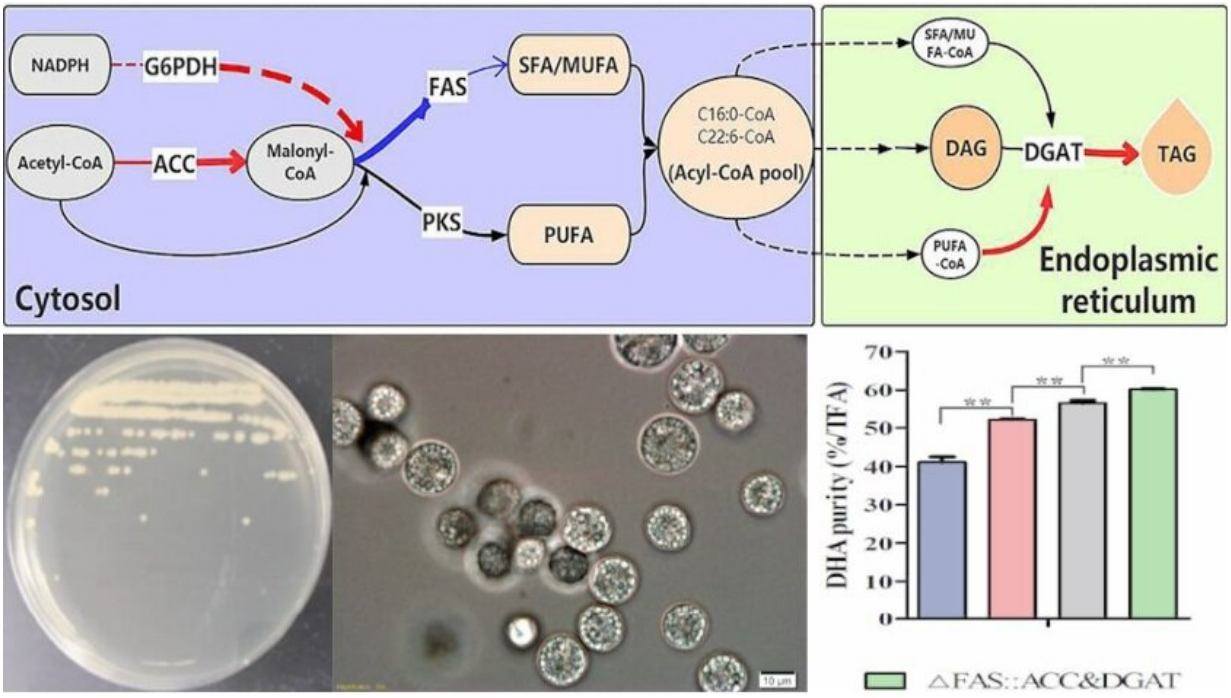
Cell factory that can produce high-purity DHA

August 26 2021, by Li Yuan



A high-purity DHA cell factory created using metabolic engineering methods. Credit: WANG Sen and SONG Xiaojin

Docosahexaenoic acid (DHA, C22:6) is an important nutrient for the brain and visual development of newborns. It is also widely applied in pharmaceutical and food industries.

Aurantiochytrium has become one of the representative strains for DHA

production due to its high biomass and high lipid content. Recently, researchers from the Qingdao Institute of Bioenergy and Bioprocess Technology (QIBEBT) of the Chinese Academy of Sciences (CAS) have developed a novel strain producing high-purity DHA through metabolic engineering strategy.

The enhanced DHA purity not only improves the product quality of DHA oil, but also reduces the purification processing cost. The study was published in the journal *Agriculture and Food Chemistry* on August 20.

The strategy includes both partial deactivation of the competing pathway of DHA biosynthesis, by disrupting one copy of the fatty acid synthase gene, and strengthening of substrate supply and triacylglycerol synthesis, by the overexpression of acetyl-CoA carboxylase and diacylglycerol acyltransferase.

The DHA contain of the mutant was 331 mg/g, of which DHA accounted for 61% of the total fatty acids.

Moreover, the cell growth rate, biomass, and lipid yield of the novel strain have not changed significantly, ensuring that the new strain could meet the industrial requirements.

More information: Zhuojun Wang et al, Obtaining High-Purity Docosahexaenoic Acid Oil in Thraustochytrid Aurantiochytrium through a Combined Metabolic Engineering Strategy, *Journal of Agricultural and Food Chemistry* (2021). DOI: 10.1021/acs.jafc.1c03781

Provided by Chinese Academy of Sciences