SOME FEATURES OF NITROGEN-FIXING BACTERIUMAND MICROALGATO DEVELOP A MULTIFUNCTIONAL BIOBASED PRODUCT FOR SUSTAINABLE AGRICULTURE

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Abstract - This paper presents the physiological and enzymological characterization of nitrogen-fixing bacterium and microalga to create a consortium as a biofertilizer, biostimulant and biopesticide.The nitrogen-fixing bacterium Sphingobacterium sp. L13G8 (GenBank: accession number OR304288.1; Culture Collection, SPC "Armbiotechnology" NAS RA, Armenia) and the microalga Tetradesmus obliquus(ACOI 204/07, ACOI Culture Collection, Coimbra University, Portugal) were studied for their use of carbon sources (rhamnose, galactose, sucrose, lactose, arabinose, maltose, raffinose) and their amylase, protease, gelatinase, catalase, cellulase, lipase and urease activities.It was shown thatL13G8 had the ability to utilize the investigated carbon sources, with the exception of lactose. The highest bacterial growth was observed with arabinose and raffinose.In case of T. obliquus, the highest growth was recorded in lactose medium. The microalga was able to utilize mentioned sugars, except rhamnose. Amylase, protease, gelatinase, catalase and cellulose activities were present in both nitrogen-fixing bacterium and microalga. L13G8 showed the highest amylase, gelatinase and catalase activities. In case of T. obliquus, the highest enzyme activity was observed in terms of protease, cellulase and gelatinase. Both species did not show any lipase and urease activities. L13G8 and T. obliquus will be used to create a multifunctional biobased product that will meet the challenges of sustainable agriculture and open up new opportunities in that sector.
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Keywords - Carbon Sources, Enzymatic Activities, Sphingobacterium Sp., Tetradesmus Obliquus