REFERENCE
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Molecular profiling of microbial populations in aerated bio-treatment of olive oil wastewater

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The knowledge of the microbial community structure during a wastewater treatment process using a bio-reactor allows the control of its performance since it is influenced by changes in operating conditions. At INETI, an efficient bio-treatment of olive oil wastewater, using the native microbial consortia, was conducted in a 20-L JACTO bio-reactor and scaled-up to a 200-L bio-reactor. Characterisation of microbial communities in the bio-reactors was already evaluated by conventional microbiological methods, indicating the predominance of *Bacillus megaterium*, *Bacillus sphaericus*, *Brevibacillus brevis* and *Stenotrophomonas maltophilia*[1,2]. However, this microbial composition profile was influenced by the restrictions of cultivation based-studies of bacterial populations. To obtain the complete microbial structure composition, molecular profiles were analysed by temperature gradient gel electrophoresis (TGGE) of PCR-amplified 16S rRNA gene fragments and correlated with COD consumption, N-Kjeldahl and nitrates contents at different stages of the bio-treatment. The determination of microbial structure shifts either induced by changes on hydraulic retention time, or after the treatment scale-up is the most essential tool to optimise bio-reactor performances and guarantee a secure transfer of this technology to industrial processes.

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2. Eusébio, A. *et al. International Biodeterioration* (submitted).