BACTERIA ISOLATES FROM MICROBIAL MATS IN LAKE MAGADI WITH POTENTIAL FOR SUBSTRATE UTILIZATION

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Abstract

Lake Magadi is an alkaline, hypersaline environment with extreme environmental conditions that allow specific microorganisms with specific characteristics to flourish. Its pH ranges from 9-11.5, very high temperatures, high salt concentrations (Na_2CO_3). Despite all the extreme conditions, this type of lake is the most productive aquatic environment in the world with productivity rates greater than the mean rate for all aquatic environments in the world. They are usually characterized by the presence of coloration of water caused by different microorganisms for instance the cyanobacteria. On the other hand microbial mats are microbial communities made up of a consortium of bacteria dominated by cyanobacteria. They are usually ubiquitous in nature and are found over the sediment surface or as floating masses in marine waters, hypersaline waters, estuaries, hot springs and deep oceans. Ecological success of microbial mats and their broad array of microbial activities suggest these microbial ecosystems might be useful in bioremediation of environmental pollutants and even bio generation of useful products. Since microbial mats contain both nitrogen fixing bacteria and photosynthetic bacteria, they usually tend to be self-sufficient with few growth requirements. The study was aimed to isolate useful bacteria from microbial mats from Lake Magadi with both biotechnological and therapeutic applications. This is because some of these bacteria can produce enzymes, proteases, antitumor and even antimicrobial agents for a variety of pathogens. Microbial mats were obtained from Lake Magadi and brought to the microbiology laboratory in the University of Embu. They were then heat treated to 100°C and 120°C. They were serial diluted and cultured in both actinomycetes agar and oatmeal agar and then incubated at temperatures ideal for their growth. After incubation 19 pure isolates were obtained from the study. Out of these only one isolate was able to utilize starch and only one could utilize cellulose. Thirteen isolates utilized tween 20 and 12 could utilize skimmed milk. No isolate utilized CMC, xanthan and lignin. Most of them were gram positives and even pathogenic. Few enzymes were identified and therefore further tests and research needs to be done for these extreme environments as there is a high diversity of microbes in the area.