

Cold Loving Microorganisms

BY: [Shekhar C Bisht](#) | Category: [Biology](#) | Submitted: 2011-03-05 19:34:17



Article Summary: *"Cold tolerant microorganisms exhibit distinctly different properties than representatives of mesophiles and thermophiles. Microorganism with low temperature optima are generally referred to as psychrophiles (cold loving). Their natural habitats include snow, glacial and sea ice, permafrost soil, ice clouds These organisms have c.."*

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Cold tolerant microorganisms exhibit distinctly different properties than representatives of mesophiles and thermophiles. Microorganism with low temperature optima are generally referred to as psychrophiles (cold loving) and the definition given by R. Mortia in 1975 become widely accepted. He based definition of cold adapted bacteria on their cardinal growth temperature, viz. lower limit, optimum and upper limit. A psychrophile can be defined as an organism whose optimal growth temperature below 2 °C and a minimal growth temperature at 0 °C or below. Microorganisms which grow at 0°C or at subzero but grow optimally at 20-30°C are referred to as psychrotolerant (also named cold tolerant or psychrotrophic). Any such classification is artificial, and individual cold-adapted microorganism may not fit the man-made definitions. Studies from Antarctic soil bacterial isolates may have both their optimum and upper limit between 15 and 20°C, or they may have an average optimum that is 15°C but an upper limit of upto 20°C. The main difference between the two groups is the facts that psychrotolerant have a much broader growth temperature range (30 to 40°C) than do psychrophiles (~20°C). Psychrotolerant may grow as fast as psychrophiles at low temperatures.

The new terms 'eurypsychrophile' and 'stenopsychrophile' have been proposed to substitute

psychrophile and psychrotolerant, respectively. 'Steno-' and 'eury-' are ecological terms derived from Shelford's law of tolerance that describes a narrow or wide tolerance to an environmental determinant, respectively. The term stenopsychrophile ('true psychrophile') describes a microorganism with a restricted growth temperature range that cannot tolerate higher temperature for growth. Eurypsychrophile ('psychrotolerant' or 'psychrotrophic') describes a Microorganism that likes permanently cold environment, but that can tolerate a wide range of temperature extending into the mesophilic range (that is 'mesotolerant', not 'psychrotolerant'). The term psychrophiles is effective as a general term that describes a microorganism that grows in cold environment. It is noteworthy that the term 'trophic' pertains to a nutritional state and is not a useful term for clarifying the temperature that can tolerate by any organism.

Such psychrotrophic microorganisms are much more widely distributed than true psychrophiles, they persist in permanently cold habitats, such as in Polar Regions, at high altitudes or seasonal temperature fluctuations (e.g., area in continental climates with high summer and low winter temperatures) are favorable to psychrotrophs, which grow over a wide temperature range and have fastest growth rates above 20°C. Diverse microorganisms have remained viable within glacial ice cores for over 120,000 years. During last two decades, a number of investigations have reported, special focus has been given to microbial life in frozen natural habitats (snow, glacial and sea ice, permafrost, ice clouds), due to the increasing interest in life on distance frozen planets (astrobiology), genetic tools to create transgenic, and a realization of the considerable biotechnological potential of these organisms.

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<p>Masoud 2011-08-02 12:22:27 201</p>	<p>Hi Shekar, I was amazed with your paper. would you please send me a copy of your article since I am a PhD student at the Univeristy of Guelph, Canada, and working on Mesophilic psychrotolerant Basillus cereus. Best regards, Masoud</p>
<p>Kirti K 2011-11-17 03:08:32 236</p>	<p>Sir, really your work is amazing. do you have some matter related to pigmentation strategies in cold loving bacteria. Do send if you have some. thankx</p>
<p>Shekhar C Bisht - Author 2012-01-01 00:31:31 248</p>	<p>Thanks, for your interest taking in my article, I apologies for late responses. I like ur interest that pigmentation strategies in cold loving bacteria. During my research on cold pigmented bacteria, I was found that pigmentation is might be adaptation strategies in bacteria or with the lowering temperature bacteria can change their pigmentation. I had not work in this direction but, these are my observation during handling my culture.rnFor details contact me or search my work on reseach gate rnrnrn</p>
<p>Shekhar C Bisht - Author 2012-01-01 00:39:37 249</p>	<p>Hi Masoud, Thanks, for your interest taking in my article, I apologies for late responses. I like ur current research work on Mesophilic psychrotolerant Basillus cereus. Dear Masoud, This article is short summary of two book chapter and one review articles. Book chapter are already published while review articles in on processing. You can see my recent publication on Research Gate. Thanks With Best regards</p>

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