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Potential contribution of microbial communities in technical ceramics for the improvement of rheological properties

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Several bacterial and fungal species naturally occurring in ceramic raw materials used in construction, such as Aspergillus, Penicillium and Aureobasidium, are known to produce exopolysaccharides (EPS). These polymers excreted by the cells are of widespread occurrence and may confer unique and potentially interesting properties with potential industrial uses, such as viscosity control, gelation, and flocculation, during ceramic manufacturing. In this study, the microbial communities present in clay raw materials were identified by both cultural methods and DNA-based molecular techniques in order to appraise their potential contribution to enhance the performance of technical ceramics through the use of EPS. Mineralogical identification by X- Ray Diffraction (XRD) and Fourier Transform Infrared (FTIR) spectroscopy of the clay raw materials, as well as characterization of rheological properties of ceramic slips were also performed. Microbial EPS production and its introduction into ceramic slips will be then carried out in order to evaluate their effects on the rheological properties of the ceramic slips, powders and conformed bodies. Some positive aspects related to the use of EPS are: reduction of the environmental impact caused by synthetic organic additives, reduction of production costs, as well as the costs related with operator protection systems, gaseous effluent treatments, complex landfill, among others.