Structure modification of Quercetin using Multiple expression with several genes

Bong-Gyu Kim , Kwang-Hee Shin and Joong-Hoon Ahn
Bio/Molecular Informatics Center, Department of Molecular Biotechnology, KonKuk University, Seoul
TEL : +82-2-450-3764, FAX +82-2-446-9001

Flavonoids are typical plant secondary metabolites belonging to a group of polyphenols. Over 6,000 natural flavonoids have been reported, and many of them are common in higher plants[1]. Flavonoids constitute a relatively diverse family of phenolic molecules. These compounds are modified by genes such as *O*-methyltransferase(OMT) and glycosyltransferase(GT)[2),3)]. We investigated the multiple expressions of ROMT-9, SOMT-2, and BcGT-1. ROMT-9 and SOMT-2 are 3' and 4'-*O*-methyltransferse of quercetin and was cloned from Rice and Soybean, respectively. Also BcGT-1 is 7-glycosytranferase and cloned from *Bacillus cereus*. Three genes were cloned to pET-21 vector system, respectively. In addition, ROMT-9 and SOMT-2 was independently cloned into one pET-21 vector and the resulting plasmid is named as RSOMT. ROMT-9, SOMT-2 and BcGT-1 conjugated vector is named as RSBK. Five constructs were expressed in *E. coli* BL21 to study multiple expression of RSOMT and RSBK for quercetin as substrate. HPLC analysis of reaction product from three construct having each gene showed one apparent product peak: 3'-*O*-methylated quercetin for ROMT-9, 4'-*O*-methylated quercetin for SOMT-2, and 7-*O*-glycosylated quercetin for BcGT-1. When RSOMT was expressed in BL21, three reaction products were detected, containing 3', 4'-*O*-dimethylated quercetin. In case of RSBK reaction products showed six product peaks, which will be further identified through mass spectrometric and NMR analysis.

References

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