

Characterization of bacterial alginate extracted from biofilm matrix

Yuemei Lin^{a,b*}, Hailing Zhang^c, Avner Adin^a

^aDepartment of Soil and Water Sciences, Faculty of Agricultural, Food and Environmental Quality Sciences, The Hebrew University of Jerusalem, Rehovot 76100, Israel

^bFaculty of Life Science and Technology, Ocean University of China, Qingdao 266100, China
Tel. +972 (8) 948-9179; Fax +972 (8) 947-6916; email: lin@agri.huji.ac.il

^cCollege of Environmental Science and Engineering, Ocean University of China, Qingdao 266100, China

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ABSTRACT

Alginate has been employed as a model exopolysaccharide for studying biofilm establishment in water purification system. Yet, very few investigations focused on direct alginate extraction from biofilm matrix and characterization. To collect more information on the role of alginate exopolysaccharide in building the biofilm network, bacterial alginate was extracted from the biomass of a lab-scale submerged biofilm reactor, identified and characterized by Raman spectroscopy and MALDI-TOF mass spectrometry. Investigation was as well put on its interaction with Ca²⁺ by the atomic force microscopy. The extracted alginate amounted to (164 ± 21) mg g VSS⁻¹ (as organic content). It was partially O-acetylated oligosaccharides blend with the ratio of mannuronic acid residue to guluronic acid residue as 1.19. Strong gel-like film formed by its cross linkage with Ca²⁺. It may contribute to the formation of biofilm matrix skeleton. Direct exopolysaccharides extraction and characterization may throw new insight on biofilm building up mechanism.

Keywords: Alginate; Biofilm; Exopolysaccharide; Wastewater treatment

* Corresponding author.