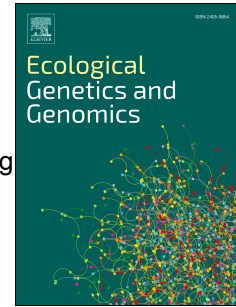


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Md Firoz Mortuza, Md Hafizur Rahman, Md Habibur Rahman, Arifatun Nahar, Md Rezaul Islam Khan, AKM Mahbub Hasan, Mustafizur Rahman



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Isolation, biochemical and genetic characterization of extracellular protease producing cattle hide dehairing bacterium – a potential alternative to chemical dehairing

Md Firoz Mortuza^{1,2}, Md. Hafizur Rahman¹, Md. Habibur Rahman¹, Arifatun Nahar², Md. Rezaul Islam Khan^{1,3}, AKM Mahbub Hasan¹, Mustafizur Rahman^{1*}

¹Department of Biochemistry and Molecular Biology, University of Dhaka, Dhaka, Bangladesh.

²Institute of Food and Radiation Biology, Bangladesh Atomic Energy Commission, Dhaka, Bangladesh.

³Bio-X Institute, School of Life Science and Technology, Shanghai Jiao Tong University, Shanghai, 200240, China.

*Corresponding author

Mustafizur Rahman, email: m22_rahman@yahoo.com, Cell: +8801819271011. Fax: +88029862226.

Abstract

Wastes of leather industries are substantially polluting the environment; therefore, to ameliorate the situation using environment-friendly dehairing process, an extracellular protease producing bacterium highly capable of dehairing cattle hide was isolated from soil. The bacterium was capable of producing extracellular protease which could dehair cattle hide within 8-10 hours only. Scanning electron microscopic analysis of the dehaired hide obtained from enzymatic process showed that hair pores were free of any hair residues and grain surface was found to be smoother than conventional dehairing process. The optimum temperature for bacterial growth and enzyme production was found to be around 37°C and crude enzyme was found to have optimum activity at pH 8.5. Complete inhibition of the enzyme activity by phenylmethylsulfonyl fluoride (PMSF) indicated that the enzyme could be serine protease. Molecular phylogenetic analysis of 1430 nt 16S rRNA gene sequence by MEGA 6.0 placed the isolated bacterium in the same clad with *Bacillus subtilis*. Phylogenetic analysis of full length 16S-23S Internal Transcribed Spacer (ITS) region and partial sequence of 23S rRNA gene also showed that the bacterium could be a member of *Bacillus subtilis* family. This potential bacterium can be used in the leather industries as an eco-friendly alternative to chemical dehairing.

Keywords Dehairing; protease; scanning electron microscopy; 16S rRNA; phylogenetic analysis; *Bacillus*.

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