Inhibition of clostridium scindens and clostridium hiranonis growth by bifidobacterium pseudocatenulatum G4 in simulated colonic pH

Abstract

In some patients, increased proportions of deoxycholic acid produced by 7α-dehydroxylating in the bile acid pool in the intestines have been associated with the development of cholesterol gallstones. The levels and activities of bile acid 7α-dehydroxylating bacteria have been reported to be increased in gallstone patients. In the current study, the ability of Bifidobacterium pseudocatenulatum G4 to survive and tolerate the simulated colonic pH and its inhibitory activity against two 7α-dehydroxylating bacteria, Clostridium scindens JCM 10418 and Clostridium hiranonis JCM 10541, was investigated. B. pseudocatenulatum G4 showed antimicrobial activity against the two tested indicator organisms, however, B. pseudocatenulatum G4 showed higher antagonistic activity against C. hiranonis as compared with C. scindens. Also, the effect of three different colonic pH (5.7, 6.2 and 6.8) on Clostridiums and B. pseudocatenulatum G4 growth was studied. Reducing the pH leads to 1-2 log decrease in number of both C. scindens and C. hiranonis. B. pseudocatenulatum G4 showed more inhibitory activity against each one of Clostridiums compared to mix of them and the effect of pH on Clostridium growth was increased by presence of B. pseudocatenulatum G4. The highest reduction in Clostridium growth observed at pH 6.8 followed by pH 6.2 and 5.7. Good tolerance and survival of B. pseudocatenulatum at different levels of pH demonstrating this bacterium as a potential probiotic for human consumption.