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Short Communication

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Preliminary Evaluation of Antiulcerogenic Activity of Ceiba pentandra Gaertn and Helicrysum meadowianum Klatt in Rats

1J-R. Ibara, 2R.D.G. Elion Itou, 3J.M. Ouamba, 4M. Diatéwa,
5M. Gbéassor and 6A.A. Abena

The aqueous extracts of Ceiba pentandra and Helicrysm meadowianum were evaluated for their antiulcerogenic effects by using indomethacin-induced gastric lesions in rats. The both aqueous extracts are well tolerated by animals. Until the dose of 3200 mg kg\(^{-1}\) per os, no mortality was observed. At the dose of 400 mg kg\(^{-1}\) per os, the two preparations (as the reference substance, ranitidine 50 mg kg\(^{-1}\)) reduced significantly the decrease of pH and the formation of lesions induced by indomethacin, compared to control group. These results which could support the folk use of these plants in Congo required further investigations for their confirmation.

Key words: Antiulcerogenic, Ceiba pentandra, Helicrysm meadowianum, rats

1Service de Médecine interne et d’Hépato-Gastro-Entérologie, Centre Hospitalier Universitaire de Brazzaville, BP 32, Brazzaville-Congo
2Laboratoire de Biochimie et Pharmacologie, Faculté des Sciences de la Santé, UNIVERSITÉ Marien Ngouabi, BP 69, Brazzaville-Congo
3Unité de Chimie du Végétal et de la Vie, Faculté des Sciences, Université Marien NGOUABI, BP 69, Brazzaville-Congo
4CERFOPLAM, UNIVERSITÉ de Loué, BP 1515, Loué-Togo
INTRODUCTION

*C. pentandra* G. (Bombacaceae) is a great tree with 50 m high and 2 m of diameter (Adjanohoun et al., 1988). The plant is meted in tropical America, Asia and Africa (Aubreville and Leroy, 1975). In African traditional medicine, *C. pentandra* is used in many diseases as headache, dizziness and fever (Ngounou et al., 2000). In Congo Brazzaville, the plant is specially used to treat stomach damage, diarrhoea, hernia and oedema (Adjanohoun et al., 1988; Bouquet, 1969). Pharmacological studies demonstrate hypoglycaemic (Olusola et al., 2005) and inflammatory (Lin et al., 1992) activities.

*H. mechowianum* (Asteraceae) is a hardly grass growing in Togo, Nigeria, Cameroon, Angola and Congo (Adjanohoun et al., 1988).

In Congolese folk medicine, the plant is used for treatment of stomach damage and cephalalgia (Adjanohoun et al., 1988; Bouquet, 1969; Kabangu-Kambu, 1990).

No bibliographic result is available to confirm the use of these plants in stomach damage.

The present study was realised to evaluate the eventual antulcerogenic activity of *C. pentandra* and *H. mechowianum* using indometacin-induced ulcer in rats.

MATERIALS AND METHODS

Plants materials: Plants were collected from the south area of Brazzaville in August 2004 and identified by Dr. J. Moutsambo: Botanist of Rural Institute of Development (IDR) of University Marien Ngouabi.

Voucher specimens of plants were deposited in herbarium of Center of Study of Vegetal Resources (CERVE) of Brazzaville.

The dried bark of *C. pentandra* and dried leaves of *H. mechowianum* were respectively powdered.

Preparation of plants extracts: Ten gram of powder of each plant are mixing and boiling in 100 mL of sterile distilled water during 15 min. After cooling and filtration, 40 mL of each aqueous extract were obtained. Those extracts are then stored at 4°C for the future use.

Experimental animals: Male and female adult albino Wistar rats were obtained from the animal house of the Health Sciences Faculty, University Marien NGOUABI. The rats were divided randomly into groups of 5 each. Each rat (weighing between 150-200 g) was housed individually in the cage. The animals were placed for 48 h in laboratory room conditions for acclimatization and were maintained on standard pellet diet and water.

Animals were fasted 18 h before the experiment but access to water was *ad libitum*. Just two hours before starting the experiment, water was also removed.

Acute toxicity: Eleven groups of 5 rats were constituted and treated orally with 5 mL kg⁻¹ of distilled water (group 1), 200, 400, 800, 1600, 3200 mg kg⁻¹, respectively of aqueous extracts of *C. pentandra* (groups 2, 3, 4, 5, 6) and *H. mechowianum* (groups 7, 8, 9, 10, 11).

Rats were macroscopically observed for 6 h after drugs administration and mortality was noted at 24, 48 and 72 h.

Antiulcerogenic activity study: Seven groups of fasted rats were constituted. Negative and positive control groups (groups 1 an 2) received respectively 5 mL kg⁻¹ of sterile distilled water. Groups 3 were treated by 50 mg kg⁻¹ of reference substance (Ramitidine); 4 and 5 were treated respectively by 200 and 400 mg kg⁻¹ of aqueous extract of *C. pentandra* whereas groups 6 and 7 received respectively 200 and 400 mg kg⁻¹ of *H. mechowianum*. All products were administrated orally.

Ulceration was induced in all animals of groups 2, 3, 4, 5, 6 and 7 by using indometacin (20 mg kg⁻¹) intraperitoneally (Magistretti et al., 1988). One hour after orally drug administration, indometacin (20 mg kg⁻¹) was intraperitoneally injected to animals. Five hours after indometacin administration, rats were sacrificed under ether anesthesia; the stomach was opened along the greater curvature. Gastric pH is measured by using a pHmeter (HANNA instruments; Pierron) and a tampon solution PH7 of sodium sulphate.

Each stomach is watching with sterile distilled water and placed in flat surface for macroscopic observations using electric magnifying glass. The length (mm) and the width (mm) of ulcer are determined and the ulcer area calculated.

Gastric mucous surface is dehydrated by using adsorbent cotton; mucosa was scraped with thin strip and weighed.

Phytochemical screening: Different chemical groups (alkaloids, flavonoids, quinones, saponines, tannins and terpenoids) presents in the two aqueous extracts were researched by using the classical methods (Bouquet, 1966).

Statistical analysis of data: Results were expressed as meansMSE. The statistical difference between control and treated groups was analysed by using Student's t-test.

RESULTS

Acute toxicity: No significant modification was observed after administration of 200, 400, 800, 1600 and
Table 1: Effects of *C. pentandra* and *H. mechwowianum* extracts on indometacin-induced gastric ulcer

<table>
<thead>
<tr>
<th>Products</th>
<th>Dose</th>
<th>Mucosa weight (mg)</th>
<th>Ulcer area (mm²)</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative control</td>
<td>0.5 mL/100 g</td>
<td>42.3±4.10</td>
<td>0.0±0.0</td>
<td>2.96±0.49</td>
</tr>
<tr>
<td>Positive control</td>
<td>0.5 mL/100 g</td>
<td>41.0±4.20</td>
<td>0.0±0.0</td>
<td>3.19±0.40</td>
</tr>
<tr>
<td>Ranitidine (azantac*)</td>
<td>50 mg kg⁻¹</td>
<td>45.8±2.30 (NS)</td>
<td>4.80±0.20 ***</td>
<td>5.88±0.30 **</td>
</tr>
<tr>
<td><em>Helichrysum</em></td>
<td>200 mg kg⁻¹</td>
<td>44.2±1.80 (NS)</td>
<td>4.9±0.10 (NS)</td>
<td>3.05±0.50 (NS)</td>
</tr>
<tr>
<td><em>Mechowianum</em></td>
<td>400 mg kg⁻¹</td>
<td>39.4±0.70 (NS)</td>
<td>5.0±0.20 (NS)</td>
<td>3.02±0.40 (NS)</td>
</tr>
<tr>
<td><em>Cebia pentandra</em></td>
<td>200 mg kg⁻¹</td>
<td>38.8±0.90 (NS)</td>
<td>5.0±0.20 (NS)</td>
<td>3.02±0.40 (NS)</td>
</tr>
<tr>
<td></td>
<td>400 mg kg⁻¹</td>
<td>39.8±0.70 (NS)</td>
<td>5.0±0.20 (NS)</td>
<td>3.02±0.40 (NS)</td>
</tr>
</tbody>
</table>

*p<0.05; **p<0.01; ***p<0.001; Versus positive control. Student's t-test Values are the means±SEM; n = 5

Table 2: Phytochemical screening of *Helichrysum mechwowianum* and *Cebia pentandra*

<table>
<thead>
<tr>
<th>Aqueous extract of plant</th>
<th><em>Helichrysum mechwowianum</em> (Asteraceae)</th>
<th><em>Cebia pentandra</em> (Bombacaceae)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaloids</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Leucanthocyanins</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Quinones</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Saponins</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Terpenoids</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Tannins</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

+ : Positive test; - : Negative test

3200 mg kg⁻¹ of *C. pentandra* or 200, 400 and 800 mg kg⁻¹ of *H. mechwowianum* extracts. The doses of 1600 and 3200 mg kg⁻¹ of *H. mechwowianum* induced sedation and ptosis in rats.

No mortality was observed with the both extracts at the doses used.

**Antulcerogenic activity:** The effects of *C. pentandra* and *H. mechwowianum* extracts on indometacin-induced gastric ulcer are presented in Table 1. The doses of 400 mg kg⁻¹ of the two preparations reduced significantly the area of gastric ulcer induced by indometacin comparatively to the control positive group. At this dose, the two extracts increased significantly the gastric pH. Those effects were less important that those observed with the reference substance ranitidine.

*C. pentandra* and *H. mechwowianum* (as ranitidine) were unable to modify the mucosa weigh.

No effect was observed at the dose of 200 mg kg⁻¹ of the two extracts.

**Phytochemical screening:** Phytochemical screening showed (Table 2) the presence of flavonoids, saponins, saponins and terpenoids in the extract of *C. pentandra* and quinones, saponins and terpenoids in *H. mechwowianum*.

**DISCUSSION**

The present preliminary study demonstrate that at the dose of 400 mg kg⁻¹, the aqueous extracts of *C. pentandra* and *H. mechwowianum* reduced significantly the formation of lesions in indometacin-induced gastric damage. This effect which is characterized by reduction of ulcer area and increase of pH could suggest the reduction of gastric HCl secretion.

Nevertheless, the effects observed is widely less important that of well known antihistaminic substance, ranitidine.

Antulcerogenic activity observed with the two extracts could be support by the presence of some chemical groups as flavonoids, saponins and terpenoids in *C. pentandra* extract and saponins and terpenoids in *H. mechwowianum* (Galati *et al.*, 1998, 1997; Germano *et al.*, 1994; Ukwe, 1998).

These results could support the folk uses of the two plants in stomach damage. However, further investigations, mainly histological studies, are necessary to confirm these data.

**REFERENCES**


