Enhancement of malic acid production by introduction of protein colocalization strategy in recombinant Escherichia coli

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To produce malic acid from non-oxidative pathway route in Escherichia coli using two key enzymes and synthetic scaffold complex. E. coli was engineered to produce malic acid from glucose by co-localization of two key enzymes phosphoenolpyruvate carboxylase (Ppc) and malate dehydrogenase (MdhA) with synthetic scaffold complex. Scaffold plasmid has produced the maximum concentration of 3.51 g/L malic acid from 10 g/L glucose in 48 h of culture. pH 5.5 and temperature 30℃ were optimum for malic acid production without any engineering of competing metabolic pathways. E. coli mutant strains and different concentrations of glucose also tested. When 50 g/L glucose was used as substrate, 20.4 g/L of malic acid was produced.