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Title: A Review on Metabolic Pathway Analysis in Biological Production

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Abstract: Metabolic pathway analysis has become significant for evaluating intrinsic network characteristics in biochemical reaction network reconstruction. Current applications of metabolic pathway analysis involve identifying the enzyme for the desired production, identifying pathways of optimal production, determining non-redundant pathways for drug design, and genome comparisons by alignment of pathways for missing genes identification. With the expanded application of bioinformatics, more organized methods have been introduced to examine the overall metabolic networks and network reconstruction based on genomic data. There are several in silico approaches for analysing metabolic pathways, including elementary mode analysis and extreme pathway under pathway topology analysis, flux balance analysis and metabolic flux analysis under analysis of metabolic fluxes, and metabolic control analysis. In this paper, elementary mode analysis, flux balance analysis, metabolic flux analysis and metabolic control analysis are reviewed, together with their application in metabolic network reconstruction and biological production enhancement in biological organisms. Next, a comparison of strengths and weaknesses between each of the metabolic pathway analysis methods is presented in this paper.

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