COAGGREGATION BETWEEN BACTERIA ISOLATED FROM TAP WATER – ROLE OF EXTRACELLULAR POLYMERIC SUBSTANCES PRODUCTION AND EVIDENCE OF A BRIDGING BACTERIA

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ABSTRACT

Six dominant heterotrophic bacteria isolated from tap water coming from a drinking water distribution system in the North of Portugal were identified by 16S ribosomal DNA gene sequencing. Their coaggregation partnerships were determined immediately after dual bacteria mixture, 24 h and 48 h later, using the visual coaggregation assay. Interspecies interactions were also analysed by scanning electron microscopy (SEM) and epifluorescence microscopy using a DNA binding stain. Extracellular polymeric substances – EPS (proteins and polysaccharides) were assessed along time and correlated with the coaggregation properties. The bacteria isolated were *Acinetobacter calcoaceticus*, *Burkholderia cepacia*, *Methylobacterium* sp., *Mycobacterium mucogenicum*, *Sphingomonas capsulata*, *Staphilococcus* sp. Only *A. calcoaceticus* coaggregated with all the five other strains. The other bacteria had not the ability to coaggregate in the absence of *A. calcoaceticus*. Coaggregation after immediate bacteria association was higher for *A. calcoaceticus/B. cepacia*, being the only interaction that decreased coaggregation score along time (24 h and 48 h later). The other interactions maintained (*A. calcoaceticus/Staphilococcus* sp.) and increased (*A. calcoaceticus/Methylobacterium* sp., *A. calcoaceticus/M. mucogenicum*, *A. calcoaceticus/S. capsulata*) coaggregation scores along time. Microscopic analysis revealed a higher degree of interaction between species than the one obtained by the visual coaggregation assay. Coaggregation ability was not related with EPS production because the variation along time of the extracellular proteins and polysaccharides content seemed not to account for coaggregation phenomenon.

Biofilm formation (single and mixed species) studies using an *in vitro* microplate assay are under running in order to ascertain the function of *A. calcoaceticus* as bridging bacteria in biofilm development and to correlate coaggregation results with biofilm formation ability.