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NOVEL METHODS AND PROCESSES TO SUPPLY AND REGENERATE BIOCHEMICAL COFACTORS

AUTHORS
Monika MÜLLER / INNOSYN B.V., URMONDERBAAN 22, GELEEN

PURPOSE OF THE ABSTRACT

Biocatalysis is one of the core technologies at InnoSyn to develop chemo-enzymatic processes for the production of small molecules which are applied in pharmaceutical and chemical industries [1-3]. Hydrolases like lipases, esterases and proteases are not that popular in academic research anymore, but represent the work horses of industrially applied biocatalysis since decades because of their unmet stability and efficiency [4].

Alcohol dehydrogenases in the reductive mode come close to the efficiencies of hydrolases but require NAD(P)H cofactor regeneration. Recently we focused on more challenging co-factor and co-substrate supply and regeneration strategies for cost efficient industrial biocatalysis such as the in situ regeneration of NAD(P)+ for oxidative ADH reactions at pilot plant scale and other co-factors and co-substrates.

Regio-, chemo- and enantioselective alcohol oxidations with pure O2 as terminal oxidant were scaled up to pilot plant production achieving industrially relevant product concentrations of 40 - 200 g L-1 and high volumetric productivities of 1.5 - 14 g L-1 h-1, respectively [5-6]. Finally, proof-of-principle of scalable and efficient ATP regeneration with stable and cheap phosphoenolpyruvate formulations, 2-ketoglutarate production from L-glutamate at up to 1 mol L-1 for 2-KG/Fe(II) dependent oxygenase reactions and UDP-glucose supply and recycling from sucrose for the multi-gram scale production high-value glucosylated natural products were obtained [7] and will be presented.

FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

Industral Biocatalysis | Cofactor dependent enzymes | Regeneration strategies

BIBLIOGRAPHY