

## FACTORS AFFECTING THE ANTIBACTERIAL ACTIVITY OF PROBIOTIC BACTERIA AGAINST CERTAIN PATHOGENS

Abou Ayana, I. A. A.; A. A. Gamal El Deen and S.F. Mahmoud  
Dairy Research Department, Food Technology Research Institute,  
Agric. Res. Center, Giza, Egypt.

### ABSTRACT

This study was carried out to determine the effect of various factors influencing the antibacterial activity of fermented milk with *Bifidobacterium* spp. 420 (bifidus) and with *L. acidophilus* 145 (acidophilus) against eight test bacteria, viz *Staphylococcus aureus*, *Escherichia coli* 0157:H7, *Pseudomonas fluorescens*, *Klebsiella pneumoniae*, *Enterobacter cloacae*, *Listeria monocytogenes*, *Serratia marcescens* and *Salmonella infantis* were determined. The agar diffusion technique was used to determine the antibacterial activity. There was a significant variation ( $P \leq 0.05$ ) in the antibacterial activity of bifidus and acidophilus made of various types of milk (buffaloes, cows, goats, ewes and camels' milk). Goats and camels fermented milk had a greater antibacterial activity than control (MRS medium) and other types of milk. The Gram-positive bacteria (*L. monocytogenes* and *Staphylococcus aureus*) took an opposite trend compared with tested Gram-negative pathogens. Antibacterial activity against Gram-positive were higher at pH 5 and pH 4.8 than pH 4.6, while antibacterial activity increased against tested Gram-negative pathogens at lower pH values. Statistically, no significant differences were observed between control and 15% sucrose concentration against all tested pathogens, except *Escherichia coli* 0157:H7 and *Serratia marcescens*, which were significant inhibition at 15% sucrose. Generally, there were not statistically significant differences between antibacterial activity in control and 0.3 % sodium chloride (NaCl) or between 0.6 and 0.9 % NaCl, however, 0.6 and 0.9% resulted in significant inhibition against the tested pathogens than 0.3 % NaCl.

**Keywords:** probiotic, pathogenic bacteria, the antibacterial activity

### INTRODUCTION

The possible prophylactic and/or therapeutic properties of yoghurt and related products have been the subject of much speculation. As a result of that, there has been a contemporary trend to enhance such properties of fermented milk by inclusion of therapeutic bacteria in the composition of starter. These bacteria involve *Lactobacillus casei* subsp *casei* biovar shirota, *L. acidophilus* and *Bifidobacterium* spp. (Dong et al. 1987). A lot of research has referred to the health benefits of those bacteria, which could be summarized by Mercenier (1999).

The need for better control of food borne pathogens has been paramount in recent years. Within the last contract, considerable interest has been developed in the world with respect to use of Bifidobacteria and lactobacilli as a biopreservatives in food. Probiotic have the ability to suppress the growth of pathogenic bacteria by producing organic acids such as lactic and acetic acids, other antimicrobial compounds such as hydrogen peroxide and bacteriocins. Lactic and acetic acids account for more than 90% of the acids produced in small quantities which include citric, hippuric, orotic and uric acids (Shah, 2001).