

The introduction of chimeric two-component system for the construction of acidic amino acids sensing Escherichia coli

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In an attempt to create an acidic amino acid-sensing Escherichia coli, a chimeric sensor kinase (SK)-based biosensor was constructed using Pseudomonas putida AauS. AauS is a sensor kinase that ultimately controls expression of the aau gene through its cognate response regulator AauR, and is found only in P. putida KT2440. The AauZ chimera SK was constructed by integration of the sensing domain of AauS with the catalytic domain of EnvZ to control the expression of the ompC gene in response to acidic amino acids. Real-time quantitative PCR and GFP fluorescence studies showed increased ompC gene expression and GFP fluorescence as the concentration of acidic amino acids increased. These data suggest that AauS-based recombinant E. coli can be used as a bacterial biosensor of acidic amino acids. By employing the chimeric SK strategy, various bacteria biosensors for use in the development of biochemical-producing recombinant microorganisms can be constructed. This work was supported by a grant from the Next-Generation BioGreen 21 Program (SSAC, grant number: PJ011116) by RDA and Basic Science Research Program by the Ministry of Education (NRF-2014R1A1A2054726).