





Towards the valorisation of cinnamon bark extract residue: microbial fermentation for carotenoids production

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Abstract:

Within a circular economy perspective, microbial cell factories have increasingly been deployed in bioprocesses, since their ability to use side biomasses from the agroindustrial sector, in order to obtain additional products as sidelines to mainstream ones. The aim of this work is the valorisation of cinnamon extraction waste (CEW) material from *Cinnamonum verum* (J.Presl), generally disposed without any additional processing. After assessing CEW overall sugar content by acid hydrolysis, this residual biomass was subjected to enzymatic hydrolysis, releasing mono- and disaccharides to sustain microbial growth. The low titer of potential cinnamon anti-microbial compounds led to the screening of different fungal cell factories for the ability to grow on CEW hydrolysate. Among these species, the yeast *Rhodosporidium toruloides* was able to replicate and produce carotenoids both on plates and in shake flasks, when provided with the hydrolysate in a separated hydrolysis and fermentation (SHF) process as the only carbon and nitrogen source. This result leads to the possibility to develop bioprocesses based on CEW using different microorganisms, with high-value molecules as additional products starting from a waste material.