SYNTHESIS OF β-HYDROXY-α-AMINOACIDS UTILIZING L-THREONINE (TRANS)ALDOLASES

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β-Hydroxy-α-aminoacids (β-HAAs) are a class of compounds widely used as intermediates in pharmaceutical synthesis (antibiotics, antiviral drugs), with the capacity to be incorporated into therapeutic peptides or functional proteins [1]. β-HAAs are typically obtained via chemical synthesis, although this process is unfavourable due to the use of several blocking groups during synthesis [2]. An alternative approach involves an enzymatic synthesis using L-threonine aldolases and transaldolases, which catalyse an aldol reaction between glycine or L-threonine and an aldehyde [3].

In this study, substrate selectivity was investigated using L-threonine aldolases from Neptunomas marina and Cellulosilyticum sp. (NmLTA and CsLTA) and L-threonine transaldolase from Pseudomonas fluorescens (ObiH). The substrate scope was evaluated using whole-cell biocatalysis, discovering that among the 23 aldehydes tested, 9 were suitable substrates for at least one enzyme. The analysis of enzymatic reactions showed that NmLTA and CsLTA catalyse the aldol reaction with pyridine-carbaldehydes (13-22%) as well as large aromatic aldehydes (3-7%), while ObiH was also active towards formyl-indoles (44-84%).

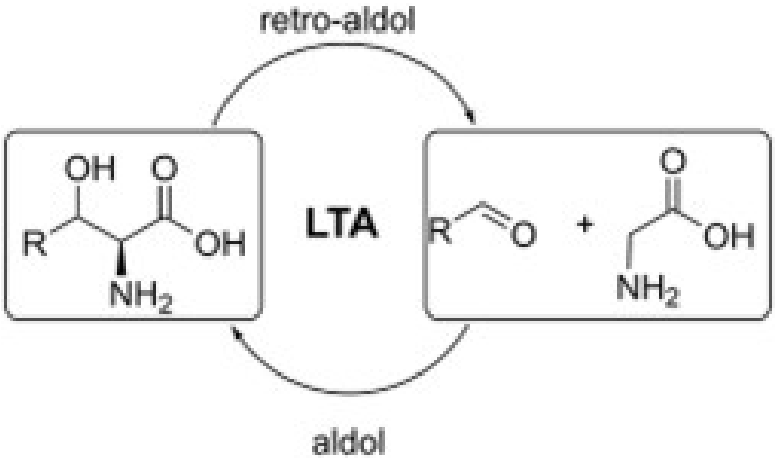

Fig. 1. Fig. 1 L-Threonine aldolase catalysed reactions [4].

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