

ABSTRACT

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THE ROLE OF METAL IONS ON THE ANTIMICROBIAL RESISTANCE OF *Bifidobacterium animalis* subsp. *lactis* BR2-5

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Antimicrobial resistance (AMR) has become a global issue as improper usage of antibiotics continues to grow. This selective pressure can result in an increased frequency in the transfer of resistant genes through horizontal gene transfer. This particularly becomes an issue in the case of probiotics such as *Bifidobacterium* spp. as these seemingly harmless bacteria may act as intermediaries in the transfer of antibiotic resistance to potentially pathogenic bacteria within the gastrointestinal tract. The purpose of this study was to determine the antimicrobial resistance of *Bifidobacterium animalis* subsp. *lactis* BR2-5. Phenotype analysis was performed using the disk diffusion method while genotypic approaches involved WGS and bioinformatic analysis using the Comprehensive Antibiotic Resistance Database (CARD). This study also looked at the potential usage of ethylenediaminetetraacetic acid (EDTA) as a new strategy in increasing the inhibition effect of some antibiotics based on previous studies which have reported its effect on the function and expression of antibiotic resistance genes in gram-negative bacteria. This was done by measuring the effect of a sub-inhibitory concentration of EDTA (125 mg/L) on the inhibition zones of antibiotic discs as well as performing SDS-PAGE to identify changes in the expression of specific antibiotic resistance genes. Results from this study show that *Bifidobacterium animalis* subsp. *lactis* BR2-5 was resistant to fifteen antibiotics, namely cefoxitin, methicillin, oxacillin, vancomycin, neomycin, streptomycin, kanamycin, gentamicin, tetracycline, clindamycin, lincomycin, ciprofloxacin, nalidixic acid, ofloxacin and mupirocin; which was supported by bioinformatic analyses. Additionally, it was found that EDTA supplementation resulted in increased sensitivity towards several antibiotics, namely tetracycline, ciprofloxacin and ofloxacin as well as decreased expression of the tet(W) ribosomal protection protein.

Keywords : Antibiotic resistance, probiotics, EDTA, protein expression

References : 126 (1968-2023)