Degradation of difluorobenzenes by the wild strain *Labrys portucalensis*

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Haloaromatic compounds have been produced industrially on a large scale for several decades, becoming environmental pollutants of soil, water and air. Whereas the degradation of chlorinated and brominated compounds has been studied extensively, fluoaromatics have received less attention and fewer studies are available on their biodegradation. This study focuses on the biodegradation of difluorobenzenes, which are commonly employed as chemical intermediates in various pharmaceutical and agricultural applications. A previously isolated microbial strain (strain F11), identified as *Labrys portucalensis,* and with the capacity to degrade fluorobenzene as sole carbon and energy source, was tested for its capability to degrade 1,2-, 1,3- and 1,4-difluorobenzene. The results obtained showed that this strain is able to degrade 1,3-difluorobenzene as a sole carbon and energy source and to degrade 1,3- and 1,4-difluorobenzene in co-metabolism with fluorobenzene. In batch cultures, growth of strain F11 with 0.5mM of 1,3-difluorobenzene led to stoichiometric release of fluoride ion. The same result was verified in cultures growing in co-metabolism with 1mM of 1,3- or 0.5mM of 1,4-difluorobenzene, in the presence of 1mM of fluorobenzene. Addition of sodium acetate to the culture medium did not improve the degradation of the difluorobenzenes. To our knowledge, this is the first time biodegradation of 1,3-difluorobenzene as a sole carbon and energy source, by a single bacterium, is reported.