

## CHAPTER 36

### MICROBIOLOGY

#### Doctoral Theses

314. ADHIKARI (Shreekant)  
**Production and Applicability of Thermostable and Alkalistable Xylanase of an Extreme Thermophile Geobacillus Thermoleovorans in Prebleaching of Paper Pulps.**  
Supervisor : Prof. T. Satyanarayana  
Th 15478

*Abstract*

Describes the production of thermostable and alkalistable xylanase by an extremely thermophilic bacterium Geobacillus thermoleovorans and its application in pulp and paper industry.

*Contents*

1. Introduction 2. Materials and methods. 3. Results. 4. Discussion. 5. Summary and Conclusions. 6. References.

315. GULATI (Pooja) Nee SACHDEVA  
**Molecular Characterization of Strains of Yersinia Enterocolitica Isolated from India.**  
Supervisor : Dr. J. S. Viridi  
Th 15356

*Abstract*

Studies genotyping strains of Y. enterocolitica of Indian origin using a whole-genome based approach of rep (REP/ERIC)-PCR fingerprinting, and to compare these with global strains. Characterises the strains using rrn locus and gyrB gene-based typing also studies the distribution of variable number tandem repeat (VNTR) containing loci in genome of Y. enterocolitica, and to investigate the applicability of recently developed multilocus-VNTR analysis for typing of Y. enterocolitica.

1. Introduction 2. Review of literature. 3. Aims and objectives. 4. Materials and methods. 5. Results. 6. Discussion. 7. Summary. 8. Bibliography.

316. KAPOOR (Mukesh)  
**Alkalothermostable Endo- $\beta$ -1, 4-Xylanase from Bacillus Pumilus Strain MK001 and its Application in Bleaching of Paper Pulp.**  
Supervisor : Prof. Ramesh Chander Kuhad  
Th 15358

*Abstract*

Concludes that hightiters of an alkalo-thermo-stable cellulase-free endoxylanase from Bacillus pumilus strain MK001 under submerged, solid state fermentation and biphasic growth cultivation conditions were achieved. Immobilization of whole bacterial cells enhanced xylanase production, while immobilization of xylanase on varied supports improved the biochemical and kinetic properties of enzyme. The endoxylanase was purified to homogeneity with a high specific activity. The application of xylanase as a prebleaching agent, in pulp and paper industry, improved pulp properties of waste paper and non-woods pulps as well as reduced the consumption of bleaching agents, while in chick feed improved it improved digestibility. Xylanase was able to produce high levels of xylo-ologosaccharides.

*Contents*

1. Introduction. 2. Review of literature. 3. Materials and methods. 4. Observations and results. 5. Discussion. 6. Summary and conclusions. 7. Bibliography.

317. RAMNANI (Priya)  
**Biochemical and Molecular Characterization of a Keratinase from Bacillus Licheniformis RG1 : Application in Feather Recycling.**  
Supervisor : Dr. Rani Gupta  
Th 15357

*Abstract*

Attempts to understand the complex mechanism of keratinolysis using feather as the model system. The present strain Bacillus

licheniformis RG1, is highly keratinolytic, capable of completely degrading chicken feather within 24. It can be exploited for recycling of feather for generating protein rich feather meal for feed. The keratinase produced by the bacterium has biochemical characteristics similar to industrially important proteases viz. broad pH-temperature range and substrate specificity and can be exploited in a number of biotechnological sectors ranging from detergents, medicine, cosmetics to leather processing.

*Contents*

1. Introduction. 2. Review of literature. 3. Materials and methods. 4. Observations and results. 5. Discussion. 6. Summary and conclusions. 7. Bibliography.

318. RAO (J. L. Uma Maheswar)  
**Production, Characterization and Applications of Hyper Thermostable  $\alpha$ -Amylase of Geobacillus Thermoleovorans.**  
 Supervisor : Prof. T. Satyanarayana  
 Th 15477

*Abstract*

Optimization of culture variables led to an increase in amylase production by 'one variable at a time' approach. Further optimization by RSM  $\alpha$ -amylase production enhanced in chemically defined and cane molasses medium. The anionic detergents (cholic acid, SDS) were more effective in enhancing cell membrane permeability and thus increasing enzyme secretion than the cationic detergents. Furthermore, surfactants stimulated the activity and stabilized the enzyme during preservation at 4° C. Polyamine-biosynthesis inhibitor, MGBG enhanced secretion. The amylase in thermoleovorans was constitutive, since the enzyme synthesis occurred not only in starch but also in non-metabolizable carbon sources. The enhancement in  $\alpha$ -amylase production in fed-batch was two-fold higher than that in batch fermentation. The PUF immobilized cells could be reused for 15 batches without any noticeable decline in  $\alpha$ -amylase yield.

*Contents*

1. Introduction 2. Materials and methods. 3. Results. Discussion. 4. Summary and Conclusions. Bibliography.

319. SHARMA (Sachin)  
 **$\beta$ -Lactamases and Extended Spectrum  $\beta$ -Lactamases (ESBL) of *Yersinia Enterocolitica* Strains Isolated from India.**  
Supervisor : Dr. J. S. Virdi  
Th 15476

*Abstract*

Reports detection of  $\beta$ -lactamases(Bla-A and Bla-B) and extended spectrum  $\beta$ -lactamase (ESBL) in the strains of *Y. enterocolitica* isolated from India. The enzymes were characterized by their inhibition with well-known inhibitors, and determination of their isoelectric points and molecular weights. Furthermore detection of  $\beta$ -lactamase genes namely blaA and blaB and their molecular heterogeneity was also studied. For comparison, biovar 1A strains procured from France, Germany and the USA were also included.

*Contents*

1. Introduction 2. Review of literature. 3. Aims and objectives. 4. Materials and methods. 5. Results. 6. Discussion 7. Summary. Bibliography.