Structural characterisation of novel exopolysaccharide biosynthesized by potential probiotic strain *Lactobacillus fermentum* D12

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Lactobacillus fermentum D12, biosynthesize exopolysaccharides, is released in large amounts in MRS broth supplemented with glucose. High Performance Size Exclusion Chromatography (HPSEC), ^{1}H-NMR, GC and GC-MS analysis revealed that this strain produces three different types of EPOLs; the first homopolysaccharide (HoPOL) of a molecular weight of 400 kDa and two different low molecular weight heteropolysaccharides (HePOLs) of less than 2 kDa. 2D-NMR spectroscopy analysis revealed that HoEPOL, with the highest molecular mass, is composed of repeating units of D-glucose linked by an α-1,4-glycosidic bond, where 20% of the glucose subunits is acetylated at C-3. Further chromatographic analyses and NMR experiments showed that each HePOL contained mannose, glucose and galactose in an averaged relative molar ratio of 1.78:0.87:1 and 6.38:1.6:1, respectively. Since a probiotic strain survival in rigorous gastrointestinal (GI) conditions is the first probiotic selection criterion to be met, and with respect to efficient survival of D12 strain in GIT *in vitro* (bacteria counts $\geq 10^6$ CFU ml^{-1}) the potential probiotic role of *Lb. fermentum* D12 was evaluated. Also, sensitivity to different antibiotics, minimum inhibitory concentrations (MICs), antagonistic activity and analysis of fermentation of different carbohydrates using API 50 CHL media of this potential probiotic strain was assessed.

Key words: *Lactobacillus*, exopolysaccharides, probiotic activity, structural characterization