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Review Article

Antibiotic Susceptibility of Potentially Probiotic Vaginal Lactobacilli

Virginia Ocaña,[1] Clara Silva,[2] and María Elena Nader-Macías[3]

[1] *Nuevo Hospital El Milagro, Salta 4400, Argentina*
[2] *Facultad de Bioquímica, Química y Farmacia, Universidad Nacional de Tucumán, Tucumán 4000, Argentina*
[3] *Centro de Referencia para Lactobacilos (CERELA-CONICET), Chacabuco 145, Tucumán 4000, Argentina*

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Objective. To study the antimicrobial susceptibility of six vaginal probiotic lactobacilli. *Methods*. The disc diffusion method in Müeller Hinton, LAPTg and MRS agars by the NCCLS (National Committee for Clinical Laboratory Standards) procedure was performed. Due to the absence of a *Lactobacillus* reference strains, the results were compared to those of *Staphylococcus aureus* ATCC29213. Minimal Inhibitory Concentration (MIC) with 21 different antibiotics in LAPTg agar and broth was also determined. *Results*. LAPTg and MRS agars are suitable media to study antimicrobial susceptibility of lactobacilli. However, the NCCLS procedure needs to be standardized for this genus. The MICs have shown that all *Lactobacillus* strains grew at concentrations above 10 μg/mL of chloramphenicol, aztreonam, norfloxacin, ciprofloxacin, ceftazidime, ceftriaxone, streptomycin and kanamycin. Four lactobacilli were sensitive to 1 μg/mL vancomycin and all of them were resistant to 1000 μg/mL of metronidazole. Sensitivity to other antibiotics depended on each particular strain. *Conclusions*. The NCCLS method needs to be standardized in an appropriate medium to determine the antimicrobial susceptibility of *Lactobacillus*. Vaginal probiotic lactobacilli do not display uniform susceptibility to antibiotics. Resistance to high concentrations of metronidazole suggests that lactobacilli could be simultaneously used with a bacterial vaginosis treatment to restore the vaginal normal flora.

INTRODUCTION

Bacteria of the genus *Lactobacillus* have been proposed as probiotic microorganisms to restore the ecological equilibrium of the intestinal, respiratory, and urogenital tracts [1]. This type of bacterial replacement therapy has been widely used as fermented milks to prevent diarrhea in humans and animals [2, 3]. They have also been increasingly considered for their use in women to prevent genital and urinary tract infections [4–8].

It has been found that administration of antimicrobial substances alters the microbial balance of the vagina and suppresses certain bacterial groups [4]. The effect of these substances on autochthonous *Lactobacillus* is of interest in understanding the development of genital and urinary tract infections related with the lack of these bacteria [9].

The present study was conducted to determine the antimicrobial susceptibility of six candidate probiotic *Lactobacillus* strains. These lactobacilli have been previously selected for probiotic properties as surface hydrophobicity [10], self-and coaggregation [11], adhesion to vaginal epithelial cells [12], and production of antimicrobial substances [13–15]. The main aims of knowing the behavior of exogenously applied *Lactobacillus* under the effect of antimicrobial substances are to have an approach of the response of lactobacilli administered to patients subjected to some kind of antibiotic therapy and to consider the concomitant use of lactobacilli and an antibiotic to restore the disrupted ecological environment.

Having in mind that a method to study antimicrobial susceptibility of genus *Lactobacillus* has not been standardized yet, different techniques were assayed. The results obtained by using the disc diffusion method with culture media different from Müller Hinton agar proposed by the NCCLS (National Committee for Clinical Laboratory Standards) and the determination of the minimal inhibitory concentrations in an enriched medium are described in this paper.

MATERIALS AND METHODS

Microorganisms and growth conditions

The microorganisms used in this study were *Lactobacillus acidophilus* CRL1251 (Centro de Referencia para Lactobacilos Culture Collection), *Lactobacillus paracasei ssp paracasei*