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SOLUTION BEHAVIOUR OF NEW PULLULAN DERIVATIVES WITH BIOTECHNOLOGICAL POTENTIAL

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Abstract

The synthesis of dimethylamino-propylamine pullulan, DMAPA-P, with a substitution degree of 0.4 was performed in dimethylsulfoxide using N,N'-carbonyldiimidazole as activator and dimethylaminopropylamine as amination agent. Then, two quaternary derivatives (trimethylammonium-propylamine pullulan, TMAPA-P, and benzyldimethylammonium-propylamine pullulan, BzDMAPA-P) were prepared from DMAPA-P by quaternization with methyl iodide and benzyl chloride. The solution behavior of new pullulan derivatives containing tertiary amine or quaternary ammonium groups in different polar solvents (protic or aprotic) with added low molecular salt was studied by laser light scattering. Thus, all polymers recorded positive second virial coefficients A_2 in solvents with 0.5 M salt added, and molecular masses for TMAPA-P and BzDMAPA-P increased compared with their precursor DMAPA-P. Finally, these polysaccharide derivatives (alone or in tandem with NaCl) were tested for their capacity to remove inorganic materials from synthetic turbid water. Turbidity of aqueous bentonite solutions in the presence of BzDMAPA-P or DMAPA-P increased compared with turbidity of bentonite solutions. Remarkably, the addition of NaCl improved the inorganic particles settling capacity of all three polysaccharides.

Key words: bentonite, laser light scattering, pullulan derivatives, turbidity

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