Evaluation of antinociceptive activity of an Indonesian herbal product Sendi in Swiss albino mice

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ABSTRACT

The antinociceptive activity of an Indonesian herbal product named Sendi was evaluated in Swiss albino mice in acetic acid-induced abdominal pain model. The product, when administered to mice at doses of 25, 50, 100 and 200 mg per kg body weight, reduced the number of acetic acid-induced gastric constrictions by 33.4, 40.0, 53.4, and 63.4%, respectively. The results were dose-dependent and statistically significant at all doses of the product. In comparison, a standard antinociceptive drug, aspirin, when administered at doses of 200 and 400 mg per kg body weight, reduced the number of gastric constrictions in mice, respectively, by 33.4 and 66.6%. The results suggest that the herbal product is comparable to aspirin in alleviation of pain and validates the use of this product for pain relief.

Key words: Antinociceptive, Indonesia, herbal, pain, Sendi

Introduction

Chronic pain, as suffered by patients with cancer, rheumatoid arthritis and migraine are ailments that affect millions of people throughout the world and for which allopathic medicine can only provide symptomatic relief. Besides chronic pain, acute or lesser degrees of pain in human beings can arise from a number of causes ranging from simple sprains to more complicated cases like bone fracture or stress. Existing over the counter drugs like aspirin or paracetamol can alleviate pain, but the effects of these drugs do not last long. Moreover, both drugs suffer from adverse side-effects like gastric ulceration or hepatotoxicity, particularly from over-dosage or long-term use. As a result, it is important to find out newer drugs that can alleviate pain without any resultant side-effects. Herbal products can be the source of such new drugs or formulations, because herbal practitioners in many parts of the world claim to treat pain with herbal formulations without any resultant adverse effects. As such, it is important to conduct scientific research on these herbal formulations towards validating their uses.

We had been conducting ethnomedicinal surveys among the folk and tribal medicinal practitioners of Bangladesh for the last several years (Rahmatullah et al., 2009a-c; Rahmatullah et al., 2010a-g; Rahmatullah et al., 2011a,b; Rahmatullah et al., 2012a-d). From the information obtained from the traditional healers, further studies are conducted on selected floral species towards evaluation of their antinociceptive, antihyperglycemic, and cytotoxic potential (Anwar et al., 2010; Jahan et al., 2010; Khan et al., 2010; Mannan et al., 2010; Rahman et al., 2010; Rahmatullah et al., 2010h; Shoha et al., 2010; Ali et al., 2011; Barman et al., 2011; Hossan et al., 2011; Jahan et al., 2011; Rahman et al., 2011; Sutradhar et al., 2011; Ahmed et al., 2012; Arefin et al., 2012; Haque et al., 2012; Sathi et al., 2012). Towards an extension of this research, we have recently also started conducting studies on herbal products of other countries, particularly to evaluate their claimed antinociceptive and antihyperglycemic potential. Sendi is an herbal product of Indonesia and is used to obtain relief from stiffness and pain in joints and muscles. It was the objective of the present study to evaluate the antinociceptive potential of Sendi in acetic acid-induced gastric pain model in Swiss albino mice.

Materials and Methods

Sendi was obtained from an herbal shop in Kuala Lumpur, Malaysia in 2012. The product was sold in 7g sealed packets, the contents of which were to be used for a single dosage. The front side of the packet (Fig 1) bore the words Sendi®, cPOTB/GMP certified, UntukEncok, Pegal Linu for stiffness, muscle and joint pains. The address of the manufacturer was given as Borobudur-Herbal medicine industry, P.O. Box 7078 Semarang.
Indonesia [www.borbudurherbal.com]. Indications as mentioned on the reverse of the packet described the contents as “Help to relieve stiffness, muscle and joint pains. Help to refresh and warm the body”. Directions as mentioned on the reverse of each packet mentioned “Mix a sachet of Sendi into a half glass of hot water (± 100 c.c.). Add a few drops of lemon juice and honey. Take regularly once or twice a day @ 1 sachet or according to personal need” (Fig 2).

The reverse side of each packet gave the composition detailed below (also see Fig 2). Composition: Serving per container: 7 gram of powder

1. Zingiberis Rhizoma 1.75g
2. Curcuma domesticate Rhizoma 1.40g
3. Curcumae aeruginosae Rhizoma 1.05g
4. Languatis Rhizoma 0.91g
5. Myristicae Semen 0.70g
6. Saussureae lappae Radix 0.70g
7. Zingiberis Rhizoma 0.35g
8. Retrofracti Fructus 0.14g

Fig. 1: Front side of Sendi packet.
Fig. 2: Reverse side of Sendi packet.
Experimental dosages for mice experiments were determined on the basis of the packet information of 7g per human being, the average weight of a human being taken as 70 kg, i.e. 1g per 10 kg body weight, or 100 mg per kg body weight. The various doses for experimental purposes were fixed based on this afore-mentioned calculation as 25, 50, 100 and 200 mg per kg body weight of mice. Stock solution of Sendi was made by suspending 1g of packet contents in 10 ml distilled water.

Chemicals:

Glacial acetic acid was obtained from Sigma Chemicals, USA; aspirin was obtained from Square Pharmaceuticals Ltd., Bangladesh.

Animals:

In the present study, Swiss albino mice (male), which weighed between 22-25g were used. The animals were obtained from International Centre for Diarrheal Disease Research, Bangladesh (ICDDR,B). All animals were kept under ambient temperature with 12h light followed by a 12h dark cycle. The animals were acclimatized for three days prior to actual experiments. The study was conducted following approval by the Institutional Animal Ethical Committee of University of Development Alternative, Dhaka, Bangladesh.

Antinociceptive activity:

Antinociceptive activity of Sendi was examined using previously described procedures (Shanmugasundaram and Venkataraman, 2005). Briefly, mice were divided into seven groups of six mice each. Group 1 served as control and was administered vehicle only. Groups 2 and 3 were orally administered the standard antinociceptive drug aspirin at a dose of 200 and 400 mg per kg body weight, respectively. Groups 4-7 were administered Sendi at doses of 50, 100, 200 and 400 mg per kg body weight, respectively. All mice were individually weighed and dose determined on the basis of individual weight. Following a period of 60 minutes after oral administration of standard drug or extract, all mice were intraperitoneally injected with 1% acetic acid at a dose of 10 ml per kg body weight. A period of 15 minutes was given to each animal to ensure bio-availability of acetic acid, following which period, the number of abdominal constrictions was counted for 10 min.

Statistical analysis:

Experimental values are expressed as mean ± SEM. Independent Sample t-test was carried out for statistical comparison. Statistical significance was considered to be indicated by a p value < 0.05 in all cases.

Results and Discussion

The herbal product Sendi, when administered at doses of 25, 50, 100 and 200 mg per kg body weight demonstrated dose-dependent and statistically significant reductions in the number of abdominal constrictions in mice induced by intraperitoneal administration of acetic acid. At the afore-mentioned four doses, the percent reductions in the number of constrictions were, respectively, 33.4, 40.0, 53.4, and 63.4. A standard antinociceptive drug, aspirin, by comparison, when administered at doses of 200 and 400 mg per kg body weight, reduced the number of abdominal constrictions in mice, respectively, by 33.4 and 66.6%. The results demonstrate that Sendi is comparable to aspirin in terms of alleviation of gastric pain induced by acetic acid injection. The results are shown in Table 1.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Dose (mg/kg body weight)</th>
<th>Mean number of writhings</th>
<th>% inhibition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (Group 1)</td>
<td>10 ml</td>
<td>5.00 ± 0.26</td>
<td>-</td>
</tr>
<tr>
<td>Aspirin (Group 2)</td>
<td>200 mg</td>
<td>3.33 ± 0.56</td>
<td>33.4*</td>
</tr>
<tr>
<td>Aspirin (Group 3)</td>
<td>400 mg</td>
<td>1.67 ± 0.76</td>
<td>66.6*</td>
</tr>
<tr>
<td>Sendi (Group 4)</td>
<td>25 mg</td>
<td>3.33 ± 0.56</td>
<td>33.4*</td>
</tr>
<tr>
<td>Sendi (Group 5)</td>
<td>50 mg</td>
<td>3.00 ± 0.68</td>
<td>40.0*</td>
</tr>
<tr>
<td>Sendi (Group 6)</td>
<td>100 mg</td>
<td>2.33 ± 0.56</td>
<td>53.4*</td>
</tr>
<tr>
<td>Sendi (Group 7)</td>
<td>200 mg</td>
<td>1.83 ± 0.48</td>
<td>63.4*</td>
</tr>
</tbody>
</table>

All administrations (aspirin and Sendi) were made orally. Values represented as mean ± SEM, (n=6); *P < 0.05; significant compared to control.
The herbal product, as per the information provided contains a number of plant components with reported analgesic properties. The analgesic and anti-pyretic activities of *Curcuma longa* (synonym: *Curcuma domestica*) rhizome extracts has been shown in rats (Neha *et al.*, 2009). Although any analgesic property of *Curcuma aeruginosa* remains to be established, another *Curcuma* genera plant, namely *Curcuma amada*, has been shown to demonstrate CNS depressant and analgesic activities (Mujumdar *et al.*, 2004). The anti-inflammatory and analgesic properties of *Zingiber officinale* rhizome extract has also been shown (Raji *et al.*, 2002). The use of this herbal product for alleviation of pain can be taken as scientifically validated, and together, the various plant parts can produce a synergistic and so powerful effect leading to alleviation of pain.

**Financial disclosure:**

Authors of this study have no financial interest in any of the product(s) or manufacturer(s) mentioned in this article.

**References**


