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

HALABI, MOHAMMED FAROUQ O

UNIVERSITY OF MALAYA
FACULTY OF SCIENCE
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HALABI, MOHAMMED FAROUQ O

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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 microscopily 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.
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LIST OF SYMBOLS & ABBREVIATION

ACF Aberrant crypt foci
AOM Azoxymethane

P. niruri Phyllanthus niruri

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
<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>EtOH</td>
<td>Ethanol</td>
</tr>
<tr>
<td><em>et al.</em></td>
<td>and other people</td>
</tr>
<tr>
<td>ROS</td>
<td>Reactive oxygen species</td>
</tr>
<tr>
<td>RNS</td>
<td>Reactive nitrogen species</td>
</tr>
<tr>
<td>DNA</td>
<td>Deoxyribonucleic acid</td>
</tr>
<tr>
<td>SEM</td>
<td>Standard Error of the Mean</td>
</tr>
<tr>
<td>SOD</td>
<td>Superoxide dismutase</td>
</tr>
<tr>
<td>DMSO</td>
<td>Dimethyl sulfoxide</td>
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<tr>
<td>FRAP</td>
<td>Ferric Reducing Antioxidant Power</td>
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