Lactobacilli are predominant vaginal microorganisms in healthy women offering protection against urogenital tract infections and microbiota imbalance. Since these properties may be species- and strain-specific, numerous strains must be screened during probiotic development. A lot of probiotics for gastrointestinal tract but only a few probiotics for urogenital tract are currently on the market.

**Aim**

The aim was to screen vaginal lactobacilli for their probiotic potential assessing some functional properties – hydrogen peroxide and lactic acid production as well as antagonistic activity against *Escherichia coli*, *Candida albicans* and *Gardnerella vaginalis*.

**Material and Methods**

135 lactobacilli strains were investigated: 70 originated from women of infertile couples (48 partners of healthy men, 22 partners of men with inflammatory prostatitis) and 65 from healthy women.

**Hydrogen peroxide detection**: assessment of change in color on tetramethylbenzidine (TMB, Sigma) agar.

**Lactic acid detection**: estimated by using HP model 6890 gas chromatography (Hewlett Packard, USA).

**Antagonistic activity against**:  
- *E. coli* strains (ATCC 700414, 700336 and 3 strains from women with bacterial vaginosis) was tested using agar spot method (mm).
- *C. albicans* and one *C. glabrata* strains (ATCC 32032 and two strains from women with vaginal candidiasis) was tested using agar streak method (mm).
- *G. vaginalis* strains (DSM 4944 and a strain from woman with bacterial vaginosis) was tested using optical density assessment in liquid medium (OD).

**Results**

The strains were identified by sequencing of the 16S rDNA fragment as *L. crispatus* (53%), *L. jensenii* (28%), and *L. gasseri* (19%). Most of *L. crispatus* (89%) and *L. jensenii* (86%) strains while only 42% of *L. gasseri* strains produced hydrogen peroxide (p<0.0001; p=0.0003, respectively). Lactobacilli strains of healthy women expressed higher production hydrogen peroxide compared to strains from infertile couples (p=0.025).

The best lactic acid producers were *L. gasseri* compared to *L. crispatus* and *L. jensenii* (18.2±2.2 mg/ml; 15.6±2.8 mg/ml vs. 11.6±2.6 mg/ml, p<0.0001; p<0.0001, respectively).

The strongest antagonist against *E. coli* was *L. crispatus* (p=0.001 in comparison with *L. jensenii*; Figure 1). *L. gasseri* displayed the best activity against *G. vaginalis* (Figure 2). The strongest antagonist against *C. albicans* (p<0.001, p=0.01) and *C. glabrata* (p<0.001, p=0.001) was also *L. crispatus* (Figure 3, 4).

**Conclusions**

Our study revealed *L. crispatus* as the most frequent species in vaginal samples. Moreover, *L. crispatus* strains produced H₂O₂ and had antagonistic activity against *E. coli* and *Candida* spp. Therefore a potential probiotic candidate could be found among *L. crispatus*.

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