





Effects of manganese ion on Antarctic esterase

Marchetti A.1, Mangiagalli M.1, Lotti M.1

E-mail: a.marchetti20@campus.unimib.it

¹ University of Milano-Bicocca, Department of Biotechnology and Biosciences, Piazza della Scienza 2, 20126, Italy

Keywords: Extremozyme, psychrophiles, esterase, manganese, characterization, activity, structure.

Organisms able to survive and thrive in cold environments are widespread and have developed several molecular adaptations to survive in these extreme conditions, including the production of cold-active enzymes. Compared to mesophilic enzymes, cold-active enzymes are characterized by high activity at low temperatures and thermolability, making them suitable for bioprocesses involving thermolabile substrates or products.

Esterases are widespread enzymes, which hydrolyse ester bonds present in different molecules, generating a carboxylic acid and an alcohol as products. This thesis is focused on an esterase (Mar-Est), identified in the genome of *Marinomonas ef1*, an Antarctic marine bacterium. Our preliminary results suggest that Mar-Est is a strictly cold active enzyme with a temperature optimum of 5°C. Interestingly, the addition of Mn²⁺ ion improves the thermal stability of these enzymes. The effects of Mn2+ ion on functional and structural properties of Mar-Est will be deeper investigated combining site directed mutagenesis and biophysical analysis.