

In Vivo analgesic activity of aqueous extract from leaves of *Limoniastrum feei*

Abstract

Aim of the study: To evaluate analgesic effect of *Limoniastrum feei*, a medicinal plant from the southeast of Algeria. Two doses (25mg/kg and 30mg/kg) of the crude aqueous extract of leaves from *Limoniastrum feei* were evaluated for analgesic activity using acetic acid induced writhing in mice. The two doses (25,30mg/kg) of the extract tested were effective. The extract at the tested doses produced a percentage inhibition of the acetic acid induced abdominal constriction of (33.39 and 35.38%), respectively. The crude extract produced a statistically significant analgesic activity comparable to the effect of standard drug (50mg/kg Diclofenac). This study demonstrated the potential analgesic properties of crude aqueous extract of leaves from *Limoniastrum feei*.

Keywords: *limoniastrum feei*, *plumbagenacea*, medicinal plant, endemic, analgesic activity

Volume 4 Issue 3 - 2017

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Received: December 06, 2017 | **Published:** December 27, 2017

Introduction

Limoniastrum feei belongs to *Plumbagenaceae* family. It grows in the southeast of Algeria where the climate is whole and dry, cold season in winter and hot in summer. *Limoniastrum feei* has a height of 10–40 ft, it's possessed long leaves and flowering palms without leaves, and its flower is endured by bricking bracts with a purplish red color. *Limoniastrum feei* is traditionally used to treat gastric disorders, prepared by decoction in water and drinking like tea.¹ The other uses of *Limoniastrum feei* are as an antibacterial, for treatment bronchitis and stomach infection.² Previous phytochemical studies reported the presence of polyphenols, flavonoids, and saponins in *Limoniastrum feei*.³ The methanol extracts of leaves exhibited significant in-vitro antimicrobial activity.⁴ *Limoniastrum feei* also showed remarkable antioxidant,⁵ antibacterial and anti-fungal activity with presence of flavonoids, saponins and tannins in methanolic and aqueous extracts.⁶ However, to the best of our knowledge, no study has tested here analgesic activity. This present study seeks to evaluate the analgesic effect of this plant.

Materials and methods

Plant material and extraction

The plant *Limoniastrum feei* was collected in February 2012 in the region of Bechar city, Algeria. The leaves were dried (overnight) and grounded into powder using the grinder. Extractions were done using Soxhlet apparatus with water for aqueous extract (ALE). The duration of extraction process was around 8 hours.⁷

Animals

Male and female albino Swiss mice (24–28g) were purchased from the institute "Pasteur" Algeria (El-Koba, Algiers, Algeria) and were housed in plastic cages under standard light (light on from 7.00a.m.

to 7.00p.m.) and temperature(22±1°C) conditions for at least 3 days before experimentation. All studies were performed in accordance with European Union Regulations for the handling and use of laboratory animals (EEC Council Directives 86/609).

Analgesic activity

Acetic acid-induced writhing test: In this study, 24 adult mice were used. The mice were randomly divided into 4 groups, each containing 6 individuals. Analgesic effect of aqueous extract of *Limoniastrum feei* was investigated applying 25 and 30mg/kg (10ml/kg body weight) by intraperitoneally injection in mice.⁸ Diclofenac (50mg/kg; 10ml/kg body weight) was used as positive control.⁹ For the negative control animals (10ml/kg body weight) of water was administered in the same protocol. Thirty (30) min after receiving intraperitoneally injection of the plant extracts, positive and negative control.¹⁰ Each mouse was given intraperitoneally 0.6% aqueous solution of acetic acid (10ml/kg body weight).¹¹ After 5min from the injection, each animal was placed in a transparent observation cage and the number of writhes per mouse was counted for 30min.¹² The writhing activity consists of a contraction of the abdominal muscles together with a stretching of the hind limbs.¹³ The percentage of inhibition was calculated using the following ratio:

$$\left(\frac{\text{control mean} - \text{treated mean}}{\text{control mean}} \right) \times 100$$

Results and discussion

The effect of *Limoniastrum feei*, extracts on acetic acid-induced writhing responses in mice is shown in Table 1. It was found that the AELF of this plant at the doses assayed caused a significant inhibition on the writhing responses induced by acetic acid when compared with control, with values ranging from 33.39 to 35.38% of inhibition, being the AELF at a dose of 30mg/kg i.p., in this regard, the most effective.

Nevertheless, none of the doses of screened extract reached the values obtained for diclofenac at 50mg/kg.i.p. (66.61%), the non-steroidal anti-inflammatory chosen as a reference drug. Our results showed that intra peritoneal administration of AELF of this species significantly reduced the number of mouse abdominal constriction following acetic acid, indicating analgesic activity at the doses assayed. It is known that constriction induced by acetic acid is considered to be a non-selective anti-nociceptive model since acetic acid acts indirectly by inducing the release of endogenous mediators,¹⁴ which stimulate the nociceptive neurons that are sensitive to non-steroidal anti-inflammatory drugs, to narcotics and to other centrally active.^{15,16}

Table 1 Effect of the aqueous extract of *Limoniastrum feei* (AELF) on acetic acid-induced writhing response in mice

Treatment	Dose (mg/kg)	Number of writhing	Inhibition (%)
Control	-	92.33	-
AELF	25	61.5	33.39
	30	59.66	35.38
Diclofenac	50	30.83	66.61

Conclusion

In conclusion our results clearly showed that aqueous extract of *limoniastrum feei* (leaves) has an anti-nociceptive potential. We suggest the plant contains interesting molecules which might activate and modulate nociceptors. This activity explain the traditional medicinal uses of this plant.

Acknowledgments

The authors are grateful to Prof N Rayan, Nadjah University Palestin.

Conflict of interest

The author declares no conflict of interest.

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