

Phyto Chemical and Pharmacological Activities of *Forsskaolea tenacissima* with Special Reference to Antinociceptic Activity

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Abstract

Forsskaolea tenacissima L. locally known as Lazzaaq (Veloro plant), belongs to family Urticaceae, used topically, by biting, to treat rheumatic pains. The plant is used as a cure for cough and headache in Baluchistan and is also fed to goats [1,2].

Keywords: *Forsskaolea tenacissima*; Lazzaaq; Baluchistan

Introduction

The powdered plant material consists of the pounded aerial parts. It is a yellowish-green heterogeneous coarse powder with a slight pleasant aromatic odour and a flat somewhat mucilaginous taste with a slight nasal irritant effect. Microscopically, the powder shows numerous detached covering trichomes including very long slender ones, short thick, curved trichomes with hook-like pointed ends and very thick, warty, tapering trichomes. Also shows are some narrow closely packed palisade cells containing small cluster crystals of calcium oxalate, many groups of grey tracheids and groups of very long fibres.



Figure

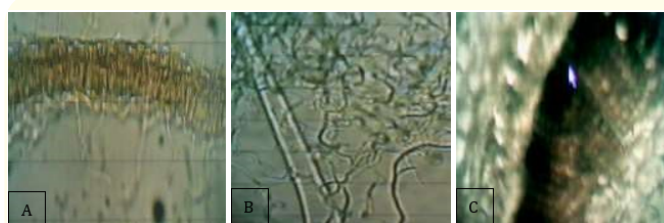


Figure 1A-1C: TS through a portion of the leaf showing the upper epidermal layer bearing long slender twisting covering trichomes, underlain by a palisade layer containing calcium oxalate rosettes then the spongy mesophyll cells underlain by the lower epidermis that bear more of the long slender covering trichomes.

B: A surface view of a portion of the upper epidermis of the leaf bearing many long slender twisting covering trichomes and a very thick warty conical covering trichome.

C: A TS of a portion of the stem showing from left to right cortical cells, a circle of groups of non-lignified fibres that surround a zone of heavily lignified vascular tissues then the comparatively large cells of the pith.

Chemical constituents

It contains steroids, tannins and flavonoids (flavones, flavonols or xanthones) and does not contain alkaloids, saponins or anthraquinone glycosides.

The following chemical studies have been carried out (ZCHRTM unpublished work) on the aerial part of the plant *Forsskaolea tenacissima*.

UV Spectral studies

Physicochemical parameters (%)

Loss of weight in drying at 105 ^o c	11.10
Absolute alcohol solubility (%)	1.60
Water solubility (%)	30.60
Successive extractives (%)	
Petroleum ether (60-80 ^o)	0.90
Chloroform	0.90
Absolute alcohol	6.00
Ash values (%)	
Total ash	16.67
Water soluble ash	2.33
Acid insoluble ash (10% Hcl)	1.67
pH values (aqueous solution)	
pH of 1% solution	8.68 - 8.73
pH of 10% solution	8.38 - 8.41

Table 1

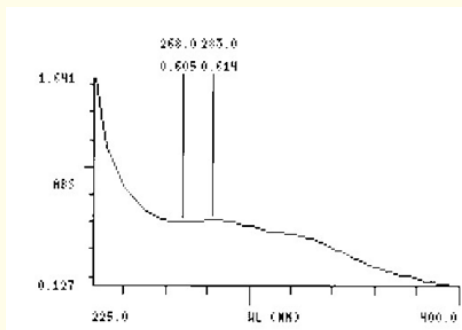


Figure 2: Intestinal Fluid simulated without pancreatic pH = 7.5 ± 0.1.

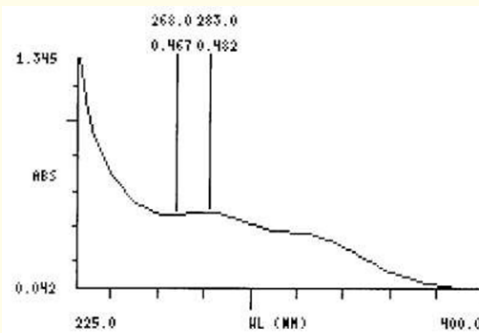


Figure 3: Gastric fluid simulated without pepsin pH = 1.2 ± 0.1.

Elemental analyses

Ash values (British Herbal Pharmacopeia- Reference)					
Assay and identification of element (AOAC International- Reference)					
Apparatus	(AA-6800 Shimadzu-Flame method)				
Element	Std. conc. µg/ml (ppm)	Sample conc.mg/ml	Sample absorbance	Actual conc.mg/ml	Actual conc.(%)
Cr	1, 2, 4	10	0.0062	0.00554	0.000554
Zn	0.25, 0.5, 1	10	0.1233	0.01065	0.001065
Cu	1, 2, 4	10	0.0512	0.02285	0.002285
Fe	1, 2, 4	10	0.7596	0.53801	0.053801
K	1, 2, 4	0.5	0.8068	29.1992	2. 91992
Pb	1, 2, 4	10	0.0027	0.00664	0.000664
Cd	0.25, 0.5, 1	10	0.0000	0.0000	0.0000
Ca	5, 10, 20	0.5	0.0608	39.034	3.9034

1ppm conc. = 1 µg/ml; Actual conc.(%) = Actual conc.(ppm) x 0.0001 [1ppm = 0.0001%].

Table 2

Ultraviolet Spectrum (USP- reference)				
Apparatus	Milton Roy Spectronic Genesys 5 Spectrophotometer - Milton Roy.			
Sample conc. (mg/ml)	Solvent	λ max (nm)	λ min (nm)	Abs. (λ max - λ min)
1.2725	Intestinal Fluid simulated without pancreatic pH = 7.5 ± 0.1	283	268	0.614 - 0.605
0.99	Gastric Fluid simulated without pepsin pH = 1.2 ± 0.1	283	268	0.482 - 0.467

Table 3

Thin layer chromatography (TLC)

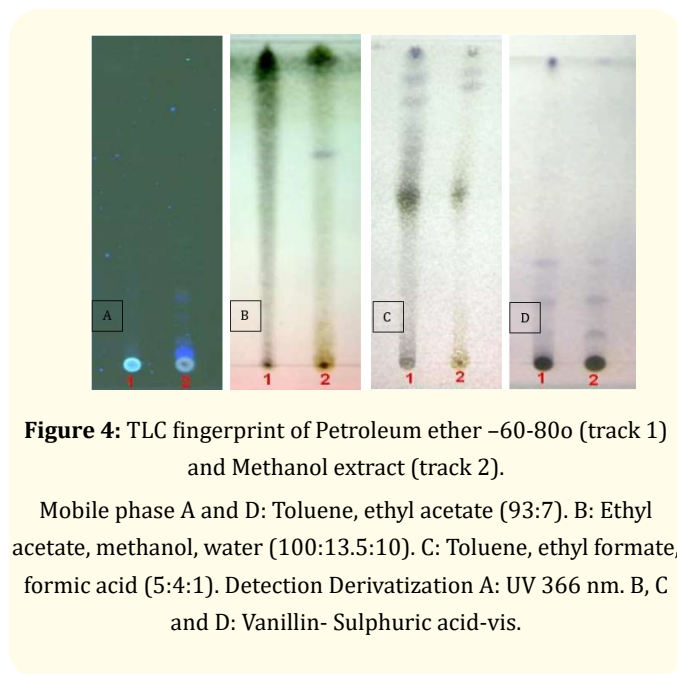


Figure 4: TLC fingerprint of Petroleum ether -60-80o (track 1) and Methanol extract (track 2).

Mobile phase A and D: Toluene, ethyl acetate (93:7). B: Ethyl acetate, methanol, water (100:13.5:10). C: Toluene, ethyl formate, formic acid (5:4:1). Detection Derivatization A: UV 366 nm. B, C and D: Vanillin- Sulphuric acid-vis.

Pharmacological and toxicological studies

Literature and reported information about the plant.

The important pharmacological and toxicological activities of the plant *Forsskaolea* sp. reported in various scientific journals have been presented in the present brief review.

Several scientific names of plants have been changed in recent years, reflecting ongoing research and classification. The plant old name is *F. cossoniana* Webb belongs to the family Urticaceae. The free radical scavenging activity of longan seed extract examined by using three different assay methods. Longan extracts contained corilagin; the results demonstrate that three polyphenolics may not be the major contributors of the high antioxidant activity [3].

The diuretic properties attributed to three endemic species have been confirmed from the Canary Islands. The plants chosen were *Forsskaolea angustifolia*. The results confirm a diuretic activity probably due to high content of potassium salts [4-7].

Pharmacological studies (Forsskaolea tenacissima-Aqueous extract)

Activity	Results			
	Strong	Moderate	Mild	Negative
Analgesic	√			
Antidepressant		√		
Anticonvulsant			√	
Anti-diabetic activity			√	
Gastro-protective activity	√			
Effect on rabbit jejunum		√		
Effect on rat fundus			√	
Effect on Guinea pig ileum			√	
Effect on Guinea pig tracheal chain				√
Antithrombotic effect		√		
Effect on right rat atria			√	
Anesthetized rat BP and HR				√
Effect on detrusor muscle		√		
Biochemical studies (BUN, TP, AST, ALT and CREA) ↓	√			
Hematological studies (RBC, HGB and HCT) ↑	√			
Locomotor activity test			√	
Motor co-ordination (grip strength and motor activity)			√	
Rectal temperature				√
Body weight				√
Autonomic and behavioural effect				√

Table 4

Analgesic activity of *Forsskaolea* on mice hot plate Effect of *Forsskaolea* on rat gastric ulcer NaOH

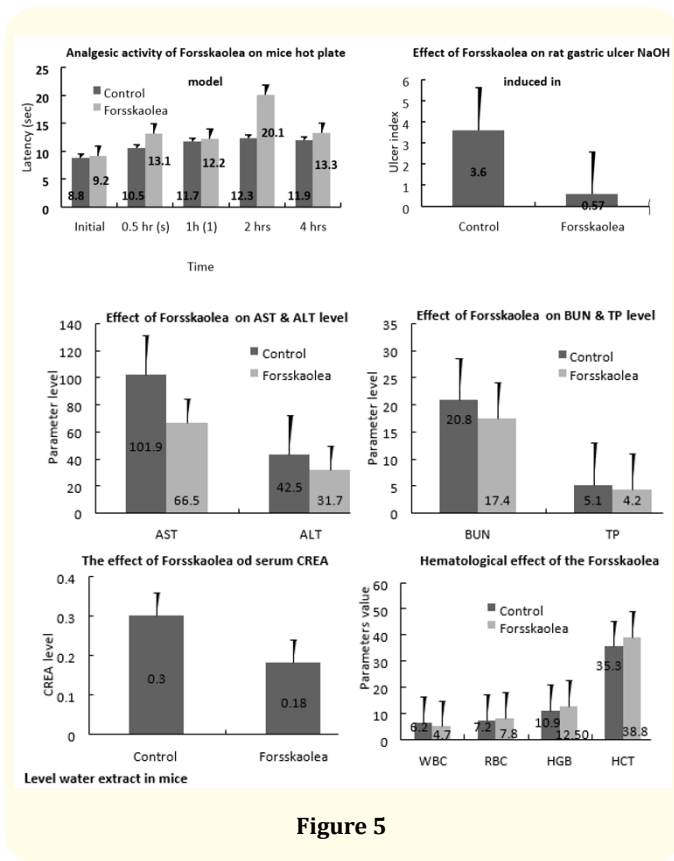


Figure 5

Conclusion of Results

- The plant extract showed significant anti-nociceptive activity.
- The extract prolongs the onset of clonic convulsions and the death time.
- The plant extract has significant effect on NaOH and Ethanol-induced gastric ulcers, antithrombotic effect. The extract significantly decreased the blood urea, nitrogen creatinine, total protein, albumin, aspartate aminotransferase, alanine transaminase and lactate dehydrogenase and slightly increased alkaline phosphatase.
- The extract significantly increased the red blood cells count, hemoglobin concentration, hematocrit, however, mean corpuscular volume, mean corpuscular hemoglobin mean corpuscular hemoglobin concentration, and platelet showed mildly increased. The plant extract has mild sedation effect at the dose tested and did not show toxic signs.

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