

**PRODUCTION, CHARACTERIZATION AND  
IMMOBILIZATION OF THERMO-ALKALI-STABLE  
XYLANASE FROM *GEOBACILLUS  
THERMODENITRIFICANS* X1 AND ITS APPLICATION  
IN PAPER PULP BIO-BLEACHING**

*Thesis submitted in fulfillment of the requirements for the degree of*

**DOCTOR OF PHILOSOPHY**

By

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