

Metabolic engineering of Escherichia coli for short chain alkanes production through novel pathway

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Despite a long time efforts in microbial biofuel production, transport fuel production in sustainable way has not been yet established. Here, we introduced metabolic engineering into Escherichia coli, which can produce short chain alkanes (petrol), free fatty acids (FFAs), fatty esters, and fatty alcohols through novel pathway. The fadE and fadR gene was deleted to reinforce the pathway, and a mutated thioesterase was introduced, for the conversion to the corresponding FFAs. The fatty acyl-CoA synthetase, fatty acyl-CoA reductase and fatty aldehyde decarbonylase, were introduced to mediate the conversion to each alkane species. As a result, the engineered E. coli strain produced 580.8 mg/L of short chain alkanes. [This work was supported by the Advanced Biomass Research and Development Center of Korea (NRF-2010-0029799) through the Global Frontier Research Program of the Ministry of Science and ICT (MSIT) through the National Research Foundation (NRF). Systems metabolic engineering work was supported by the Technology Development Program to Solve Climate Changes on Systems Metabolic Engineering for Biorefineries (NRF-2012M1A2A2026556 and NRF-2012M1A2A2026557) by MSIT through NRF].