

Antimicrobial Activities of Lactic Acid Bacteria from Fermented Foods and Probiotic Products

Authors : Alec Chabwinja, Cannan Tawonezvi, Jerneja Vidmar, Constance Chingwaru, Walter Chingwaru

Abstract : Objective: To evaluate the potential of commercial fermented / probiotic products available in Zimbabwe or internationally, and strains of *Lactobacillus plantarum* (L. plantarum) as prophylaxis and therapy against diarrhoeal and sexually transmitted infections. Methods: The antimicrobial potential of cultures of lactobacilli enriched from 4 Zimbabwean commercial food/beverage products, namely Dairibord Lacto sour milk (DLSM), Probrand sour milk (PSM), Kefalos Vuka cheese (KVC) and Chibuku opaque beer (COB); three probiotic products obtainable in Europe and internationally; and four strains of *L. plantarum* obtained from Balkan traditional cheeses and Zimbabwean foods against clinical strains of *Escherichia coli* (*E. coli*) and non-clinical strains of *Candida albicans* and *Rhodotorula* spp. was assayed using the well diffusion method. Three commercial Agar diffusion assay and a competitive exclusion assay were carried out on Mueller-Hinton agar. Results: Crude cultures of putative lactobacillus strains obtained from Zimbabwean dairy products (Probrand sour milk, Kefalos Vuka vuka cheese and Chibuku opaque beer) exhibited significantly greater antimicrobial activities against clinical strains of *E. coli* than strains of *L. plantarum* isolated from Balkan cheeses (CLP1, CLP2 or CLP3) or crude microbial cultures from commercial paediatric probiotic products (BG, PJ and PL) of a culture of *Lactobacillus rhamnosus* LGG ($p < 0.05$). Furthermore, the following has high antifungal activities against the two yeasts: supernatant-free microbial pellet (SFMP) from an extract of *M. azedarach* leaves ($27\text{mm} \pm 2.5$) > cell-free culture supernatants (CFCS) from Maaz Dairy sour milk and Mnandi sour milk (approximately $26\text{mm} \pm 1.8$) > CFCS and SFMP from Amansi hodzeko ($25\text{mm} \pm 1.5$) > CFCS from Parinari curatellifolia fruit ($24\text{mm} \pm 1.5$), SFMP from *P. curatellifolia* fruit ($24\text{mm} \pm 1.4$) and SFMP from mahewu ($20\text{mm} \pm 1.5$). These cultures also showed high tolerance to acidic conditions ($\sim\text{pH}4$). Conclusions: The putative lactobacilli from four commercial Zimbabwean dairy products (Probrand sour milk, Kefalos Vuka vuka cheese and Chibuku opaque beer), and three strains of *L. plantarum* from Balkan cheeses (CLP1, CLP2 or CLP3) exhibited high antibacterial activities, while Maaz Dairy sour-, Mnandi sour- and Amansi hodzeko milk products had high antifungal activities. Our selection of Zimbabwean probiotic products has potential for further development into probiotic products for use in the control diarrhea caused by pathogenic strains of *E. coli* or yeast infections. Studies to characterise the probiotic potential of the live cultures in the products are underway.

Keywords : lactic acid bacteria, *Staphylococcus aureus*, *Streptococcus* spp, yeast, inhibition, acid tolerance

Conference Title : ICPFF 2017 : International Conference on Probiotics and Functional Foods

Conference Location : Miami, United States

Conference Dates : March 09-10, 2017