Inulin is a natural biopolymer comprising linear chains of fructose units, which presents different physicochemical and functional properties depending on its degree of polymerization and percentage of branching (1). It is used by the food industry as a soluble dietary fiber and fat/sugar replacement, and in the pharmaceutical industry as a stabilizer and excipient (2,3). Since inulin is biochemically inert, non-toxic and can form hydrogels, it has been used as a slow-release drug delivery system (3). There is still very limited information related to the non-modified inulin-based drug delivery systems. Thus, the main objective of this work was to study the formation of inulin nanoparticles (np) enzymatically synthetized by inulosucrase IsLA, a multidomain enzyme from Leuconostoc citreum and its biological and physicochemical properties. It was determined that this high molecular weight inulin (3,000 kDa) contains 10.25% branching percentage and a Z-potential value of -2.15±0.17 mV. Moreover, in a solution of 5g/L of inulin 2.83×10⁸ np/ml were quantified, with an average hydrodynamic diameter (h.d.) of 82.5 nm. Through TEM, it was possible to elucidate that the formation of these particles is carried out during the enzymatic synthesis of the polymer, concluding that they are self-assembled. The nanoparticles show a spherical morphology and the polydispersity index was 0.6. The ionic strength in the reaction medium was varied from 0.05, 0.1 and 0.2 M; however it did not have any effect on the nanoparticles h.d. On the other hand, the reaction temperature influenced h.d. At 30°C the aggregation concentration was 15.17 g/L and h.d.=97 nm. Lowering the temperature to 4°C produced nanoparticles with h.d.=172 nm showing an aggregation concentration of 6.78 g/L. Regarding the biological properties, inulin nanoparticles did not show cytotoxicity in human peripheral blood mononuclear cells culture at a concentration up to 200 ?g/ml and no prebiotic potential was found with typical probiotic strains such as Lactobacilli and Bifidobacteria. Due to all these properties, the self-assembled inulin nanoparticles will be explored as a drug delivery system.

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