Enhanced polyhydroxybutyrate (PHB) production in a engineered cyanobacterium *Synechococcus elongatus* UTEX 2973 using flue gas as a CO2 source

이소영, 노혜진, 심상준†
고려대학교
(simsj@korea.ac.kr†)

Plastic production has increased around the world and processing used petroleum-based plastics generates greenhouse gases such as CO2. Therefore we need to substitutes for petroleum-based plastics and one of them is bioplastics. Among the various bioplastics, Polyhydroxybutyrate(PHB) is promising because it is similar to Polyproplyene(PP), the main component of conventional plastics. Cyanobacteria accumulate PHB as an energy source using CO2, so both environmental and economic benefits can be achieved. A novel PHB-producing cyanobacterial strain was developed by harnessing fast-growing cyanobacteria *Synechococcus elongatus* UTEX 2973 with introduction of heterologous *pha*CAB genes. Under photoautotrophic condition, the engineered strain produced 420 mg L-1 with the highest specific productivity of 75.2 mg L-1 d-1. When compared with a native PHB producer *Synechocystis* PCC 6803 under nitrogen deprivation, the engineered strain exhibited 2.4-fold higher PHB productivity. This study can provide a promising solution to address petroleum-based plastic waste and contribute to CO2 mitigation.