

Production of 3-hydroxy propionic acid from levulinic acid using recombinant *Pseudomonas putida* KT2440

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Levulinic acid (LA) is a five  $\gamma$ -keto carbon acid that can be easily obtained through acid hydrolysis without enzyme reaction from cellulose. 3-Hydroxy propionic acid (3-HP) is a monomer of the biodegradable polymers that can be replaced petrochemistry based polymers. In this study, LA is proposed as a novel carbon source for 3-HP production by using *Pseudomonas putida*, gram negative soil bacteria. According to the complete annotated genome information, *P. putida* contains the metabolic pathway of LA. In M9 minimal media with 75mM of LA, *P. putida* grew to OD<sub>600</sub> 8.15 without growth inhibition. Because LA is catabolized to propionyl-CoA and acetyl-CoA, butyryl-CoA dehydrogenase, enoyl-CoA hydratase and 3-hydroxy isobutyryl-CoA hydrolase from *P. putida* were overexpressed to convert propionyl-CoA to 3-HP. After that, prpC gene, 2-methylcitrate synthase, was deleted to increase the yield of 3-HP by blocking the methylcitrate cycle. Finally, with these genetic modifications, the production of 3-HP from LA is confirmed. The results of this study suggest that *P. putida* is a novel candidate that can biosynthesize 3-HP from LA as a sole carbon source.