

## Promising discovery of beneficial *Escherichia coli* in the human gut

### ABSTRACT

Ingested dietary fibres are hydrolysed by colon microbiota to produce energy-providing short-chain fatty acids (SCFA) that stimulate anti-inflammatory effects. SCFA-producing bacteria were screened from bacteria isolated from human faeces using bromothymol blue as an acid indicator and gas chromatography for SCFA profiling. The beneficial functions (antagonistic activity, haemolytic activities, antibiotic susceptibility, mucus adherent percentage and toxin gene detection) were evaluated for the top five SCFA-producing bacteria isolated from three healthy volunteers that identified as *Escherichia coli* strains. They produced acetic, propionic, isobutyric, butyric, isovaleric, valeric and caproic acids at average concentrations of 15.9, 1.8, 1.1, 1.9, 1.8, 2.7 and 3.4 mM, respectively. The SCFA production by *E. coli* strains was rapidly increased during the first 8 h of incubation and gradually decreased after 16 h of incubation. All *E. coli* strains showed acid and bile tolerance, resulting in a survival rate greater than 70% with no haemolytic activity, mucus adherence greater than 40% and susceptibility to conventional antibiotics. Hence, the selected *E. coli* strains exhibited promising probiotic properties with neither enterotoxin nor LPS producibility was detected. The present results confirm the existence of friendly and harmless *E. coli* strains in human microbiota as potential probiotics.

**Keyword:** *Escherichia coli*; Lipopolysaccharide; Probiotic; Short-chain fatty acids