

The Biosynthesis of GDP-D-mannose

양영현, 강영복, 이광원, 단기순, 박성수, 김병기
서울대학교 응용화학부, 유전공학연구소 생물공학실
전화 (02)-880-7528 Fax (02)-874-1206

ABSTRACT

An enzymatic one-pot synthesis method¹⁾ for GDP-D-mannose was developed starting from GMP, acetylphosphate and fructose-6-phosphate in recombinant *Escherichia coli* BL21 strains. Five enzymes, i.e. GMP kinase, acetate kinase, Phosphomanno isomerase, Phosphomannomutase²⁾ and mannose-1-phosphate guanosyltransferase^{3),4),5),6)} were expressed in the *E. coli* BL21 strain.. Using these system, we can produce GDP-D-mannose.

References

1. Xueyan Ma et al., "High yielding one-pot enzyme-catalyzed synthesis of UDP-glucose in gram scales", *Carbohydrate Research*, 333, 159-163, 2001
2. Gordon Stevenson et al., "Organization of the E.coli K-12 gene cluster responsible for production of the Extracellular polysaccharide colanic acid", *Journal of Bacteriology*, Vol.178, 4885-4893, 1996
3. Sven Fey et al., " The cofactor Mg²⁺-a key switch for effective continuous enzymatic production GDP-mannose using recombinant GDP-mannose pyrophosphorylase", *Carbohydrate Research* 305, 475-481, 1997
4. Gregory et al., "The preparation of deoxy derivatives of mannose-1-phosphate and there substrate specificity towards recombinant GDP-mannose pyrophosphorylase from *Salmonella enterica*, group B", *tetrahedron: Asymmetry*, 621-628, 2000
5. Slade et al., "Molecular evolution of the GDP-mannose pathway genes(manB and man C) in *Salmonella enterica*, *Microbiology*, 147, 599-610, 2001
6. Bingyuan et al., "Bifunctional phosphomannose isomerase/ GDP-D-mannose pyrophosphorylase is the point of control for GDP-D-mannose biosynthesis in *Helicobacter pylori*", *FEBS*, 519, 87-92, 2002