

**EVALUATION OF CHEMOPROTECTIVE EFFECTS OF  
*PHYLLANTHUS NIRURI* AGAINST AZOXYMETHANE-  
INDUCED FOCI OF ABERRANT CRYPTS IN RATS**

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**UNIVERSITY OF MALAYA  
FACULTY OF SCIENCE  
KUALA LAMPUR**

**2012**

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**DISSERTATION SUBMITTED IN FULFILMENT OF THE  
REQUIRMENTS FOR THE DEGREE OF MASTER OF  
BIOTECHNOLOGY**

**INSTITUTE OF BIOLOGICAL SCIENCES  
FACULTY OF SCIENCE  
UNIVERSITY OF MALAYA  
KUALA LAMPUR**

**2012**

**UNIVERSITI MALAYA**

**ORIGINAL LITERARY WORK DECLARATION**

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Title of Project Paper/Research Report/Dissertation/Thesis ("this Work"):

**EVALUATION OF CHEMOPROTECTIVE EFFECTS OF  
*PHYLLANTHUS NIRURI* AGAINST AZOXYMETHANE-INDUCED FOCI  
OF ABERRANT CRYPTS IN RATS**

Field of Study: Biomedical Science

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## ABSTRACT

*Phyllanthus niruri* (*P. niruri*) is an important Malaysian medicinal plant commonly used traditionally for the treatment of many ailments. The present investigation was designed to elucidate the chemoprotective effects of ethanolic extract of this plant against azoxymethane-induced (AOM) foci of aberrant crypts in rats. *Sprague Dawley* rats received injections of AOM (15mg/kg, once weekly) for two weeks. Daily treatments with *P. niruri* extracted, 250mg/kg and 500 mg/kg of body weight as low and high dose, respectively, were orally administered for eight weeks. At the end of the study, aberrant crypt foci (ACF) were evaluated and examined under a light. The numbers of crypts per focus and liver functions tests were also done in serum (biochemical parameters). *P. niruri* was found to be effectively chemoprotective, as evidenced microscopically and biochemically. Pre-treatment with *P. niruri* ethanolic extract, significantly reduced the impact of AOM toxicity on plasma protein and urea levels as well as on plasma aspartate aminotransferase (AST), alanine aminotransferase (ALT), lactate dehydrogenase (LDH) and gamma-glutamyl transpeptidase (GGT) activities. Grossly, colorectal specimens revealed that ethanol extract of *P. niruri* treatments decreased the mean score of number of crypts in AOM-treated rats. Acute toxicity test did not show any signs of toxicity and mortality up to 5 g/kg. In conclusion, the current study demonstrated that ethanolic extract of this plant slowed reduction of ACF. According to these data, *P. niruri* might be a promising chemoprotective activity, suggesting the need to isolate the chemical principles responsible for this activity and to study this activity in a model of AOM-induced in ACF.

## ABSTRACT

Kesan chemoprotective *Phyllanthus niruri* (*P. niruri*) telah dikaji terhadap tikus ‘azoxymethane-induced (AOM) foci aberrant crypts’. Tikus Sprague Dawley menerima suntikan AOM (15mg/kg, b.w. seminggu sekali) selama dua minggu. Rawatan harian dengan ekstrak daun *P. niruri* diberi sebanyak 250mg/kg b.w. Sebanyak 500 mg/kg dimasukkan selama lapan minggu. Pada akhir kajian ini, ‘aberrant crypt foci’ (ACF) telah dinilai dan diperiksa di bawah mikroskop cahaya untuk penskoran jumlah ACF serta bilangan ‘crypts’ per focus. Ujian fungsi hati juga telah dilakukan dalam (parameter biokimia) serum dan kajian histopatologi. *P. niruri* didapati berkesan sebagai chemoprotective, seperti yang telah dibuktikan oleh kajian menggunakan mikroskop cahaya, parameter biokimia dan kajian histopatologi. Pra-rawatan dengan ekstrak etanol *P. niruri*, telah mengurangkan kesan ketoksikan AOM dengan ketara pada protein plasma dan paras urea serta plasma aspartate aminotransferase (AST), alanine aminotransferase (ALT) dehydrogenase laktat (LDH) dan aktiviti transpeptidase glutamil gamma(GGT). Keputusan organ histopatologi menunjukkan bahawa rawatan menggunakan ekstrak etanol daun *P. niruri* mengurangkan min skor bilangan crypts dalam tikus AOM. Kesimpulannya, kita telah menunjukkan bahawa ekstrak etanol *P. niruri* telah menghadkan perkembangan ACF. Berdasarkan data ini, *P. niruri* mungkin mempunyai potensi aktiviti chemoprotective, yang seterusnya mencadangkan keperluan dan kepentingan untuk mengasingkan sifat-sifat kimia yang bertanggungjawab bagi aktiviti ini dan mengkajinya dalam model AOM-induced dalam ACF.

## **ACKNOWLEDGEMENT**

In the name of Allah the most gracious and the most merciful. All praise goes to Allah S.W.T., a very deep gratitude and thankful for helping me to finish this project satisfactorily and I owe my deepest gratitude to King Abdullah Scholarships Program that financially supports my Masters Degree and University of Malaya for PPP research fund number P0093/2010B.

I would like to extend my sincere appreciation to my supervisor, Prof. Dr. Mahmood Ameen Abdulla (Department of Molecular Medicine) for his ideas, guidance, support and supervision in the conduct of this study. In addition, in my daily work I have been blessed with a friendly and cheerful group in immunology lab especially Mr. Pouya Darvish.

My heartfelt gratitude also goes to my family, to the memory of my father Farouq Halabi, and my mother, Entessar Jameel who have endured many challenging days, and for Abdulaziz Bardi and Omalfadul, Allah's mercy upon them all, to my sister, Bahreen and my brothers Bassim, Ahmed, Abdulwahab and Abdulhadi who has inspired me to survive, to my beloved wife Daleya Bardi, for her love, happiness and support, to my children Faris and Lamar, whom smile and joy bring consonance and share me the busy time to complete my study. Lastly, I offer my regards and blessings to all of those who supported me in any respect during the completion of the project.

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## LIST OF SYMBOLS & ABBREVIATION

ACF	Aberrant crypt foci
AOM	Azoxymethane
<i>P. niruri</i>	<i>Phyllanthus niruri</i>
MDF	Mucin Developed Foci
BCAC	Beta-Catenin-Accumulated Crypts
MAPK	Mitogen-activated protein kinase
MDA	Malondialdehyde
b.w	body weight
%	percentage
±	Plus minus
<	Less than
/	Divide by
°C	Degree Celsius
Mm	Millimeter
mM	Micromole
µm	Micrometer
µl	Microliter
mg	Milligram
ml	Milliliter
mmol	Millimole
Kg	Kilogram
Min	Minute/s
nm	nanometer
SD	Standard deviation



EtOH	Ethanol
<i>et al.</i>	and other people
ROS	Reactive oxygen species
RNS	Reactive nitrogen species
DNA	Deoxyribonucleic acid
SEM	Standard Error of the Mean
SOD	Superoxide dismutase
DMSO	Dimethyl sulfoxide
FRAP	Ferric Reducing Antioxidant Power