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EXOPOLYSACCHARIDE PRODUCED BY A PROBIOTIC STRAIN OF BIFIDOBACTERIUM LONGUM: CHEMICAL CHARACTERIZATION AND BIOLOGICAL PROPERTIES

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The exopolysaccharides (EPS) are polymers of carbohydrates which can be classified, according to the chemical composition and biosynthesis, in homopolysaccharides (HoPS) and heteropolysaccharides (HePS). Strains belonging to the genus of *Bifidobacterium* could be able to produce EPS which can exert health benefits for the human host. The objective of the study was the chemical and biological characterization of the EPS produced by the probiotic strain *Bifidobacterium longum* W11. The genome of the strain was studied for the presence of the *eps* cluster, putatively involved in the EPS synthesis. The chemical characterization of the EPS was performed by Size Exclusion Chromatography (SEC) coupled with a Multi-angle Laser Light Scattering (MALLS) detector, GC-MS and NMR analysis. The antioxidant properties were analyzed by the Reactive Oxygen Species (ROS) assay. The effects on cytokine production were detected using peripheral blood mononuclear cells (PBMCs) alone or ConA-stimulated. The genome of the *Bifidobacterium longum* W11 showed a *eps* cluster involved in the EPS biosynthesis which harbors a single priming-GTF and a unique structural organization not previously reported in bifidobacteria. The chemical characterization proved the production of a biopolymer with a novel EPS fraction. The structural analysis described an HePS composed of a mixture of two components. The major component was a combination of two different repeating units: one linear $[-6)-\beta\text{-Galp-(1-3)-}\alpha\text{-Galp-(1-}]$ and one, the most abundant, with the same backbone but in which the $\beta\text{-Galp}$ was 5-substituted by a $\beta\text{-GlcP}$ unit. The EPS with this new structural organization showed an antioxidant capability. Moreover, it was able to increase the production of the cytokines IFN- γ , IL-1 β , IL-6 in ConA-stimulated PBMCs and IL-6 and IL-10 in not-stimulated-PBMCs. In conclusion, the results of this study demonstrate that EPS from *Bifidobacterium longum* W11 has a new relevant chemical and structural feature. Moreover, it shows interesting biological properties, acting as antioxidant, and an immune-regulatory profile. Further validations need in vivo conditions.

Biography

R Inturri has completed her PhD from University of Catania, Italy at the School in Microbiology and Virology, University of Catania, Italy. She has published more than 11 papers in reputed journals.

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