IN VITRO SCREENING OF LACTIC ACID BACTERIA ISOLATED FROM KOREAN FERMENTED FOODS TO CONTROL SALMONELLA ENTERITIDIS

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Introduction:
Salmonella has been significant cause of food poisoning in humans and contaminated eggs and chickens have been thought to be an important source of its infection. The use of Lactic acid bacteria (LAB) has been suggested as an effective strategy to reduce salmonella infection in poultry industry. In this study we tested Lactic acid bacteria isolated from Korean fermented foods for their viability in the gastrointestinal tract and their inhibitory capacities against salmonella enteritidis.

Methods:
LAB were isolated from Korean fermented foods (Kimchi and Doenjang). Kimchi and Doenjang samples were homogenized with MRS broth and cultured anaerobically for 48h at 37℃. The colonies that showed LAB morphologies were selected. For gastric juice assay, 4mg/ml pepsin was added into phosphate buffered saline adjusted to pH2.5. to test bile tolerance, 0.3% bile salt was added to the MRS broth. Each isolated lactic acid bacteria was inoculated into the artificial gastric juice and bile solution and incubated at 37℃. Viable bacteria cells were counted at 0 and 3h for the gastric juice tolerance and 0 and 24h for the bile tolerance. Disk diffusion method was followed for susceptibility test. Mueller Hinton agar was swabbed with tryptic soy broth containing Salmonella enteritidis. A paper disc (diameter, 6mm) was soaked with filtered supernatant of lactic acid bacteria and the paper disc were placed on the surface of plate. The plates were incubated at 37℃ for 24h and were examined for clear inhibition zones around discs. The 16S rDNA sequencing was used to identify the genus and species of the LABs, the sequences were analyzed with the BLAST program of the National Center for Biotechnology Information.

Results:
A total 22 of LABs were isolated from Korean fermented foods (11 isolates: Kimchi, 11 isolates: Doenjang). 9 of 11 LABs isolated from Doenjang showed tolerance to both gastric acid and bile salts. Whereas 3 of 11 LABs originated from Kimchi showed tolerance to them. In antimicrobial activity assay, Several LABs showed antimicrobial activity against Salmonella enteritidis. The species of the LABs were distinctively classified depending on the Kimchi and Doenjang origin. Kimchi isolates belonged to genus Lactobacillus and Leuconostoc. Whereas from the Doenjang, genus Bacillus, Enterococcus, Sporolactobacillus, Pediococcus were identified.

Discussion:
In this study, depending on the origin (Kimchi or Doenjang), various LABs were isolated and showed different characteristics. LABs isolated from Doenjang were more resistant to gastric acid and bile salts than those from Kimchi. It is possible that genus of LABs isolated from doenjang may have more resistance to bile and gastric juice than those from kimchi. Further study about relationship between genus of LAB and viability in the gastrointestinal tract is needed.
This study also showed that Lactic acid bacteria isolated from Korean fermented foods (Kimchi and Doenjang) have antimicrobial activity inhibiting salmonella spp. We think that it can be used as supplementation to reduce salmonella infection in poultry industry.

Keywords: Antimicrobial activity, Korean fermented foods, Salmonella enteritidis, Lactic acid bacteria, Poultry, Probiotics
Citation: