). The influence of the polyphenols on microbial community composition was characterized using various molecular methods (PCR-DGGE, qPCR). Furthermore, bacterial metabolic activity was assessed by metabolite profiling (GC-MS, NMR), including measurements of short chain fatty acids and phenolic metabolites.

Results and Discussion. The bacterial community composition in the SHIME model clearly changed due to polyphenol administration, and strong anti-microbial effects against specific bacterial groups were detected. However, not all bacterial populations were equally affected. Initial results from metabolite profiling showed differences in the conversion of the two polyphenol extracts. This study underlines the important role of the gut microbiota in mediating beneficial health effects of dietary polyphenols.