

**THE ASSESSMENT OF THE THERAPEUTIC AND  
TOXICOLOGICAL PROPERTIES OF *CARPOBROTUS  
ACINACIFORMIS* AND *SCHKUHRIA PINNATA*  
USED IN TRADITIONAL MEDICINE IN  
SOUTH AFRICA**



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*ACINACIFORMIS* AND *SCHKUHRIA PINNATA*  
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SOUTH AFRICA**

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Prof. CP Kahler

**Declaration**

I, Pasquale Jada Yengkopiong, hereby declare that the work on which this dissertation is based, is original (*except where acknowledgements indicate otherwise*); and that neither the whole nor any part of it has been, is being, or shall be submitted for another degree at this or any other university, institution for tertiary education or examining body.



PJ Yengkopiong

## **Dedication**

To Alisandro Loku, my father.

To Bernadetha Juka, my mother.

To Mathias Wani, my brother.

## Acknowledgements

Although my name appears on the cover of this dissertation as the author, it is the result of the dedicated effort of many individuals, some of whom deserve special mention. My *supervisor*, Prof. CP Kahler for her patience and commitment to guiding me to reach this point of no return; *to her, I owe my future*. I would like to acknowledge my former lecturers for having guided me to this point. Today I see my future take a sharp turn to Pharmacology and Therapeutics.

Special thanks and appreciation go to the administration of the University of Limpopo, Faculty of Medicine, Department of Pharmacology and Therapeutics for having given me this opportunity to invest in my future in this institution. *You are my pillars on which I put the roof*.

I want to mention here earlier that whether this dissertation will be accepted or not, I am confident I shall be acquitted of having acted recklessly. In all I have done I have had some conviction for the faith that is in me, and I am driven by the reasons that guide all of us in research: – first to investigate and second to progress and advance science.



PJ Yengkopiong.

**List of abbreviations**

AIDS	Acquired immunodeficiency syndrome.
ATP	Adenosine triphosphate.
$\alpha$ 1PI	Alpha-1-proteinase inhibitor.
ACN	Acetonitrile.
CAL	<i>Carpobrotus acinaciformis</i> leaf.
Ca	Calcium.
Cl <sup>-</sup>	Chloride.
Cu	Copper.
CO <sub>2</sub>	Carbon dioxide.
CNTL	Control.
CNTN	Contraction.
DNA	Deoxyribonucleic acid.
g	Gram.
GC	Gas Chromatography.
GI tract	Gastrointestinal tract.
HIV	Human immunodeficiency virus.
HPLC	High pressure liquid chromatography.
H <sub>2</sub>	Hydrogen.
HOCl	Hypochlorous acid.
Kg	Kilogram.
K	Potassium.
KHCO <sub>3</sub>	Potassium bicarbonate.

LDL	Low density lipoprotein.
Mg	Magnesium.
NADPH	Nicotinimide adenine dinucleotide phosphate reduced.
NH <sub>4</sub> Cl	Ammonium chloride.
Na <sup>+</sup>	Sodium ion.
O <sub>2</sub>	Oxygen.
pH	Negative logarithm to the base 10 of the hydrogen ion concentration.
PMA	Phorbol myristate acetate.
ROS	Reactive oxygen species.
rpm	Revolutions per minute.
SPL	<i>Schkuhria pinnata</i> leaf.
Tris-EDTA	Tri-ethylenediaminetetraacetic acid.
TLC	Thin layer chromatography.
Zn	Zinc.

### List of tables

- 5 – 1 The growth pattern of *E. coli* strains in the controlled groups with distilled water and 70% ethyl alcohol in 72 hours.
- 5 – 2 The growth pattern of *E. coli* with water and 70% ethyl alcohol extracts of *C. acinaciformis* in 24 hours.
- 5 – 3 The growth pattern of *E. coli* with water and 70% ethyl alcohol extracts of *C. acinaciformis* in 48 hours.
- 5 – 4 The growth pattern of *E. coli* with water and 70% ethyl alcohol extracts of *S. pinnata* in 24 hours.
- 5 – 5 The growth pattern of *E. coli* with water and 70% ethyl alcohol extracts of *S. pinnata* in 48 hours.
- 5 – 6 The effect of the leaf extracts of *C. acinaciformis* and *S. pinnata* with decreasing ethyl alcohol concentration (v/v) on the growth of fungi at 4° C.
- 6 – 1 The  $R_f$  values of the 70% ethyl alcohol leaf extracts of *S. pinnata* for figure 6 – 1 C.



## List of figures

- 1 – 1 The picture of *C. acinaciformis*.
- 1 – 2 The picture of *S. pinnata*.
- 2 – 1 The laboratory setup of an organ bath
- 2 – 2 The effect of methacholine or histamine on trachea of guinea pigs fed on CAL.
- 2 – 3 The effect of methacholine or histamine on trachea of guinea pigs fed on SPL.
- 2 – 4 The effect of CAL and SPL on methacholine pre-contracted tracheas.
- 2 – 5 The time of contraction (seconds) with methacholine or histamine pre-contracted tracheas.
- 2 – 6 The time of contraction (sec) with CAL or SPL.
- 3 – 1 The effect of the leaf extracts of *C. acinaciformis* and *S. pinnata* on superoxide production by guinea pigs *in vivo*.
- 3 – 2 The effect of the water leaf extracts of *C. acinaciformis* on superoxide production by human neutrophils *in vitro*.
- 3 – 3 The effect of the 70% ethyl alcohol leaf extracts of *C. acinaciformis* on superoxide production by human neutrophils *in vitro*.
- 3 – 4 The effect of the water stem extracts of *C. acinaciformis* on superoxide production by human neutrophils *in vitro*.
- 3 – 5 The effect of the 70% ethyl alcohol stem extracts of *C. acinaciformis* on superoxide production by human neutrophils *in vitro*.
- 3 – 6 The effect of the water leaf extracts of *S. pinnata* on superoxide production by human neutrophils *in vitro*.

- 3-7 The effect of the 70% ethyl alcohol leaf extracts of *S. pinnata* on superoxide production by human neutrophils *in vitro*.
- 3-8 The effect of the water stem extracts of *S. pinnata* on superoxide production by human neutrophils *in vitro*.
- 3-9 The effect of the 70% ethyl alcohol stem extracts of *S. pinnata* on superoxide production by human neutrophils *in vitro*.
- 3-10 The effect of the water root extracts of *S. pinnata* on superoxide production by human neutrophils *in vitro*.
- 3-11 The effect of the 70% ethyl alcohol root extracts of *S. pinnata* on superoxide production by human neutrophils *in vitro*.
- 3-12 The effect of increasing percentage of ethanol and ethanol extracts of *C. acinaciformis* and *S. pinnata* on superoxide production by human neutrophils *in vitro*.
- 4-1 The effect of the extracts of *C. acinaciformis* on ATP extraction from intact human neutrophils.
- 4-2 The effect of the extracts of *C. acinaciformis* on ATP extraction from lyzed human neutrophils.
- 4-3 The effect of the water extracts of *S. pinnata* on ATP extraction from intact human neutrophils.
- 4-4 The effect of the water extracts of *S. pinnata* on ATP extraction from lyzed human neutrophils.
- 4-5 The effect of the 70% ethyl alcohol extracts of *S. pinnata* on ATP extraction from intact human neutrophils.

- 4-6 The effect of the 70% ethyl alcohol extracts of *S. pinnata* on ATP extraction from lyzed human neutrophils.
- 5-1 The effect of distilled water and 70 % ethanol in the *E. coli* control groups in 72 hours.
- 5-2 The effect of the leaf extracts of *C. acinaciformis* on growth of *E. coli* in 72 hours.
- 5-3 The effect of the stem extracts of *C. acinaciformis* on growth of *E. coli* in 72 hours.
- 5-4 The effect of the leaf extracts of *S. pinnata* on growth of *E. coli* in 72 hours.
- 5-5 The effect of the stem extracts of *S. pinnata* on growth of *E. coli* in 72 hours.
- 5-6 The effect of the root extracts of *S. pinnata* on growth of *E. coli* in 72 hours.
- 5-7 The effect of the leaf extracts of *C. acinaciformis* on the growth of fungi in the laboratory settings.
- 5-8 The effect of the leaf extracts of *S. pinnata* on the growth of fungi in the laboratory settings.
- 6-1 The TLC plates of the extracts of *C. acinaciformis* and *S. pinnata* with water and 70% ethyl alcohol. *A*: water extracts of CAL and SPL, *B*: ethanol extracts of CAL; *C*: ethanol extracts of SPL under UV light.
- 6-2 The chromatograms of the leaf extracts of *C. acinaciformis* with water and 70% ethyl alcohol.
- 6-3 The chromatograms of the stem extracts of *C. acinaciformis* with water and 70% ethyl alcohol.

- 6-4 The chromatograms of the leaf extracts of *S. pinnata* with water and 70% ethyl alcohol.
- 6-5 The chromatograms of the stem extracts of *S. pinnata* with water and 70% ethyl alcohol.
- 6-6 The chromatograms of the root extract of *S. pinnata* with water and 70% ethyl alcohol.
- 6-7 The chromatograms of water and ethyl alcohol used in the plant extraction.

## Summary

The study assessed the effect of water and ethyl alcohol extracts from different parts of the plants *Carpobrotus acinaciformis* and *Schkuhria pinnata* on the contraction of the guinea pig trachea, superoxide production and ATP extraction from human neutrophils and guinea pig whole blood, antibiotic activity against some strains of *E. coli* and fungi to determine their therapeutic and toxicological effects of when used by humans. The studies with the guinea pigs fed on the water extracts of these plants and those not fed did not show any significant differences in tracheal contraction with either methacholine or histamine,  $p > 0.05$ , five degrees of freedom. However, there was a significant decrease in the time of contraction in the tracheas treated with the extracts than those not treated. Superoxide production was decreased in those guinea pigs fed on the plant extracts than those not,  $p < 0.05$ , five degrees of freedom. There was also a significant difference in superoxide production by human neutrophils. ATP extraction from the neutrophils was significantly decreased. The water and ethyl alcohol extracts of *C. acinaciformis* inhibited the growth of all *E. coli* strains for at least 24 hours; the water extracts of *S. pinnata* inhibited for only 24 hours and growth resumed thereafter. Ethyl alcohol extracts of *S. pinnata* inhibited the growth for more than 72 hours. The water extracts of both plants also prevented the growth of fungi in the laboratory settings for at least three months while the ethyl alcohol extracts inhibited the growth for more than a year. The minimum volume of ethyl alcohol required to prevent fungal growth was 10 per cent. Chromatographic techniques showed at least one band or peak and at most five. Thus, the pre-treatment of animals with the extracts of these plants increased the force of tracheal contraction. Treatment of the neutrophils with the extracts reduced superoxide production

and ATP extraction. The extracts inhibited the growth of some strains of *E. coli* and fungi.

**Key words**

Therapeutic; Toxicological; *C. acinaciformis*; *S. pinnata*; Diseases; Scavengers; Reactive oxygen species; Antioxidants.