

Methods for Extracting the Polymeric Matrix of Biofilms

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ABSTRACT

To study the composition of the polymeric matrix of biofilms a preliminary extraction method is required. In this work, five extraction methods (sonication, ion exchange resin-Dowex, Tris/HCl, phosphate buffer and glutaraldehyde) were used to obtain the polymeric fraction of a biofilm formed by *Sphingomonas paucimobills*. The methods were compared in terms of total amount of proteins, polysaccharides, total organic carbon and the extent of cell disruption (by DNA quantification). Greater amounts of protein can also indicate that intracellular material is released. Even if cells are not totally disrupted the outer membrane can be permeabilized releasing proteins from the periplasmic space.

Sonication extracts a great amount of total organic carbon (TOC) and the ratio protein/TOC is greater than the ones obtained with the other methods. The amount of DNA in the extracted fractions is also greater, suggesting that this method is more aggressive to the cells.

Tris/HCl and Dowex resin enable the extraction of smaller quantities of total protein and present a small ratio protein/TOC, but give great amounts of DNA.

With phosphate buffer, very small quantities of proteins and polysaccharides are obtained, however the DNA present is significant.

Glutaraldehyde extracts a great amount of polysaccharides, the smallest ratio protein/TOC and the minimum quantity of DNA.

According to these results the extraction with glutaraldehyde seems to be the most suitable extraction method.