
Abstract
Meticillin-resistant Staphylococcus aureus (MRSA) is a multidrug-resistant micro-organism and is the principal nosocomial pathogen worldwide. Following initial in vitro experiments demonstrating that Lactobacillus acidophilus CL1285® and Lactobacillus casei LBC80R® commercial strains exhibit antibacterial activity against clinical MRSA isolates, we conducted a literature search to find any evidence of probiotic efficacy in decolonisation or treatment of S. aureus infection. As summarised below, many strains of lactobacilli and bifidobacteria isolated from a variety of sources inhibited the growth of S. aureus and clinical isolates of MRSA in vitro. The most active strains were Lactobacillus reuteri, Lactobacillus rhamnosus GG, Propionibacterium freudenreichii, Propionibacterium acnes, Lactobacillus paracasei, L. acidophilus, L. casei, Lactobacillus plantarum, Lactobacillus bulgaricus, Lactobacillus fermentum and Lactococcus lactis. Their effects were mediated both by direct cell competitive exclusion as well as production of acids or bacteriocin-like inhibitors. L. acidophilus also inhibited S. aureus biofilm formation and lipase production. In vitro antimicrobial activity did not necessarily assure efficacy in vivo in animal infectious models, e.g. S. aureus 8325-4 was most sensitive in vitro to L. acidophilus, whilst in vivo Bifidobacterium bifidum best inhibited experimental intravaginal staphylococcosis in mice. On the other hand, L. plantarum, which showed the highest inhibition activity against S. aureus in vitro, was also very effective topically in preventing skin wound infection with S. aureus in mice. Very few clinical data were found on the interactions between probiotics and MRSA, but the few identified clinical cases pointed to the feasibility of elimination or reduction of MRSA colonisation with probiotic use.