

EFFECT OF HYDRO-ETHANOLIC EXTRACT OF
Laportea aestuans **ON BENIGN PROSTATIC**
HYPERPLASIA

By

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MASTER OF SCIENCE (M.Sc) DEGREE IN BIOCHEMISTRY.**

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ACCEPTANCE

This is to attest that this dissertation is accepted in partial fulfilment of the requirements for the award of Master of Science (M.Sc.) degree in Biochemistry in the Department of Biochemistry, College of Science and Technology, Covenant University, Ota, Ogun State, Nigeria.

DECLARATION

I, OGUNLADE Oladipupo Olawumi (16PCP01322), declare that this M.Sc. dissertation titled: “effect of hydro-ethanolic extract of *Laportea aestuans* on benign prostatic hyperplasia’ was undertaken by me under the supervision of Dr. O. E. Omotosho. The work presented in this dissertation has not been presented, either wholly or partly for the award of any degree elsewhere. All sources of scholarly information used in this dissertation were duly acknowledged.

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CERTIFICATION

We certify that the dissertation titled: “effect of hydro-ethanolic extract of *Laportea aestuans* on benign prostatic hyperplasia” is an original work carried out by Ogunlade, Oladipupo Olawumi with Matriculation Number: 16PCP01322, of Biochemistry Programme in the Department of Biochemistry, College of Science and Technology, Covenant University Ota, Ogun State, Nigeria. We have examined the work and found it acceptable for the award of Master of Science (M.Sc.) degree in Biochemistry.

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DEDICATION

This research is dedicated to an ever faithful God whose mercy, grace and favour saw me to the end of this programme.

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ABBREVIATIONS

5-AR:	5-alpha reductase
A-2M:	alpha-2-macroglobulin
AAS:	Androgen and Anabolic Steroid
ACT:	alpha-1-antichymotrypsin
Ang:	Angiotensin
ANOVA:	Analysis of Variance
BHA:	Butylated Hydroxyanisole
BHT:	Butylated Hydroxytoluene
BMI:	Body Mass Index
BOO:	Bladder Outlet Obstruction
BPH:	Benign Prostatic Hyperplasia
BSA:	Bovine Serum Albumin
CAT:	Catalase
CD4+:	Cluster of differentiation 4
CD8+:	Cluster of differentiation 8
COX:	Cyclooxygenase
CT:	Computed tomography
Cu:	Copper
CuSO₄:	Copper sulphate
dG:	deoxyguanosine
DHT:	Dihydrotestosterone
DM:	Diabetes Mellitus

DNA:	Deoxyribonucleic Acid
DRE:	Digital Rectal Examination
EDTA:	Ethylenediaminetetraacetic acid
EGF:	Epidermal Growth Factor
ELISA:	Enzyme Linked Immunosorbent Assay
eNOS:	endothelial Nitric Oxide Synthase
ETC:	Electron Transport Chain
Fe:	Iron
GSH:	reduced glutathione
G-T:	Guanine-Thymine
H₂O₂:	Hydrogen peroxide
HOBr:	Hypobromous acid
HOCl:	Hypochlorous acid
HT:	Hydroxytryptamine
IFN-g:	Interferon
IGF:	Insulin Growth Factor
IL:	Interleukin
iNOS:	inducible Nitric Oxide Synthase
iPSA:	intact Prostate Specific Antigen
kDa:	kilodalton
KGF:	Keratinocyte Growth Factor
KLK:	Kalikerrin
LOX:	Lipoxygenase

LUTS:	Lower Urinary Tract Symptoms
Lys:	Lysine
MAPK:	Mitogen Activated Protein Kinase
MDA:	Malondialdehyde
Mn:	Manganese
mRNA:	messenger Ribonucleic Acid
Na₂CO₃:	Sodium carbonate
NaCl:	Sodium chloride
NADPH:	Nicotinamide Adenine Dinucleotide Phosphate
NaKT:	Sodium potassium tartrate
NaOH:	Sodium hydroxide
NF-κB:	Nuclear Factor kappa B
nNOS:	neuronal Nitric Oxide Synthase
NOS:	Nitric Oxide Synthase
O₃:	Ozone
PAP:	Prostatic Acid Phosphatase
PCa:	Prostate Cancer
PCV:	Pack Cell Volume
PSA:	Prostate Specific Antigen
RNS:	Reactive Nitrogen Specie
ROS:	Reactive Oxygen Specie
RPW:	Relative Prostate Weight
SEM:	Standard Error of Mean

SHBG:	Sex Hormone Binding Globulin
SOD:	Superoxide dismutase
SRD5A2:	3-oxo-5 α -steroid 4-dehydrogenase
sTNF-RII:	soluble tumour necrosis factor receptor 2
TBHQ:	Tert-Butylhydroquinone
TGF:	Tumour Growth Factor
TP:	Testosterone Propionate
WHO:	World Health Organization
Zn:	Zinc
MRI:	Magnetic Resonance Imaging
AP:	Activator Protein

ABSTRACT

Several plants have been used in ancient times as medicines to treat, manage and prevent many diseases in various traditional settings throughout the world. The effect of administration of hydro-ethanolic extract of *Laportea aestuans* (*La*) leaves at different doses in *Wistar* rats induced with benign prostatic hyperplasia (BPH) was studied using antioxidant parameters, prostate specific antigen (PSA), relative prostate weight and phytochemical screening. Thirty (30) animals were randomly divided into six (6) groups (A-F) of five (5) animals each. BPH was induced in the animals by daily subcutaneous injection of testosterone propionate (TP) (3mg/kg) in olive oil and administration of treatments for four (4) weeks were done concurrently. Group A received olive oil alone subcutaneously, group B was induced with BPH alone, groups C-E were induced with BPH but received different doses of *La* at 100, 200 and 400mg/kg. Lastly, group F was induced with BPH but treated with finasteride (5mg/kg) which serves as the positive control group. Phytochemical screening results shows that saponins, flavonoids (0.5010±0.0009mg/ml), alkaloids (0.528mg/ml), phenols (0.6195±0.0015mg/ml), tannins (0.5410±0.0013mg/ml) and steroids (1.6230±0.0210 mg/ml) were present in hydro-ethanolic extract of *La*. The relative prostate weight result decreased significantly ($p<0.05$) in the 400mg/kg *La* (1.15± 0.14mg) in comparison to the BPH group (1.58±0.05mg). PSA level also decreased significantly ($p<0.05$) in the 400mg/kg *La* (131±1.91pg/ml) when compared to the BPH group (174±4.13pg/ml). Meanwhile, the levels of SOD, CAT and GSH increased significantly ($p<0.05$) at 400mg/kg *La* (48.1±4.17U/mg protein), (29.43±1.38U/mg protein) and (30.60±2.05ug/ml) respectively when compared to the BPH group (35.5±0.97U/mg protein), (11.36±2.39U/mg protein) and (15.60±1.14ug/ml). Antioxidant, PSA and relative prostate weight results may be due to the phytochemicals present in the plant. These findings also indicate that *Laportea aestuans* could be useful in the management of benign prostatic hyperplasia.

Key words: *Laportea aestuans*, benign prostatic hyperplasia, prostate specific antigen, antioxidant, phytochemicals.