Synopsis of Original Research Paper

Development of Novel Process for Producing Sulfur-containing Compound as Cosmetics Material

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In generally microorganisms, L-cysteine is synthesized from sulfide and O-acetyl-L-serine (OAS) by O-acetylserine sulfhydrylase (OASS). On the other hand, tryptophan synthase (TS) consist of α-subunit and β-subunit forming α2β2 complex. An α-subunit and β-subunit can exist as α monomer and β2 homodimer in cell, respectively. It is known three-dimensional structure of TSβ is similar to that of OASS-A which is an isozyme of OASS, although nucleotide sequences are identified only 20%. And TSβ can recognize not only OAS but also L-serine as substrate and synthesize L-cysteine from L-serine and sulfide. β2 complex has the activity of β-replacement and β-elimination reaction, and it catalyzes β-elimination reaction more than the other one. However $\alpha_2\beta_2$ complex catalyzes β-replacement reaction more.

We attempt to synthesize L-cysteine from L-serine and sulfide by using the enzyme reaction of TS overexpression organism. At first *trp*B and *trp*A gene were cloned into an expression vector p*Trc*99A and the constructed plasmid designated pTTS. We identified that L-cysteine was synthesized from L-serine and sulfide by enzyme reaction of cell-free extract of Escherichia coli JM109 carrying plasmid pTTS. And L-methionine was detected in this reaction mixture.