



National University of Science and Technology
Zimbabwe

FACULTY OF APPLIED SCIENCES

DEPARTMENT OF APPLIED BIOLOGY AND BIOCHEMISTRY

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TITLE OF PROJECT
ESTERASES AND PUTATIVE SUBERINASE ACTIVITIES OF
ARMILLARIA ISOLATES FROM ZIMBABWE

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A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF
REQUIREMENTS FOR BACHELOR OF APPLIED SCIENCE HONOURS

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thank all who gave assistance to me when I was working on this project.

Academics and moral support carried me through.

Lead with... my supervisors

ABSTRACT

Armillaria is a root rot pathogen that occurs worldwide. Three groups have been described to occur in Zimbabwe. Six isolates of *Armillaria* representing group I (P5 and P9), group II (Z1 and 40) and group III (55 and D10) were grown on malt extract agar and purified using thiabendazole and streptomycin. Suberinase and esterases activity of isolates were studied by growing isolates on Msasa crude cell walls, in Vogel's salt medium. Enzyme activities were assayed using paranitrophenol acetate as a substrate and degradation of suberin in vitro was determined by an assay ^{for free glycerol} using periodic acid and iodine. All isolates showed suberinase activity with group II isolates giving the highest activity, three times larger than that of group III isolates which recorded the lowest activity. Protein concentration was determined by the Bradford method. Polyacrylamide gel electrophoresis using α and β naphthyl acetate as substrates detected esterases and putative suberinase isozymes. Distinct and specific bands were produced by the three groups of Zimbabwean *Armillaria*. Group II was found to degrade a larger amount of suberin compared to the other groups with group III degrading the smallest amount. Group III being the most pathogenic was expected to have a high suberinase activity, may be suberinase activity does not have to be too high for a pathogen to gain entrance into host tissues, the activity produced by group III could be enough for the pathogenic fungi to gain ingress into host tissues. Group III has been found to have a high activity for other cell wall degrading enzymes, for example pectin lyases and β -1,3- glucanases.