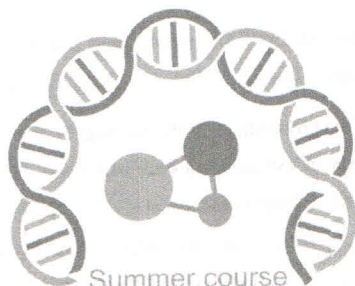


BOOK of ABSTRACTS

EXTREMOPHILES: FROM BIOLOGY TO BIOTECHNOLOGY

International Summer course
August 19-25, 2018



Summer course
EXTREMOPHILES

2018 Tashkent, Uzbekistan



ecobiome



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Nashrga tavsiya etiladi
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Biologiya Fakulteti

Mikrobiologiya va biotexnologiyaning ilmiy yangiliklari. Xalqaro Yozgi kurs materiallari – T.: “Ilm-Ziyo Zakovat” 2018. -40 bet.

Ushbu to'plam biologiya sohasidagi, xususan mikrobiologiya va biotexnologiya sohalaridagi ilmiy yangiliklarni o'z ichiga olgan. Xalqaro Yozgi kursning maqsadi mikrobiologiya va biotexnologiya sohalarida ilmiy tadqiqot ishlari olib boradigan xalqaro taniqli olimlar va yosh izlanuvchi talabalar orasidagi fikrlar almashish, va bilimlarni mustahkamlashdir.

Yozgi kurs Norvegiyaning Ta'lim sohasida Xalqaro Hamkorlik Markazi (SIU) tomonidan moliyalashtirilgan va O'zbekiston Milliy Universiteti hamda Ecobiome R&D markazi bilan hamkorlikda tashkil etildi.

Abstract Book of International Summer course on “Extremophiles: from biology to biotechnology”, Tashkent, “Ilm-Ziyo Zakovat i”, 2018 – 40 Pages

In the proceedings of the Summer course scientific studies concerning microbiology and biotechnology of extremophiles are included. The goal of the international summer course is to bring together distinguished scientists and young researchers working in the field of diversity, metabolism, genetics and biotechnology of extremophilic microbes. The training course is organized within the framework of the Eurasian project “Network for improving research based higher education in basic and applied microbiology” supported by The Norwegian Center for International Cooperation in Education (SIU) in cooperation with the National University of Uzbekistan and Ecobiome R&D Center.

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ORGANIZING AND SCIENTIFIC COMMITTEE

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Prof. Dr. Nils-Kåre Birkeland (University of Bergen, Norway)
Dr. Dilfuza Egamberdieva (EcoBiome R&D Ltd., National University of Uzbekistan)
Assoc. Prof. Dr. Hovik Panosyan (Yerevan State University, Armenia)
Dr. Vyacheslav Shurigin (National University of Uzbekistan)

WELCOME NOTE OF THE ORGANIZING COMMITTEE

Dear Participants!

On behalf of the Organizing Committee, we are glad to welcome you to the International Summer course on “Extremophiles: from Biology to Biotechnology”.

The training course is organized within the framework of the Eurasian project “Network for improving research based higher education in basic and applied microbiology” supported by The Norwegian Center for International Cooperation in Education (SIU) in cooperation with the National University of Uzbekistan and Ecobiome R&D Center.

The aim of the workshop is the presentation of scientific and application studies on topics concerning Microbiology and Microbial Biotechnology of Extremophiles. The Program of summer course include the lectures of the most distinguished scientists working in the field of diversity, metabolism, genetics and biotechnology of extremophilic microbes. Welcome to Tashkent and we will do our best to make this meeting and your stay in Tashkent a memorable event. We wish to all of you a nice time, hoping that you will find this a very productive and stimulating scientific event, set up new collaborations and make new friendship.

STUDY OF WHOLE GENOME AND SOME BIOCHEMICAL PECULIARITIES OF *HALOARCUA* SP. SALT STONE-1 ARCHAEAL STRAIN ISOLATED FROM AVAN SALT DEPOSIT

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The gene coding for 16S rRNA has been an important molecular chronometer for identification and classification of prokaryotes. Some species of *Haloarcula* harbour several divergent 16S rRNA genes in their genomes, and transcription of each copy of the 16S rRNA genes is probably related to environmental fluctuations. It causes concern about the reliability of 16S rRNA gene analysis in the phylogenetic analysis. Representatives of the genus *Haloarcula* produce biopolymers, biosurfactants, exopolysaccharides, compatible solutes, enzymes and bioactive compounds (carotenoids, anti-tumor and antimicrobial substances, etc.), which are valuable compounds for the pharmaceutical, chemical, food and feed industries. Genome-based knowledge of halophilic microbes is of great importance and interest for assessing the diversity of enzymes and bioactive compounds of biotechnological importance and revealing their 16S rRNA gene polymorphism. The aim of this study was to sequence the whole genome and to detect polymorphism of 16S rRNA genes of *Haloarcula* sp. salt stone-1 isolated from Avian subterranean salt deposit in Armenia. *Haloarcula* sp. salt stone-1 strain shares 98% 16S rRNA sequence identity with strain *Haloarcula marismortui* ATCC 43049 isolated from Dead Sea. The draft genome of the strain was sequenced using PacBio RS technology and assembled using the Celera Assembler GATC Biotech, Germany (<http://www.gatc-biotech.com>) resulting in 4 Mb of unique sequence data distributed into 48 contigs constituting a total of 4,331,370 bp. The G+C content is 61.4%. Gene prediction carried out with the NCBI Prokaryotic Genome Annotation Pipeline, as well as the RAST server (<http://rast.nmpdr.org/rast.cgi>), identified a total of 2,529 genes, including 4,261 coding DNA sequences, 68 sets of rRNA genes. Map of metabolic pathways, indicating key enzymes involved in carotenoid syntheses, was constructed using RAST annotation server. Based on genome sequence the specific primers to identify the 16S rRNA gene polymorphism were designed. This current study clearly demonstrated that two types of 16S rRNA genes occur in *Haloarcula* sp. salt stone-1 genome. The optimization of culture conditions for both cell growth and total carotenoid production of the halophilic *Haloarcula* sp. salt stone-1 strain was carried out as well. The optimum conditions for cell growth and total carotenoid production were observed at 30°C, pH 7.2, 20% NaCl (w/v), using casamino acids as carbon source. The production of biomass ranged up to 0.7 g/l and the total carotenoids up to 10.2 mg/l.

Key words: *Haloarcula*, 16S rRNA gene polymorphism, whole genome sequence, carotenoids

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