Comparison of biochemical characteristics of selected mesophilic proteins involved in bioremediation and their homologs in halophiles

Kunwali Das and Ashutosh Kumar*

Department of Microbiology, Tripura University (A Central University), Suryamani nagar, Agartala, Tripura

*Corresponding author

ABSTRACT

Halophiles are kind of extremophiles that can flourish in high salt containing medium. The presence of unique environmental strategy helps them to thrive under life-threatening effects of extreme surrounding conditions; they require a vast array of adaptations in all their cellular components to maintain metabolism and growth. There are many environmental pollutants present in the high salt conditions and biodegradation of such pollutants is difficult as most of the degradation process work efficiently in normal conditions. Esterase degrades the sulphonyl urea by the process of de-esterification. Methyl parathion degrading protein degrades organophosphate compounds, which form the basis of most pesticides and insecticides widely used in our agricultural practices. Fenoxaprop ethyl hydrolase is an important protein present in *Rhodococcus* species. FeH is said to be effective in the degradation of of Fenoxaprop-ethyl. Organophosphates or esters of phosphoric acid are the toxic compounds used in agriculture. Organo Phosphorus Hydrolase (OPHC2) degrade organophosphates (OPs). Organophosphates may not have much effects to the general people but cause huge side effects to the farmers working with these fatal insecticides. Comparison of amino acid sequences of these proteins and their homologs in halophiles shows increase in acidic amino acid residue in their proteins, halophiles change their surface potential to negative charge which helps them maintain the balance between the interior and exterior of the cell. The proposed study of protein adaptation of halophiles will provide the molecular basis of extreme adaptation of proteins. Genetic manipulation of such proteins can be useful in various bioremediation processes.

Keywords: Bioremediation, Halophiles, Proteinadaptation, Organo Phosphorus Hydrolase ($OPHC_2$).

ISBN: 978-81-947843-4-0; DOI: 10.21467/abstracts.109