STUDIES ON XYLANASE PRODUCTION BY *Aspergillus niger* ON TOMATO POMACE MEDIUM

BY

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CUGP 100356

MICROBIOLOGY, COVENANT UNIVERSITY

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DEDICATION

This thesis is dedicated to my father, helper and strength for a successful work done and also to my family for their support.

DECLARATION

I, PETER-ALBERT CHINENYE FAVOURED, hereby declare that this project report is based on the study undertaken by me in the Department of Biological Sciences, School of Natural and Applied Sciences, College of Science and Technology, Covenant University under the supervision of Dr. A. A. Ajayi.

This project has not been submitted anywhere else for a degree award. The ideas and reviews are products of research conducted by me. All ideas of other authors and researchers have been duly acknowledged.

PETER-ALBERT, CHINENYE FAVOURED **.....**

Researcher **Signature and Date**

CERTIFICATION

We certify that this work was done by Peter-Albert, Chinenye Favoured, CUGP100356 in the Microbiology programme of the Department of Biological Sciences, School of Natural and Applied Sciences, College of Science and Technology, Covenant University, Ota, Ogun State.

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Unto the king eternal unto the reigning king be all glory, honour and praise for his grace and help made available for the successful ending of this programme.

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Peter-Albert C.F.

TABLE OF CONTENT

LIST OF FIGURES

FIGURE **PAGE**

LIST OF TABLES

TABLE **PAGE**

ABSTRACT

Xylanase production by *Aspergillus niger* was investigated using tomato pomace medium in comparison with a basal salt medium. The importance of xylanase in industries cannot be over-emphasised. They are used for baking, bleaching paper pulp, improving animal feed, bioethanol production, fruit juice and beer clarification to mention a few. Considering the vast importance of xylanase enzyme, there is a need for locally produced xylanase enzyme. *Aspergillus niger* was obtained from deteriorated banana (*Musa acuminata*) fruit. A pure culture was obtained and prepared on agar slants. Tomato pomace medium and a basal salt medium were inoculated with 72-h-old culture of *Aspergillus niger.* Xylanase production was tested in both growth media after four days of inoculation at room temperature (27^0C). Xylanase activity was determined by measuring the released reducing sugar (xylose) and the specific activities of xylanase from the basal salt medium and the tomato pomace medium were 3.6 U/mg and 2.0 U/mg respectively. Partial purification of the enzyme was carried out by Ammonium sulphate precipitation. The optimum condition for xylanase activity was determined by characterizing the partially purified enzyme. Optimum temperature and pHof 40^oC and 3.5 respectively was obtained for the partially purified enzyme. Optimum substrate concentration of 0.5mg/ml and a purification fold of 4.3 were obtained for the xylanase. The apparent dissociation constant or Michaelis Menten constant (Km) which is the substrate concentration at half maximum velocity obtained from the Line-weaver burk plot was approximately 0.50mg/ml. This study established that the fungal strain of *A. niger* used for this study produced appreciable xylanase activity. This strain is a potential organism for the utilization of tomato waste. This makes tomato wastes a suitable medium for fungal xylanase production. The use of tomato waste will cut down on the foreign

exchange spent on importation of xylanase by industries that depend on its use for their manufacturing processes.

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