Project title: *Crypthecodinium cohnii* and *Zymomonas mobilis* syntrophy for production of omega 3 fatty acid from byproducts of biofuel and sugar industry

Project No. 1.1.1.1/18/A/022

Source of funding: European Regional Development Fund Specific Objective 1.1.1 "Improve research and innovation capacity and the ability of Latvian research institutions to attract external funding, by investing in human capital and infrastructure" 1.1.1.1. measure "Support for applied research". Project application selection round No.2.

Project partners: LSC "Biotehniskais Centrs", Latvian State Institute of Wood Chemistry

Project period: 01.04.2019. – 31.03.2022. (36 months)

Project costs: 648 000 EUR (374 544 EUR from EU as ERDF funding)

Project Leader: Professor, Dr.sc.ing. Egils Stalidzāns, egils.stalidzans@lu.lv

Objective: to establish a bioprocess of syntrophic co-cultivation of two microorganisms (*Crypthecodinium cohnii* and *Zymomonas mobilis*) at laboratory prototype level for bioconversion of renewables (molasses, the byproduct of sugar industry, and glycerol, byproduct of biodiesel production) into valuable vegetarian (produced by microorganisms) docosahexaenoic acid (DHA) from omega 3 fatty acid family.

Summary: Knowledge-based bioeconomy implies conversion of cheap renewable resources into biotechnological products with added value. Current project aims at production of a highly valuable infant food and vegetarian food additive and a healthy food supplement omega 3 fatty acid from industrial byproducts - molasses and glycerol. Molasses is a byproduct of sugar industry, while raw glycerol is byproduct of biodiesel production. Both are industries with massive and constantly increasing turnover. The target product of the proposed bioprocess is one of the omega 3 fatty acid family – docosahexaenoic acid (DHA).
DHA is essential for health of infants and adults. Its market growth is about 10% annually and is expected to reach 240 thousand metric tons in 2020. 96% of DHA currently is produced from fish. Although the quality of microbiologically produced DHA is higher (without specific odor or taste, especially important for infant food), it is more expensive so far. The growing market and high costs of DHA requires new solutions, addressed by this project: design of advanced, high-yielding microbial bioproceses, based on cheap renewable substrates, instead of extracting DHA from a limited resource – marine fish oil.
The project will deliver a laboratory prototype (TRL4) of DHA production, including newly developed co-cultivation bioreactor, and a model-based control system of production.