Geothermal springs as a source of thermophiles with biotechnological potential

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Study of microorganisms able to grow and propagate at high temperature environments, including geothermal springs, are relevant and open new prospects in biotechnology. Numerous geothermal springs are found on the territory of Armenia. Thermophilic microbial community of Armenian geothermal springs are still poor investigated and represented a challenge for searching of new biotechnological resources. In this context the prokaryotic (both bacterial and archaeal) diversity thriving in Armenian geothermal springs were studied using both culture-independent molecular and culture-dependent approaches. 16S rRNA gene libraries were generated from total community DNA using universal archaeal and bacterial oligonucleotide primer sets. BLAST results and phylogenetic analysis of obtained bacterial sequences indicated that they originated from Firmicutes, Cyanobacteria, Epsilon-, Alfa- and Gamma-Proteobacteria. The representative archaeal phylotypes, mainly belonged to phylum of Euryarchaeota, Crenarchaeota and Thaumarchaeota. The majority of the phylotypes detected in the gene libraries were most closely related to uncultivated organisms detected only by molecular methods and shared less than 95% identity with their closest match in GenBank, indicating that studied springs harbour a unique community of novel species with undescribed biotechnological potentials. Culture-dependent methods were applied to isolate thermophilic aerobic nonspore-forming (Thermus) and endospore-forming bacteria (Anoxybacillus, Aeribacillus, Anaerobacillus, Bacillus, Brevibacillus, Geobacillus, Paenibacillus, Sporosarcina, Ureibacillus and Thermoactinomyces). The production of some hydrolytic enzymes (such as protease, amylase and lipase) from isolates was studied and active producers of thermostabile enzymes were selected. Isolated thermophilic bacilli were analyzed also for exopolysaccharide (EPS) production and active producers of EPS were selected too.

Biography

Hovik Panosyan is Associate Professor at the Department of Biochemistry, Microbiology and Biotechnology, Yerevan State University. He has completed his PhD on microbiology at age 27 years. He is author of 2 books, 1 chapter of book, 42 peer-reviewed publications, and over 50 presentations. Dr. H. Panosyan is a member of several advisory boards and professional societies. He is married, have a son and daughter.