

**ANTIMICROBIAL ACTIVITY, PHYTOCHEMICAL SCREENING AND
TOXICITY OF JATROPHA CURCAS L. AND RICINUS COMMUNIS L. SEED
OIL**

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MINNA**

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**A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL FEDERAL
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FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE
DEGREE OF MASTER OF TECHNOLOGY IN PHARMACEUTICAL
MICROBIOLOGY**

JULY, 2021

DECLARATION

I hereby declare that the thesis titled: “**Antimicrobial Activity, Phytochemical Screening and Toxicity Of *Jatropha curcas* and *Ricinus communis* Seed Oil**” is a collection of my original research work and it has not been presented for any other qualification anywhere. Information from other sources (published or unpublished) has been duly acknowledged.

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CERTIFICATION

This thesis titled: “**Antimicrobial Activity, Phytochemical Screening and Toxicity Of *Jatropha curcas* and *Ricinus communis* Seed Oil**” by MUHAMMAD, Fatima Enagi (MTech/SLS/2017/7529) meets the regulations governing the award of the degree of Master of Technology of the Federal University of Technology, Minna and it is approved for its contribution to scientific knowledge and literary presentation.

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DEDICATION

This research work is dedicated to my late uncle Professor Abdullahi AbdulRahman Enagi for his rentless efforts towards education.

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ABSTRACT

Jatropha curcas and *Ricinus communis* are members of the *Euphorbiaceae* that have been known for their ethno-medicinal uses. The aim of this study was to investigate the antimicrobial activity, phytochemical constituents and toxicity of *J. curcas* and *R. communis* seed oil. The antimicrobial activity against *Escherichia coli*, *Salmonella* Typhi, *Staphylococcus aureus*, *Aspergillus flavus* and *Aspergillus niger* was carried out using Agar Well Diffusion method at 100, 200, 300 and 400 mg/mL. The toxicity was assessed according to Lorke's method for acute toxicity testing and the sub-acute toxicity was conducted by daily oral dosing (10, 300 and 600 mg/kgb.wt) of Wistar rats for 28 days. Haematological, biochemical analyses of blood samples and histopathology of the liver and kidney were evaluated. The highest antimicrobial activity was exhibited by *J. curcas* seed oil against *S. aureus* with mean inhibition zone of 32 ± 3.17 mm and the lowest activity of *J. curcas* was against *A. niger* with mean inhibition zone of 10 ± 0.57 mm. Similarly, the highest antimicrobial activity of *R. communis* seed oil was against *S. aureus* with mean inhibition zone of 28 ± 2.30 mm and the lowest activity of *R. communis* was against *A. niger* with mean inhibition zone of 8 ± 4.61 mm. The LD₅₀ of *J. curcas* seed oil was greater than 5000 mg/kg b.wt and 3807 mg/kg b.wt was the LD₅₀ of *R. communis* seed oil. The result of the haematological and biochemical blood test of rats administered *J. curcas* seed oil showed decrease in the TWBC, PLC and L while the level of Hb, PCV, MCV, MCH, MCHC and RBCs increased. Generally, increase in the level of AST, ALT, ALP, total bilirubin, urea, creatinine, cholesterol and TAG was observed in the 600 mg/kg bw.t group but their level in the 10 and 300 mg/kg b.wt groups were comparable with the control group. In contrast, the level of total protein and albumin decreased. The result of the effect of *R. communis* seed oil on the haematological and biochemical indices showed increased level of Hb, PCV, MCV, MCH, MCHC, PLC, L, AST, ALT, ALP, total bilirubin, urea, creatinine, cholesterol and TAG in 300 and 600 mg/kg bw.t group, their level in 10 mg/kg bw.t group was also comparable to the control group. Similarly, the level of total protein and albumin decreased. The histological evaluation revealed distortion in the cyto-architecture of the liver and kidney of rats administered 600 mg/kg bw.t of *J. curcas* seed oil, 300 and 600 mg/kg bw.t of *R. communis* seed oil. It can be concluded from this study that both seed oil can be used in the treatment of diseases associated with the tested isolates but cautious should be taken in their usage at high doses for prolonged time with emphasis on *R. communis* seed oil. The findings provide the basis for further study on the wounding healing activity of the seed oil.

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Glossary of Abbreviations

WHO	World Health Organization
DPPH	1, 1-diphenyl-2-picrylhydrazyl
COXB4	Coxsackie B Virus type 4
HSV	Herpes Simplex Virus
HAV	Hepatitis A Virus
HIV	Human Immune Virus
GIT	Gastrointestinal Tract
AgNPs	Silver nanoparticles
NIST	National Institute of Standard and Technology
LD ₅₀	Lethal Dose
EDTA	Ethylenediaminetetraacetic acid
ZnO	Zinc oxide
UV	Ultraviolet
NA	Nutrient Agar
PDA	Potato Dextrose Agar
DMSO	Dimethylsulphoxide
MIC	Minimum Inhibitory Concentration
MBC	Minimum Bacteriocidal Concentration
MFC	Minimum Fungicidal Concentration
TAG	Triacylglycerol
PLC	Platelet Count
TWBC	Total White Blood Cells Count
N	Neutrophils
L	Lymphocytes
E	Eosinophils
B	Basophils
M	Monocytes
RIPs	Ribosome Inactivating Proteins
RBC	Red Blood Cells
Hb	Haemoglobin
ALT	Alanine Transaminase
AST	Aspartate Transaminase

ALP	Alkaline Phosphatase
PCV	Packed Cell Volume
MCV	Mean Corpuscular Volume
MCH	Mean Corpuscular Hemoglobin
MCHC	Mean Corpuscular Hemoglobin Concentration