Geophysical Research Abstracts,
Vol. 10, EGU2008-A-11212, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-11212
EGU General Assembly 2008

Antarctic soils, resources of microorganisms with biotechnological properties

G. Bahrim (1), **T. Gh. Negoita** (2), M. Cotarlet (1)

(1) „Lower Danube"University, Food Science and Engineering Faculty, Galati, Romania, email: Gabriela.Bahrim@ugal.ro, phone: 0040741024997, (2) Romanian Polar Research Institute, Libertatii Blvd. 1, Bucharest 4, Romania

Microorganisms in soils represent the main promoter of the transformations that organic matter undergoes in the processes of biodegradation, natural flow of elements, soil fertilization, and bioremediation. Antarctic soil microbiota includes archaebacteria, bacteria, fungi, and algae. Determinant environmental conditions for microbial composition are low temperatures and the quasi-inexistent humidity. A number of molecular mechanisms are responsible for the adaptation of life to cold environments, the most important being the changes in enzyme structure, i.e. increased flexibility and decreased stability. Our research objectives were: isolation of microbial strains with industrial applications; investigation of morpho-physiological, biochemical and genetic properties related to life in extreme environments; screening for enzyme producers and microbes useful in bioremediation; selection of high biomass yielding strains for production of single cell proteins; development and optimization of cultivation methodologies; improvement of fermentation performance by metabolic engineering. Samples were collected from the East region of Antarctica, as it follows: Larsemann Hills: Progress Station, Druzhnaya Base, Law-Racovita Station, Stornes Peninsula, Mirny Station, Haswell Archipelago (1999); King George Island, Grove Mountains (2005). Regarding the distribution of microorganisms in soils, we concluded: total bacterial counts vary according to humidity and organic content between 10^3 and 10^5 cfu/g. Total number of yeast and moulds is also influenced by water and organic content, and can reach up to $3.3 \cdot 10^3$ cfu/g. Pure cultures of the following species have been isolated: 1) bacteria: a) non-filamentous*: Bacillus* sp. (27 strains) and some Gram

positive cocci (*Sarcina* sp., *Staphylococcus* sp., *Micrococcus* sp.) (23 strains); b) actinomycetes: belonging to the genera *Streptomyces* and *Actinomyces* (11 strains); 2) yeasts: *Candida* and *Zygosaccharomyces* genera (5 strains); 3) moulds: *Aspergillus* sp., *Mucor* sp., *Penicillium* sp., *Cladosporium* sp. (34 strains).

As a consequence of the screening studies, the culture collection of our laboratory (coded MIUG) was completed with several strains: *Bacillus* sp., producers of amylases and proteases; *Streptomyces* sp.,producers of tyrosinases and catalases; *Candida* sp., high protein yielding strains capable of growing at low temperatures on plant waste hydrolysates. Extremophiles are given a plus of attention in current global trends in biotechnology.