

4TH INTERNATIONAL CONFERENCE ON BIOSCIENCE & BIOTECHNOLOGY

" Pursuing Innovation in Bioscience and Biotechnology to Solve Local and Global Grand Challenges "

21ST - 22ND FEBRUARY 2019 **KUALA LUMPUR
MALAYSIA**

BOOK OF ABSTRACTS

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CULTIVATION OF CYANOBACTERIA IN DOMESTIC WASTEWATER FOR BIODIESEL PRODUCTION

B.K. Zayadan, A.A. Ussebayeva, K. Bolatkhan, A.M. Bayzhigitova and B.D. Kossalbaev

Faculty of Biology and Biotechnology, Al-Farabi Kazakh National University, Almaty, Kazakhstan

ABSTRACT

Currently, the cultivation and use of biomass of various grains and oilseeds is mainly considered as renewable energy sources. Bioethanol and biodiesel are produced from these sources. Biodiesel is usually produced from oilseed crops, such as rapeseed, soybean, sunflower, and palm trees, etc. The industrial crops used today for the production of biofuels displace food and feed crops from the field and due to this food products are becoming more expensive. Cyanobacteria in energy output is significantly superior to palm and rapeseed oil which are usually used for the production of biodiesel. Presently, the two critical problems affecting the world: the lack of freshwater and the energy crisis. Cultivation of cyanobacteria in wastewater could be promising approach for the production of biodiesel. This integration is cost-effective and environmentally friendly technology for the sustainable production of biofuels, since a huge amount of water and nutrients in wastewater can be reused by cyanobacteria for growth. During comparative analysis of cyanobacteria strains, strains characterized by the greatest amount of C14 fatty acids, *Cyanobacterium* sp. B-1200 and *Cyanobacterium aponium* IPPAS B-1201 were selected. Such fatty acids composition is considered to be rare for cyanobacterium and especially 14:0 and Δ 9-14:1 FA are the most popular compounds for the production of biodiesel. In this work, collection of strains cyanobacterium sp. IPPAS B-1200 and *Cyanobacterium aponium* IPPAS B-1201, strain *Anabaena variabilis* R-I-5, isolated from rice fields of Baghlan region (Afghanistan), were cultivated on various media: 1) wastewater from the sewage treatment plant of Almaty city; 2) wastewater with a nutrient medium in a 1:1 ratio; and 3) BG-11 nutrient medium. The cultivation of the strains was carried out for 14 days. It was shown that investigated cultures characterized by intensive growth on wastewater with nutrient medium in 1:1 ratio. For investigation of ability of researched strains of cyanobacterium to bioremediation, the physical and chemical composition of wastewater before and after cultivation of cyanobacterium was analysed. During the research work, it was detected that wastewater after biological treatment is considered as more suitable medium for cyanobacterium sp. IPPAS B-1200 *Cyanobacterium aponium* IPPAS B-1201 and *Anabaena variabilis* R-I-5 cyanobacteria culture growth.

Thus cyanobacteria can be used in two directions: biomass production for sustainable biodiesel production and wastewater bioremediation.

Keywords: cyanobacteria, biodiesel, wastewater

Acknowledgments: This study was supported by the Ministry of Education and Science of the Republic of Kazakhstan in the framework of the project: «Development of waste-free technology of wastewater treatment and carbon dioxide utilization based on cyanobacteria for potential biodiesel production», 2018-2020 (grant AP05131218).