Short report

Brine shrimp lethality bioassay of selected Indian medicinal plants

R. Padmaja\textsuperscript{a}, P.C. Arun\textsuperscript{b}, D. Prashanth\textsuperscript{a,\#}, M. Deepak\textsuperscript{b}, A. Amit\textsuperscript{a}, M. Anjana\textsuperscript{b}

\textsuperscript{a}Bioassay Unit, Research & Development Centre, Natural Remedies Pvt. Ltd., Plot No. 5B, Veerasandra Indl. Area, Hosur Road, Bangalore 561 229, India
\textsuperscript{b}Phytochemistry Laboratory, Research & Development Centre, Natural Remedies Pvt. Ltd., Plot No. 5B, Veerasandra Indl. Area, Hosur Road, Bangalore 561 229, India

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Abstract

Ethanolic extracts of six Indian medicinal plants, piperine, guggulsterone E and guggulsterone Z were tested for cytotoxicity using brine shrimp lethality test. \textit{Piper longum} showed most potent cytotoxic activity. Piperine, guggulsterone E and guggulsterone Z showed potent activity with LC\textsubscript{50} 2.4, 8.9 and 4.9, respectively.

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Keywords: Brine shrimp lethality test; \textit{Acorus calamus}; \textit{Centella asiatica}; \textit{Centratherum anthelminticum}; \textit{Mangifera indica}; \textit{Commiphora mukul}; Piper longum; Guggulsterone E; Guggulsterone Z; Piperine

\textbf{Plant}. \textit{Acorus calamus} L. (Araceae) rhizome, \textit{Centella asiatica} L. (Apiaceae) whole plant, \textit{Centratherum anthelminticum} Kuntze. (Asteraceae) seeds, \textit{Mangifera indica} L. (Anacardiaceae) bark, \textit{Commiphora mukul} Hook. (Burseraceae) gum resin and \textit{Piper longum} L. (Piperaceae) fruit. \textit{A. calamus}, \textit{C. asiatica} and \textit{M. indica} were collected from various parts of Bangalore in March 2000. \textit{C. anthelminticum} was collected from Salem in March 2000. \textit{C. mukul} was collected from Delhi in

\#Corresponding author.
\textit{E-mail address:} psi2k@rediffmail.com (D. Prashanth).

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September 2000. The samples were authenticated by our Pharmacognosy department where the voucher specimens are preserved.


**Tested material.** Soxhlet ethanolic extracts of *A. calamus, C. asiatica, C. anthelminticum, M. indica, C. mukul* and *P. longum* (yields on dried weight: 17.89%, 12.0%, 23.94%, 10.4%, 30%, 21.9%, respectively). Preliminary phytochemical screening [4–6] gave positive tests for tannins, β-asarone and alkaloids (*A. calamus*), saponins, sterols, tannins and asiaticoside (*C. asiatica*), fats, tannins and sterols (*C. anthelminticum*), tannins and mangiferin (*M. indica*), steroids (*C. mukul*), alkaloids (*P. longum*). Guggulsterone E [7] and Z [8] were isolated from *C. mukul* (yields: 0.12% and 0.025%, respectively).

Piperine (98%) was purchased from M/s. Plant Lipids Ltd. Cochin, India.

**Studied activity.** Cytotoxicity using Brine shrimp lethality test [9]. *Artemia salina* cysts (obtained from Laboratory of Aquaculture and Artemia Reference Centre,

<table>
<thead>
<tr>
<th>Tested material</th>
<th>Concentration tested (µg/ml)</th>
<th>LC₃₀ (24 h)</th>
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<tbody>
<tr>
<td><em>Centratherum anthelminticum</em> (seed)</td>
<td>200, 400, 800</td>
<td>473.4 (365.6–641.3)</td>
</tr>
<tr>
<td><em>Acorus calamus</em> (rhizome)</td>
<td>100, 200, 400</td>
<td>217.0 (143.8–350.8)</td>
</tr>
<tr>
<td><em>Centella asiatica</em> (whole plant)</td>
<td>100, 500, 1000</td>
<td>&gt;1000</td>
</tr>
<tr>
<td><em>Mangifera indica</em> (bark)</td>
<td>200, 400, 800</td>
<td>576.9 (470.0–716.9)</td>
</tr>
<tr>
<td><em>Piper longum</em> (fruit)</td>
<td>1, 5, 10</td>
<td>6.9 (4.2–16.8)</td>
</tr>
<tr>
<td><em>Commiphora mukul</em> (gum resin)</td>
<td>50, 100, 500</td>
<td>325.7 (198.00–792.9)</td>
</tr>
<tr>
<td>Guggulsterone E</td>
<td>1, 5, 10</td>
<td>8.9 (5.87–39.065)</td>
</tr>
<tr>
<td>Guggulsterone Z</td>
<td>1, 5, 10</td>
<td>4.9 (2.95–7.55)</td>
</tr>
<tr>
<td>Piperine</td>
<td>1, 2, 3</td>
<td>2.4 (1.9–3.3)</td>
</tr>
<tr>
<td>Potassium dichromateb</td>
<td>10, 30, 50</td>
<td>28.7 (19.9–36.5)</td>
</tr>
</tbody>
</table>

*All determinations were done in triplicate, 95% confidence limits in parentheses.*

*b Reference standard.*
University of Ghent, Belgium) were used. Potassium dichromate was used as reference standard [9]. LC50 (24 h) were determined using Finney program received from Prof. McLaughlin, Purdue University, USA.

**Results.** Reported in Table 1.

**Conclusions.** Six Indian medicinal plants (selected randomly, mainly based on their availability and apart from their traditional uses) were tested for cytotoxic activity using brine shrimp lethality test. All the extracts showed significant cytotoxic activity except *C. asiatica*. Guggulsterones E, Z and piperine showed potent cytotoxic activity.

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**References**