



**SUDAN UNIVERSITY OF SCIENCE & TECHNOLOGY
COLLEGE OF GRADUATE STUDIES**

**ASSESSMENT OF THE POTENTIAL EFFICACY OF
BEE VENOM AS AN ANTILEISHMANIAL
CHEMOTHERAPEUTIC (*IN VITRO*)**

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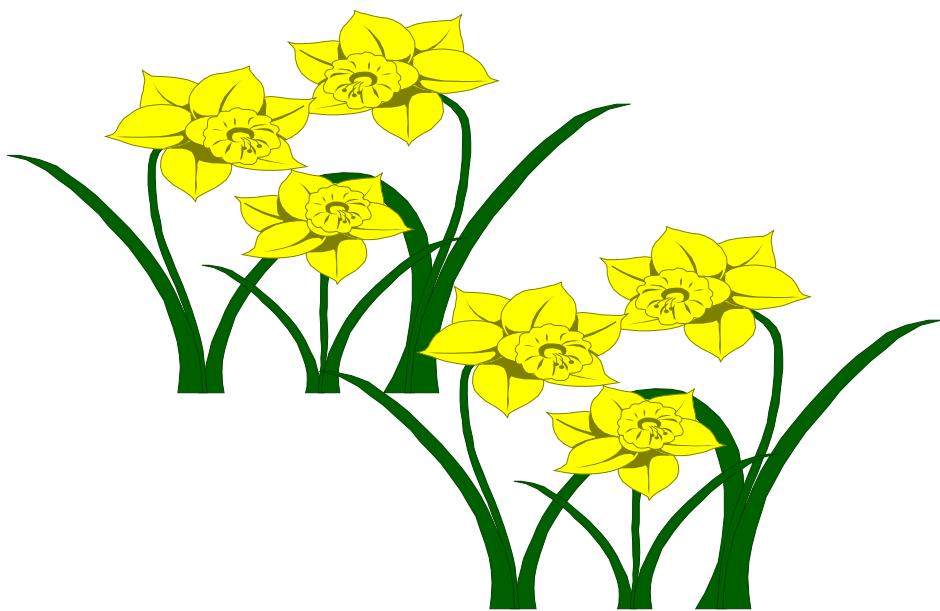
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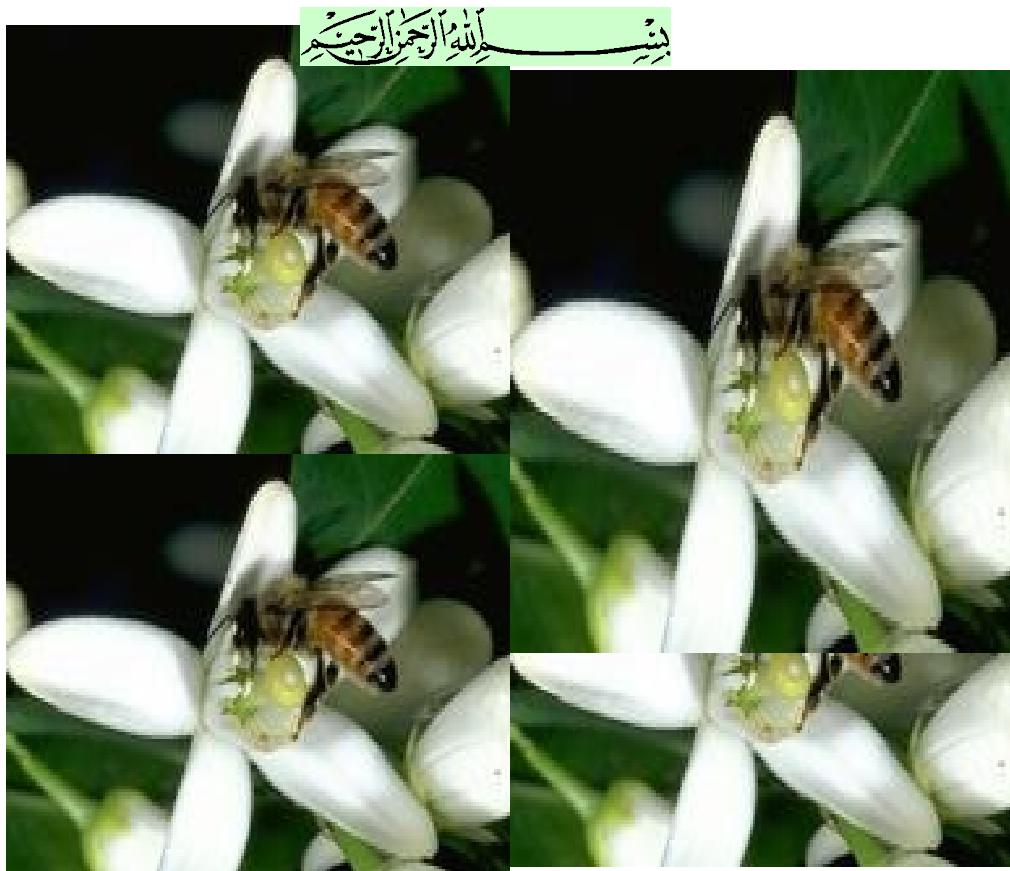


Dedication

To my dear parents, sisters
and brothers.

With my best regards, respect
and love





بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قال الله تعالى

وَأَوْحَى رَبُّكَ إِلَى النَّحْلِ أَنَّ اتَّخِذِي مِنَ الْجَبَالِ بُيُوتًا وَمِنَ
الشَّجَرِ وَمِمَّا يَعْرُشُونَ (68) ثُمَّ كُلِي مِنْ كُلِّ التَّمَرَاتِ
فَاسْلُكِي سُبُلَ رَبِّكَ ذُلْلًا يَخْرُجُ مِنْ بُطُونِهَا شَرَاثٌ مُخْتَلِفُ
الْوَانُهُ فِيهِ شِفَاءٌ لِلنَّاسِ إِنَّ فِي ذَلِكَ لَآيَةً لِقَوْمٍ يَتَفَكَّرُونَ
(69) وَاللَّهُ خَلَقَكُمْ ثُمَّ يَتَوَفَّاكُمْ وَمِنْكُمْ مَنْ يُرَدُّ إِلَى أَرْذَلِ
الْعُمُرِ لِكَيْ لَا يَعْلَمَ بَعْدَ عِلْمٍ شَيْئًا إِنَّ اللَّهَ عَلِيمٌ قَدِيرٌ (70)

صدق الله العظيم

سورة النحل الآيات 70-68

DECLARATION

The work prescribed in this thesis has been conducted by the undersigned in the Department of Clinical Biochemistry at the College of Medical Laboratory Science, Sudan University for Science & Technology.

It has not been previously accepted in substances and is not being concurrently submitted in candidature for any other degree.

Signature	(Candidate)
Signature	(Supervisor)

Date June 2005

CONTENTS

	PAGES
ABSTRACT (English)	
V ABSTRACT (Arabic)	
.....VI ACKNOWLEDGMENT	
.....VI	
DEDICATION	
.....VIII	
LIST OF TABLES	X
LIST OF FIGURES	XI
 CHAPTER I INTRODUCTION & LITERATURE REVIEW	 1
I.1 Bee Venom Therapy: A Retrospective Account	2
I.2. Chemistry of Bee Venom	4
I.3. The Biological & Therapeutic Effects of Bee Venom Components	4
I.4. Anti-inflammatory Properties of Bee Venom	7
I.5. Immunotherapeutic Properties of Bee Venom	8
I.6. Antibiotic and Antiparasitic Properties of Bee Venom	9
I.7. Rationale & Objectives	9
 CHAPTER II MATERIALS & METHODS	 12
II. 1. Test Isolate of <i>Leishmania donovani archibaldi</i>	13
II. 2. Test Preparation of Culture Media	13
II. 2.1. NNN Medium (Novey- Nicole-McNeal) 13	
II. 2.2. Haemin Agar Medium 14	
II. 2.3. <i>In vitro</i> Maintenance of Parasite 14	

II.	2.4. Mass Cultivation	14
...		
II.	3. Microscopic Examination	14
II.	4. Cryopreservation	15
II.	5. Thawing of the Parasite	15
II.	6. In vitro Bioassay of Promastigote Sensitivity to Bee Venom	15
II.	7. MTT Biochemical Assessment of Parasite Growth	16
II.	8. Lymphocyte Proliferation Toxicity Test	17
II.	9. Statistical Analysis	17
CHAPTER III RESULTS		18
III.1.	Culture of <i>Leishmania donovani archibaldi</i>	19
III.2	<i>In vitro</i> Bioassay of <i>L. donovani</i> Promastigote sensitivity to Bee venom	21
III.3.	Assessment of Bee Venom Cytotoxicity	31
III.4	Evaluation of MTT Optical Density System in the Toxicity Study of Bee Venom on PBMC	33
CHAPTER IV DISCUSSION.....		34
CHAPTER V REFERENCES.....		39

ملخص الدراسة

اجريت هذه الدراسة على سم النحل بغرض قياس مدى كفاءته كمضاد لطفيل الليشمانيا دونافاني اللذى يصيب الانسان . كما ان كثير من الدراسات اثبتت مؤخرًا مقاومة الطفيل لعدد من انواع الادويه العلاجيه المستخدمة . اجريت التجارب باستخدام الطفيل *L. donavani archabadli* Mon 82 تزرعه فى نوعين من الاوساط الغذائية وهما agar و NNN فى درجة حراره 25م لمنه اسبوعين . وجد ان معدل نمو الطفيل فى الوسط الغذائي *Haemin agar* اسرع من نموه فى الوسط الغذائي NNN . وقد اجريت التجربه على طفيل الليشمانيا الذى تم اخذ 50 ميكروليتر منه بعد ضبط تركيزه الى (3⁶ X) خلية، واصافته الى تراكيز مخففه من سم النحل بمعدل التخفيف 10 وتراوح ما بين 10⁻³ X175 الى 10⁻³ X0.0017 ميكروجرام / ملليتر فى درجة حراره 25 لمنه 24 ساعه . وقد لوحظ ان اعلى معدل تثبيط الطفيل <70% عند تركيز اعلى من 110 X ميكروجرام / ملليتر، وعند القيام باعادة التجربه بمعدل تخفيف يساوى 3 وجد ان اعلى معدل تثبيط للطفيل عند تركيز 19X10⁻³ ميكروجرام / ملليتر . وعند استخدام التحليل الاحصائى Probit regression analysis لحساب التركيز ذو الفعالية المتوسطة (IC₅₀) وجد انه يعادل 3X10⁻³ ميكروجرام / ملليتر ومقارنه مع دواء البنتوستام الذى تبلغ IC₅₀ 41.7 ميكروجرام / ملليتر . مما يثبت درجة فعالية سم النحل . كما قامت الدراسة ايضا بقياس مدى سميه سم النحل مقارنه مع البنتوستام على على الخلايا الليمفاوية المستخلصه من دم الإنسان تحت نفس الظروف بمعدل التخفيف 10 تحت درجة 37 لمنه 48 ساعه . وقد لوحظ ان هنالك درجة سميه تبلغ 40% عند تركيز اعلى من 1X10⁻³ ميكروجرام / ملليتر مقارنه مع البنتوستام الذى ليس له درجة سميه حتى عند تركيز 500 ميكروجرام ملليتر بينما اظهرت الدراسة ان هنالك زيادة فعالية(P<0.05) فى معدل انقسام الخلايا الليمفاويه يتراوح ما بين 50%-100% عند تركيزات تتراوح ما بين (0.1-0.001) ميكروجرام / ملليتر.

ABSTRACT

This study essentially evaluated the antileishmanial activity and toxicity of the bee venom using in vitro techniques. The study also compared *in vitro* the maintenance of *L.donovani* promastigotes in 2 types of culture media, 3N and Hamin- agar media .The preliminary *in vitro* examination of the potential antileishmanial effect of bee venom upon *L.donovani* promastigotes when treated with 10-fold dilutions of this chemotherapeutic agent (175×10^{-3} - 0.0017×10^{-3} µg/ml) for 24h at 25C°. The highest response of growth inhibition (>70%) was obtained when the parasite subjected to bee venom concentrations $>1.0 \times 10^{-3}$ µg/ml but a total inhibition of parasite population growth was only recorded at concentration 175×10^{-3} µg/ml. IC₅₀ was calculated as 3.0µg/ml.

The lymphocyte proliferation assay for toxicity was used to compare the bee venom toxicity with Pentostam (Wellcome, UK), a standard antileishmanial drug. The cytotoxic effect of bee venom has been expressed as the mean percent inhibition of cell proliferation after 48h treatment with bee venom. About 40% inhibition of lymphocyte proliferation was observed when the lymphocytes were subjected *in vitro* to the highest concentration of this therapeutic agent (175×10^{-3} µg/ml) , Pentostam had no effect even at maximum tested concentration 500µg/ml whereas bee venom appeared to have some toxicity at concentrations $<0.1 \times 10^{-3}$ µg/ml only. On the other hand treatment of PMBC with low concentrations (0.001 - 0.1×10^{-3} µg/ml) of bee venom significantly stimulated PMBC proliferation ($P<0.05$).

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LIST OF TABLES

Table I.1.	Bee venom composition	5
Table III. 1. a.	Growth of <i>L. donovani</i> promastigotes in 3N Medium	20
Table III.1.b.	Growth of <i>L. donovani</i> promastigotes in Haemin-agar medium	20
Table III. 2	Assessment of the antileishmanial activity Of bee venom 10-fold dilutions) upon <i>L.donovani</i> after 24 hours (Trial 1)	22
Table III.3	Assessment of the antileishmanial activity of bee venom (10-fold dilutions) upon <i>L.donovani</i> after 24 hours (Trial 2)	22
Table III. 4	Evaluation of the potential antileishmanial activity of bee venom (3-fold dilution) upon <i>L.donovani</i> promastigotes (Trial 1)	25
Table III. 5	Evaluation of the potential antileishmanial activity of bee venom (3-fold dilution) upon <i>L.donovani</i> promastigotes (Trial 2)	26
Table III.6	Evaluation of the antileishmanial activity of bee venom (10-fold dilution) as estimated by MTT biochemical system	29
Table III. 7	Evaluation of the antileishmanial activity of bee venom (3-fold dilution) as estimated by MTT biochemical system	29
Table III.8	Evaluation of the toxicity of bee venom on PBMC after 48 hours	31
Table III.9.	Evaluation of the toxicity of bee venom on PBMC after 48 hours as estimated by measurements of MTT optical density	33

LIST OF FIGURES

Fig.I.1	Life Cycle of <i>Leishmania</i> spp. (WHO, 1996)	11
Fig.III.1.	Culture of <i>L.donovani</i> promastigotes in Haemin-Agar and 3N media. Each point represents the mean of 3 experiments.	19
Fig.III.2.	Mean percentage of growth inhibition of <i>L.donovani</i> promastigotes after 24h treatment by bee venom ($0.0017-175 \times 10^{-3}$ μg/ml).	23
Fig.III.3.	Antileishmanial effect of bee venom ($0.0017-175 \times 10^{-3}$ μg/ml) on <i>L.donovani</i> promastigotes after 24h as indicated by Probit analysis of data from trials 1 & 2. Probit regression equation is $Y = -2.568 + 4.92 X$.	24
Fig.III.4.	Mean percentage of growth inhibition of <i>L.donovani</i> promastigotes after 24h treatment by bee venom ($0.0017-175 \times 10^{-3}$ μg/ml)	27
Fig.III.5.	Antileishmanial effect of bee venom ($0.07-175 \times 10^{-3}$ μg/ml) on <i>L.donovani</i> promastigotes after 24xhr, as indicated by probit analysis of data from trials 1 & 2. Probit regression equation is $Y = 4.9 + (-9.2) X$	28
Fig. III. 6.a	Evaluation of the antileishmanial activity of bee venom (3-fold dilution) as estimated by MTT biochemical system	30
Fig. III. 6.b	Evaluation of the antileishmanial activity of bee venom (3-fold dilution) as estimated by MTT biochemical system	30
Fig.III.7.	Effect of bee venom ($.001-175 \times 10^{-3}$ μg/ml) on PBMC proliferation after 48 hours in comparison with control	32
Fig.III.8.	Effect of bee venom ($.001-175 \times 10^{-3}$ μg/ml) on PBMC proliferation after 48 hours	32