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SCREENING OF MICROALGAL STRAINS SELECTED FROM FRESHWATER GREEN MICROALGAE COLLECTION FOR ANTIBACTERIAL ACTIVITY

Édesvízi alga törzsgyűjteményből válogatott zöld mikroalga törzsek antibakteriális aktivitásának vizsgálata

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We performed the biological screening of organic solvent extracts of single-cell freshwater- and filamentous- green microalgal cultures. The microalgae collection of Albitech Biotechnology Ltd. consists of its own isolates. The isolates were collected from two different locations in Hungary: Lake Velencei and Lake Kőhegyi. The collected samples were diluted and streaked on a solidified enrichment medium. The results of the appropriate dilution were single cell cultures, which were selected by visual inspection and microscope. The axenic cultures were identified in the Department of Microbiology of Eötvös Lóránd University. Identification was carried out using molecular biological methods based on the 18S rRNA gene. These microalgae strains received a strain code and they are maintained in active and cryopreserved forms. The purpose of our study was to assess whether the selected microalgae produce metabolites that may inhibit the growth of widely occurring human facultative pathogens. There are many microalgae, e.g. *Chlorella* sp*., Scenedesmus* sp*.,* and macroalgae, e.g. *Ulva rigida* with proven antibacterial effects presumably associated with polyphenols, alkaloids, terpenes, polysaccharides, fatty acids, sterols, lactones, and proteins. We examined the antibacterial effect of the selected algal extracts against the following facultative pathogenic bacterial strains: *E. coli* NCAIM: B.01992, *S. aureus* NCAIM: B.01055 and *Ps. aeruginosa* NCAIM: B.01057*.* Four different organic solvents - acetone, ethanol, diethyl-ether and hexane – were used to create the extracts from the lyophilised biomass. The antibacterial effect of the extracts was determined using the agar gel diffusion method. As a positive control, we used antibiotics to compare the results semi-quantitatively. The *E. coli* strain was the least susceptible to treatments and *S. aureus* was the most sensitive. Among the solvents used, ethanol was the most suitable for the extraction of bioactive molecules of microalgae. In addition, we have observed that the inhibition zones of extracts were comparable in size to the inhibition zones of antibiotics, which suggests strong bacteriostatic or bactericidal effects against *S. aureus*. In summary, we have confirmed the antibacterial effects of four single-cell freshwater microalgae strains and one filamentous green microalgae strain against facultative pathogenic bacteria. This work has been supported by the 2019-1.1.1.-PIACI-KFI-2019-00228 grant of the National Development Agency, Hungary.