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Increased lycopene production using Mevalonate pathway in *Escherichia coil*

Ju-Eun Kim, Sang-Hawl Yoon*, So-Won Ock*,
Jung-Hun Kim, Sook-Hee Lee, Cui Li*, Hye-Min Park,
Seon-Won Kim, Hossein Shahbarri and Si-Hyoung Lee**

*Dept. of Food Science & Nutrition, Division of Applied Life Science,
Gyeongsang National University, **Amicogen Inc.

E.coli harboring *crtE*, *crtB* and *crtI* of *Erwinia herbicola*,was able to produce lycopene. Lycopene is synthesized from isopentenyl pyrophosphate(IPP) which is a common five-carbon building block of all isoprenoids[1] IPP synthesis in E,coli is carried out by MEP pathway. DXP synthease of MEP pathway

combinesglyceraldehyde-3-phosphate(G3P) and pyruvate to produce 1-deoxy-D-xylulose-5-phosphate(DXP). Oversythesis of DXP caused metabolic imbalance of MEP pathway and growth inhibition because intracellual pool of G3P is significantly lower than one of pyruvate.[2] Therefore, foreign Mevalonate pathway was introduced for efficient supply of IPP for lycopene production. A recombinant plasmid pSSN12Didi containing *mvaK1, mvaK2* and *mvaD* of *Streptococcus pneumoniae* and *idi* of *E.coli* was constructed by using a low-copy vector pSTV28. Another recombinant plasmid pBBR1PZSN containg *mvaK1, mvaK2* and *mvaD* of *Streptococcus pneumoniae* and *idi* and *atoB* of *E.coli* and *mvaS* and *mvaA* of *Paracoccus zeaxanthinificiens* was constructed for lycopene production *E.coli* DH5瞪 harboring pSSN12Didi and pBBR1PZSN produced 25.5 lycopene/ g DCW and 12.6 lycopene / gDCW. Where were 5-fold and 2.4-fold higher than that using MEP pathway. The increased lycopene production was suspected to be caused by no both metabolic imbalance and feed-back regulation of Mevalontate pathway in E.coli beacuase Mevalonate pathway is foreign pathway and uses acetyl-CoA as starting material.[3]