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Improvement of actinorhodin production yield in *Streptomyces coelicolor* by immobilized-cell cultivations by using PCL- and PLA-based films

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Actinomycetes are Gram-positive bacteria producing most of naturally occurring antibiotics (Donadio *et al.*, 2010). At industrial level, antibiotics are produced by submerged fermentations where the actinomycete filamentous morphology negatively affects bioproductivity (van Dissel *et al.*, 2014). Microporous membranes for bacterial cell-immobilization were already proven increasing bioproductivity in *Streptomyces coelicolor*, that is a model actinomycete producing the blue pigmented actinorhodin (ACT) antibiotic (Scaffaro *et al.*, 2016). To develop an immobilized-cell bioreactor system, different kinds of polycaprolactone (PCL) and polylactic acid (PLA) films were produced by an electrospinning-based approach. *S. coelicolor* cells immobilized on PCL and PLA membranes formed a dense biofilm as observed by scanning electron microscope. An increased biomass content and more than 4-fold ACT yield was obtained in comparison with free-cell cultivations for all the membranes, with O_2-plasma treated PLA membranes as the most effective. Therefore, the membranes are suitable for bioproduction improvement in actinomycete-based fermentation and encourage studies for process scaling-up.