

## Enhanced Coenzyme Q<sub>10</sub> Productivity by Exopolysaccharide Deficient *Agrobacterium tumefaciens* ATCC4452

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### Abstract

For improving productivity of intracellular biological products, there are generally two ways. They are high density cell culture and increasing product contents in cells. Especially, as an aspect of high density cell culture, reducing by-product is very useful approach on the cell if had remarkable amount of another products except target material. In a production of Coenzyme Q<sub>10</sub>(CoQ<sub>10</sub>) by *Agrobacterium tumefaciens* ATCC4452, released exopolysaccharide has emerged in critical problem to reach high cell mass. Therefore, we introduced classical mutagenesis method to block exopolysaccharide producing pathway in *A. tumefaciens*. EMS(EthylMethane Sulfonate) and NTG (*N*-methyl-*N'*-nitro-*N*-nitrosoguanidine) could make a few exopolysaccharide deficient mutants on calcofluor white selective medium. We selected a colony among these mutants and designated Exo\_1. In an baffled flask test, exopolysaccharide production was reduced 5 times than wild type strain and DCW( dry cell weight) was approximately enhanced 50%. But, the CoQ<sub>10</sub> content in Exo\_1 was decreased 3 mg/g-cell to 2 mg/g-cell. As a result, CoQ<sub>10</sub> concentration ( g/L) was equal to two strains ( Exo\_1 and wild type). For detailed controled culture, we investigated CoQ<sub>10</sub> productivity in 2.5 L lab-scale fermenter. Fermentation parameters were optimized as following condition; 800 rpm, 1 vvm, 30°C and pH 7.0 stat culture. pH was adjusted by 14% ammonia solution and decreased pH was controlled by feeding on 150 g-sucrose and 0.75 g-MgSO<sub>4</sub>·7H<sub>2</sub>O solution

dissolved in 100 mL distilled water. Produced exopolysaccharide and CoQ<sub>10</sub> contents were same in flask test but culture time was shortened 98 hrs by 78 hrs. So, we determined that reduced CoQ<sub>10</sub> contents result in enhanced specific growth rate and at last, the blocking of exopolysaccharide production was increased CoQ<sub>10</sub> productivity.