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Whole cell based biocatalytic production of 2,5-furan dicarboxylic acid

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Polyethylene furanoate (PEF), made of 2,5-furan dicarboxylic acid (FDCA), has immense application value and can play a role in reducing the dependence of non-renewable energy sources by replacing the petroleum based products such as polyethylene terephthalate (PET) and polybutylene terephthalate (PBT). The conventional chemical process for production of FDCA via oxidation of 5-hydroxymethyl furfuraldehyde (HMF) requires high temperature, high pressure, metal salts, organic solvents and toxic chemicals. Further, purification of FDCA makes the processes expensive as well as generates considerable pollutants and eco-friendly. The alternative bio-based approach, microbial conversion of substrates such as HMF, fructose and renewable biomass to FDCA sounds promising. In the present study, several soil isolates were evaluated for production of FDCA and one isolate, *Enterobacter* sp., showed potential for conversion of 5-(hydroxymethyl)furfural (HMF) to FDCA with an yield of 0.07g/L FDCA from 0.5g/L HMF in mineral salt media at 14 days of incubation. Changing the production media with 0.25% glucose and 0.25% glycerol showed an inhibition in the FDCA production by 7- and 2-folds, respectively.

Keywords: Biopolymer, FDCA, Green chemicals, 5-(hydroxymethyl)furfural (HMF)