PONTIFICIA UNIVERSIDAD CATÓLICA DE CHILE
ESCUELA DE INGENIERÍA
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The biofilm lifestyle of microorganisms and their applications in bioleaching of metal sulfides.

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Biofilms represent a common and widespread microbial lifestyle on earth. This sessile mode of growth is enabled by communities of microorganisms that are embedded in a self-produced matrix of extracellular polymeric substances (EPS). Biofilms can be found self-associated either as "floating mats" in air-water interfaces or as surface-associated communities of microorganisms. Microbial diversity within a biofilm can vary from few to hundreds of different species.

The intrinsic advantages of the biofilm lifestyle are largely attributed to the presence of EPS, composed by of macromolecules such as polysaccharides, proteins, nucleic acids, and lipophilic compounds. Secretion of EPS provides several goods to the community: i) a protective barrier against environmental changing conditions, ii) a highly hydrated environment (as EPS can retain up to 90% water), iii) a nutrient source and an extracellular redox reactive space, iv) co-metabolism and synergistic processes by providing a physical matrix where cell-cell interactions can easily occur, v) a prerequisite for the exchange of genetic material.

A summary of our research on biofilms of industrially relevant microorganisms such as the ones used in bioleaching and biocorrosion will be shown. These cell-cell communication mechanisms, Confocal Laser Scanning Microscopy (CLSM), Epifluorescence Microscopy (EFM), and advanced molecular studies.

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