Seminari IRSA 2021

Venerdì 7 maggio, ore 14:30 (*)

Fruibile in streaming attraverso la piattaforma 'GoToMeeting' previa registrazione

Granules formation at high salinity in upflow anaerobic sludge blanket (UASB) reactors: five years of multidisciplinary research

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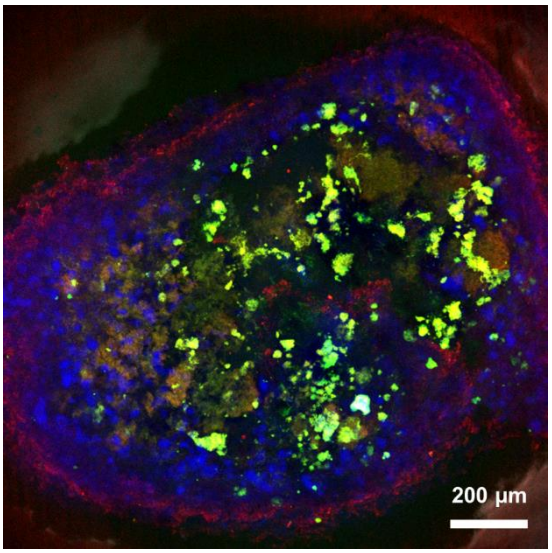

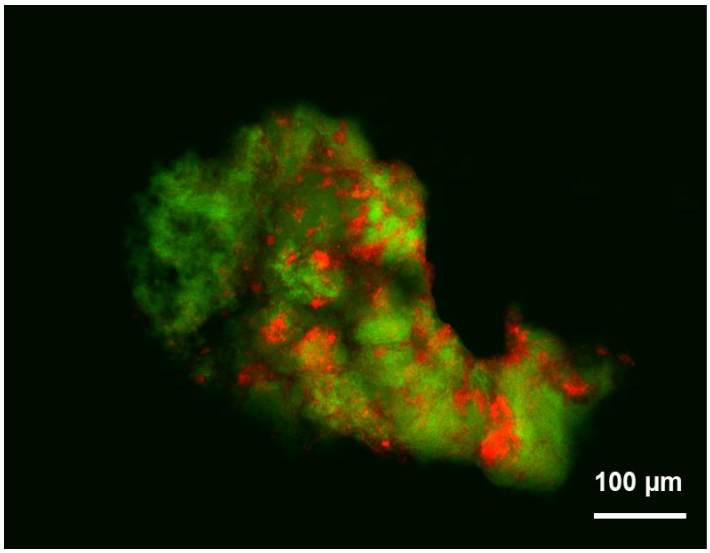

The treatment of saline effluents has been an emerging topic among researchers due to the large volumes generated by several human-made and industrial activities. The upflow anaerobic sludge blanket (UASB) reactor is an efficient technology to treat industrial wastewaters, including saline streams, being an option to remove organics before desalination. In these reactors, microbial biomass spontaneously aggregates into granules, but high Na^+ concentrations are unfavourable for granules' formation and stability. Ca^{2+} addition may counteract this negative Na^+ effect but at the same time could hamper methanogenesis and mass-transfer in the granules. Also (low amounts of) proteins in the feed can stimulate formation of granules and improve their stability. Moreover, the start-up inoculum used for granules formation is one of the key factors in determining the process performances when treating saline effluents via UASB reactors. In this seminar, I present an overview of results of 5 years of research, were we did dive into many aspects of microbial granulation in saline conditions. We were able to obtain fast granulation of anaerobic biomass from dispersed inoculum at Na+ concentrations of 5 and 20 g/L in UASB reactors. The presence of a (adequate) protein source was fundamental for granules formation, while calcium addition could deteriorate performances over a certain concentration. The microbial community was dealing with salinity by producing an extracellular polymeric substance (EPS) able to bind sodium. Within the granules' microbial community, the key player was *Methanotrix harundinacea*, reported here for the first time as a halotolerant methanogen, able to excrete EPS and produce osmolytes and carotenoids in response to an increase of salinity.

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* Il seminario verrà registrato e reso successivamente disponibile sul sito web dell'Istituto.