

## Effect of mass transfer on biodesulfurization kinetics of alkylated forms of dibenzothiophene by *Pseudomonas putida* CECT5279

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### Abstract

**BACKGROUND:** An important problem exists for the implementation of biodesulfurization technology of fuels related to the influence of mass transfer on the overall reaction rate and process yield. *Pseudomonas putida* CECT5279 has been shown to be one of the most promising biocatalysts, but most kinetic studies were done at small scale and their capability for the transformation of alkyl substituted forms (Cx-DBTs) has not yet been reported.

**RESULTS:** Conversion yields and kinetic parameters were calculated under aqueous and biphasic resting cell conditions in a 2 L stirred tank reactor. In aqueous reaction media, 100% conversion of DBT, 4MDBT and 4,6DMDBT was achieved while the conversions in the presence of an organic liquid were 38% for DBT, 19.5% for 4MDBT and 16.5% for 4,6DMDBT, showing that the process is strongly affected by mass transfer between liquids. Laboratory scale-up of *P. putida* CECT5279 growing step was successfully carried out using a 15 L stirred tank, on the basis of the volumetric mass transfer coefficient ( $k_L a$ ).

**CONCLUSIONS:** *P. putida* CECT5279 is capable of removing Cx-DBT compounds successfully in aqueous resting cell conditions using stirred tank reactors, but in biphasic media, mass transfer between liquids controls the process, increasing time of reaction and lowering process yield. © 2012 Society of Chemical Industry

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### Citing Literature

Number of times cited according to CrossRef: 14

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