ENGINE-READY FUELS EXCRETION FROM PHOTOTROPHIC ALGAE CULTURES

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Photofuel is an H2020 project aiming to advance the base technology of microalgae cultivation in closed bioreactors by enabling phototrophic algae and cyanobacterial microorganisms to produce alkanes and alcohols, which are excreted to the culture broth for direct separation without cell harvesting. This thereby turns the microbial cells into self-reproducing biocatalysts allowing the process to directly convert solar energy, water and CO2 into engine-ready fuel instead of being used to form biomass, as shown in the figure above. The final goal is to advance the solar fuel technology towards the aim of highly sustainable production of drop-in fuels on arid or marginal land. Photofuel partners are Volkswagen, Uppsala Univ, Uni Bielefeld, Imperial College, Uni Florence, A4F, IFP New Energy, Neste, KIT, Fiat, Volvo and SYNCOM. The best biocatalytic system(s) will be scaled-up and operated outdoors. The WT strains are being tested outdoor by Uni. Florence in GWP systems. A4F has started the laboratory scale trial of a GMM cyanobacteria strain engineered to excrete a high energy density alcohol, with promising results. A microalgae strain engineered to excrete a diesel substitute is also being tested at lab scale. The preliminary results indicate the presence of the interest products, during the trials aiming at optimization of the culture medium adapted to industrial cultivation conditions. The most promising GMM strains identified in the project will be produced in photobioreactors on the scale of several cubic meters, at A4F's microalgae pilot plant, which is one of the few GMM compliant plants at this scale. Different technologies will be tested, in order to determine which is the most promising for each strain, considering both productivity enhancement and an efficient biofuel separation from the medium, ideally in continuous cultivation. The system integration – bioreactors and biofuel separation in continuous process - will be developed and tested at pilot scale.

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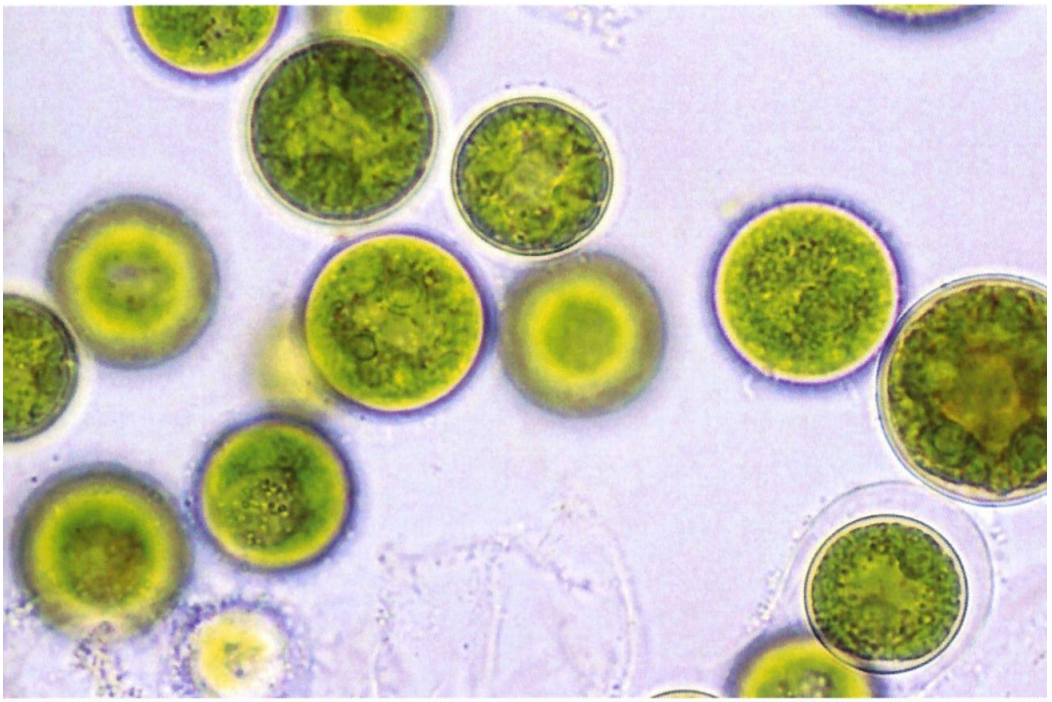

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