Effect on capillary permeability in rabbits of *Acalypha langinia Buddleia scordioides, Hylocereus undatus, Tecoma stans* and *Astianthus viminalis*

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SUMMARY

Aqueous extracts of *Acalypha langinia, Buddleia scordioides*, *Hylocereus undatus*, *Tecoma stans* showed protective activity against the increased (both chloroform and histamine) skin vascular permeability in rabbits. The protective effect, measured as the reduction in leakage of Evans blue, were 90.2, 37.3, 43.5 and 69.3% respectively a dose of 250 mg/kg. *Astianthus viminalis,* showed only a 12.6% inhibition at the same dose. The results showed that the extracts produced a significant inhibitory effect on the capillary permeability in rabbit skin. Comparison was made between the action of the aqueous extracts and a known protective microvascular drug as troxerutin (25 mg/kg).

Key Words:*Buddleia scordioides*, *Acalypha langinia, Hylocereus undatus, Astianthus viminalis, Tecoma stans,* capillary permeability

Introduction

Several indigenous drugs have been described in folkloric Mexican medicine for the management of wounds. One of them is *Acalypha langinia* Muell. (Euphorbiaceae) is commonly know as “arlomo”. It is a common herb that grows wild and abundantly in the

fields of Mexico. A water extract of the leaves has long been used for indigenous when abundant hemorrhages are present during postpartum, it is applied as a vaginal wash (1). Previous investigations a survey of literature showed has been done for the above mentioned activity.

B. scordioides belonging to the family Loganiaceae. It is commonly know as "lengua de vaca" is used in traditional medicine for various types of illnesses. It is a common herb that grows wild and abundantly in the fields of Mexico. A water extract of the leaves has long been used for Guerrero indigenous for the treatment of wounds and the use in Aguascalientes of powdered leaves to treat ulcers was reported a long time ago (1). Decoction of the roots is drunk for the treatment of hepatitis. Decoction of the root or the leaves is also used to wash wounds and a powder of the same plant parts is applied topically as a wound healer.

Buddleia scordioides in *t*he literature survey indicated that the flavonoids rutin, quercetin and quercetrina were isolated from *Buddleia scordioides* (2). Other compounds isolated include syringin, saikogenin A, 3,23,28-trihydroxyoleana-11,13(18)-diene, peracetate of 3-O-α-L-ramnopyranosyl-(1→4)-β-D-glucopyranosyl-[(1→3)-β-D-glucopyranosyl-(1→2)]-β-D-fucopyranosyl-3,23,28-trihydroxyoleane-l1,13(18)-diene, 3-O-α-L-rhamno pyranosyl-(1→4)-β-D-glucopyranosyl-(1→3)-[β-D-glucopyranosyl-(1→2)]-β-D-fucopyranosyl-3,16,23,28-tetra hydroxyoleane-11,13(18)-diene, and peracetate of buddlejasaponin I (3).

Hylocereus undatus (Haworth), is a Cactaceae widely distributed from the coast of Florida to Brazil. Its fruit is named "pitahaya orejona" because of the shape of the scales on the fruit skin; it is also known as " Queen of the night" because of its exquisitely fragrant large flowers that only open for the night (4). For their peculiar appearance have received special attention in Mexico for a long time, history and folklore have recorded this importance among prehispanic tribes (5), Played an important role, as food, medicine (6), and ornamentally (7). Currently, the pitahaya is a highly economical crop for the traditional producer because little or no investment is required for its cultivation. Therefore, it can be considered an alternative crop with high commercial potential (8). Its leaves and flowers are traditionally used by Mayas as hypoglycaemic, diuretic and cicatrizant agent (1).

Astianthus viminalis (H.B.K.) Baillon belonging to the family Bignoniaceae. It is commonly know as "Azúchil" is used in traditional medicine for treatment of diabetes. This plant showed the presence of iridoid glucosides campenoside, 5-hydroxycampenoside, stansioside and plantarenaloside, also contained the acids ursolic, oleanolic, *p*-methoxycinamic, (9). The methanol extract of *A. viminalis* exhibited significantly hypoglycemic activity.

Tecoma stans Juss (Bignoniaceae) is widely distributed in Central America and is cultivated in West Africa. The leaves have enjoyed a wide use by the natives of Mexico in the control of diabetes. Phytochemical studies have resulted in the characterization of stansioside, stanside, plantarrenanoside, 5-deoxystansioside, plantarenaloside, 5-deoxylamioside, yuheinoside (10), tecostanine, tecostidine, δ-skytanthine, 3,9,12,15-octadecatetraenoic acid, N-normethyl skytanthine, noractinidine, 7α-hydroxyskytanthine, Δ^{4a}-dihydroxyskytanthine and boschniakine (11).

Methods

Plant material. The leaves, of *Hylocereus undatus* were collected in the state of Oaxaca, Mexico, and were taxonomically authenticated in the Department of Natural Resources of CIDIR-IPN and a voucher specimen (No. A-843) has been deposited at herbarium of this Department for reference. The leaves of *Buddleia scordioides* were collected in the state of Guerrero, Mexico. The material was identified in the Department of Botany of ENEP-Iztacala UNAM and a voucher specimen (No. 7976) of the plant is stored in the herbarium of this Department for reference. The leaves of *Acalypha langinia* were collected in the state of Colima, Mexico, and were taxonomically authenticated in the Department of Botany of ENEP-Iztacala UNAM and a voucher specimen (No. 7912) are kept at the herbarium of this Department for reference. The leaves of *Astianthus viminalis* were collected in the state of Morelos, Mexico, and was identified in the Department of Botany of UAM-Xochimilco and a voucher specimen (No. 4652) of the plant is stored in the herbarium of this Department for reference. *Tecoma stans* was collected in the state of Mexico, Mexico, and were taxonomically authenticated in the Department of Botany of UAM-Xochimilco and a voucher specimen is deposited in the herbarium of this Department for reference with registration number 4723.

Animals. Young adult, rabbits weighing 2000-2800 g, both sexes were used. The animals were maintained with pellet foot (Purina), while tap water was available *ad libitum*. The procedures involving animals and their care conformed to the international guidelines Principles of Laboratory Animals Care.

Preparation of the aqueous extract. Fresh leaves of *B. scordioides,* were dried at room temperature and ground into a find powder. 300 g of powder was heated to reflux temperature (Soxhlet) with 2 L of water for 30 min. The aqueous extract was filtered on Whatman paper. The filtrates obtained were lyophilized gave a residue green (yield obtained was of 5.6%) and stored at room temperature until use. A small quantity of water (volumes to cover the entire wound surface) was added to the lyophilized *B. scordioides* powder, and different concentrations of galenical product (25, 100, 150, 200 and 250 mg/ml) in sterile gum solution were prepared for studies.

Effect on capillary permeability in rabbits. The male rabbits (2 kg mean weight, 12 animals in each experimental group) were treated intraperitoneally with either NaCl (0.9%) (control group) or the extract or troxerutin (25 mg/kg and as a 2.5% solution in water). After 30 min, three zones of depilated skin were irritiated with chloroform applied by means of a cotton tipped glass tube pressed lightly on the skin for 30 s. After a further 60 min the histamine was administered intradermally, 0.8 µg to each of the three zones (i.e. 2.4 µg/rabbit), followed by immediate intravenous application of Evans blue (25 mg/kg, as 10% aqueous solution). The animals were killed 30 min after histamine administration and the skin zones (each 3 x 3 cm) were accurately cut off and extracted with 4 mL formamide for 72 h at 45°. The absorption of the decanted supernatant was measured at 620 nm and the Evans blue content read from the calibration curve (12).

Results

All extracts with the exception of *A. viminalis* significantly inhibited capillary permeability in rabbits and showed a concentration-dependent. The protective microvascular activity was measured as a counteracting effect on the leakage of Evans blue introduced intravenously. Troxerutin (25 mg/kg) a protective microvascular was used as reference drug in this study. The results of aqueous extract of *A. langinia* are shown in Table 1. The aqueous extract of *A. langinia* 120 min after peritoneal treatment at a dose of 150 and 200 mg/kg of extract produced a inhibitory effect on the capillary permeability in rabbit skin increased by chloroform and histamine 30 and 90 min of 73.2 and 81.4% respectively. This effect was

more pronounced at 250 mg/kg (90.2% reduction). The protective microvascular activity of *B. scordioides*, is shown in the Table 2.

Table 1. Effect of the aqueous extract of *Acalypha langinia* on increased microvascular permeability induced by both chloroform and histamine in rabbits.

Treatment mg/kg	Inhibition (%)
0.9% NaCl	0
25	10.1
100	61.5
150	73.2
200	81.4
250	90.2
Troxerutin 25	45.9

Table 2. Effect of the aqueous extract of *Buddleia scordioides*, on increased microvascular permeability induced by both chloroform and histamine in rabbits.

Treatment mg/kg	Inhibition (%)
0.9% NaCl	0
25	0
100	23.1
150	27.8
200	31.5
250	37.3
Troxerutin 25	45.6

The group treated with 250 mg/kg of extract showed 37.3% reduction. A results of the effects of extract of *H. undatus* in rabbits are shown in Table 3. The extract produced a maximum inhibition at 250 mg/kg of 43.5%. The administration of 200 mg/kg of *T. stans* (Table 4) produced a significant inhibition of 58.1% and caused a maximum inhibition at a dose of 250 mg/kg (69.3%). The group treated with 250 mg/kg of extract of *A. viminalis* showed only a 12.6% inhibition (Table 5).

Table 3. Effect of the aqueous extract of *Hylocereus undatus*, on increased microvascular permeability induced by both chloroform and histamine in rabbits.

Treatment mg/kg	Inhibition (%)
0.9% NaCl	0
25	0
100	26.4
150	29.8
200	37.4
250	43.5
Troxerutin 25	45.8

Table 4. Effect of the aqueous extract of *Tecoma stans* on increased microvascular permeability induced by both chloroform and histamine in rabbits.

Treatment mg/kg	Inhibition (%)
0.9% NaCl	0
25	4.2
100	35.6
150	41.8
200	58.1
250	69.3
Troxerutin 25	45.7

Discussion

All the extract at doses of 25 mg/kg were less effective or inactive than troxerutin as a protective microvascular agent. In conclusion, it appears that the aqueous extract of *Acalypha langinia Buddleia scordioides*, *Hylocereus undatus* and *Tecoma stans* exhibited positive protective microvascular activity. *A. viminalis* was found to be less effective than other plants.

Table 5. Effect of the aqueous extract of *Astianthus viminalis* on increased microvascular permeability induced by both chloroform and histamine in rabbits.

Treatment mg/kg	Inhibition (%)
0.9% NaCl	0
25	0
100	0
150	5.3
200	8.1
250	12.6
Troxerutin 25	45.9

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