

Phytochemical & Pharmacological Studies of *Moltkiopsis ciliata*

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Abstract

The stem and branches have silvery white colour with a pink tint. They bear stiff covering trichomes and leaves or leaves remaining are found at their numerous internodes. Dark brown scars are left by falling leaves. The branches are brittle and their outer layer separate on breaking.

Microscopically, the powder shown many free conical, warty, tapering covering trichomes of various lengths and sizes; the comparatively smaller ones belong to leaves while the significantly large ones are detached from stem and branches. The powder also shows light orange-brown fragments of leaf exhibiting compact endings of palisade cells rounded in outlines; some of these fragments bear many covering trichomes. There are also many grey or grayish-brown fragments of fibro-vascular tissues of branches, some are thick and closely packed, in addition to many fragments of light brown bark cells polygonal or almost square in outlines.

Keywords: phytochemical; pharmacological studies; moltkiopsis ciliata

Introduction

Moltkiopsis ciliata (Forssk.) I.M. Johnston (Halam or Hamat) also known as *Lithospermum callosum* Vahl. Belonging to family Boraginaceae is very common on coastal sands north and inland of Abu Dhabi, especially along margins of depressions; thrives in loose sand around Dubai, Sharjah and further north (Western, 1989). Whole plant is used as a drug, pulp made from fresh plant are hemostatic (LoutfyBoulos, 1983), plant possesses wound healing, anti-tumor, antimicrobial and antithrombotic (Sa, 1981).



Pharmacognosy & Phytochemistry:

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Parts studied: leaf and stem



- A. TS of a portion of the leaf near the margin of the lamina with the epidermises bearing conical warty trichomes. Three layers of the palisade tissues beneath the upper epidermis and above the lower one. At the centre is the spongy mesophyll whose cells contain yellowish-brown materials.
- B. Surface view of a portion of the stem showing the almost rectangular colourless epidermal cells with their thick cell walls. The photo also shows some detached epidermal tapering covering trichomes.
- C. A transverse section of a representative portion of the stem showing its different layers and zones: the small epidermal cells, layers of grayish cortical cells, layers of brownish polygonal cortical cells, layers of compressed cells surrounding a large zone of heavily lignified vascular tissues then the pith cells part of which separate give a large hollow area.

Chemical constituents: Beta acetoxy isovalerylalkalin, Betabeta dimethyl acryl shikonin (salam, 1981). Benzoyl shikonin; betasitosterol, polyhydroxyterpine, kaempferol 4'-methyl ester-3-o-glucoside (Khafagy. 1981).

The following chemical studies have been carried out (Quality Control

methods, 1998; Evans, 1996) on the aerial part of the plant *Maltkiopsis ciliata* (ZCHRTM unpublished work):

Physicochemical constituents (%):	
Loss of weight in drying at 105 ⁰ c	: 11.40 Absolute
alcohol solubility	: 1.60
Water solubility	: 12.00
Successive extractives (%)	
Petroleum ether (60-80 ⁰)	: 1.00
Chloroform	: 0.70
Absolute alcohol	: 1.60
Ash values (%)	
Total ash	: 17.10
Water soluble ash	: 5.10
Acid insoluble ash (10% HCl)	: 1.60

pH values (aqueous solution)	
pH of 1% solution	: 8.362-8.396
pH of 10% solution	: 7.960-7.970

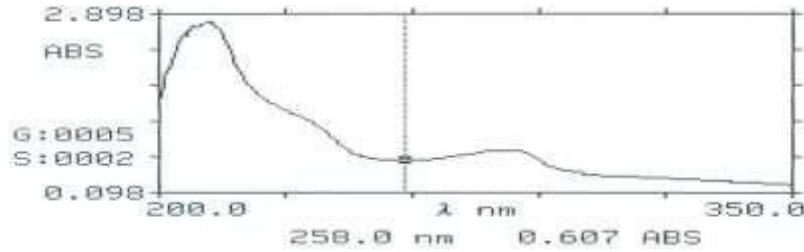
Elemental analyses:

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	0.0028	0.00456	0.000456
Zn	0.25-0.5-1	10	0.0001	<0.0025	<0.0002
Cu	1-2-4	10	0.0046	0.00554	0.000554
Fe	1-2-4	0.909	0.0207	0.41976	0.041976
K	1.2-4	0.909	0.2022	1.5423	0.15423
Pb	1.2-4	10	0.0000	<0.001	<0.0001
Cd	0.125-0.25- 0.5	10	0.0000	<0.0001	<0.00001
Ca	5-10-20	0.0826	0.1550	49.62819	4.96289
Mg	0.25-0.5-1	0.0826	0.7977	8.21227	0.821227
Na	1.2-4	0.909	0.1683	0.35002	0.035002

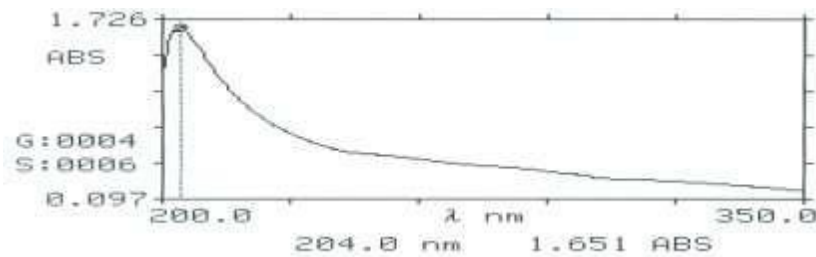
1ppm conc. = 1µg/ml; Actual conc. (%) =Actual conc.(ppm)x0.0001 [1ppm=0.0001%]

UV Spectral studies:

Ultraviolet Spectrum (USP reference)				
Apparatus	Beckman DU 520 general purpose UV/VIS spectrophotometer.			
Sample conc.(mg / ml)	Solvent	λ max (nm)	λ min(nm)	Abs.(λ max - λ min)
0.5481	Intestinal Fluid simulated without pancreatic pH=7.5±0.1	212.5		2.771
		281	258	0.757- 0.607
0.838	Gastric Fluid simulated without pepsin pH=1.2±0.1	204		1.651

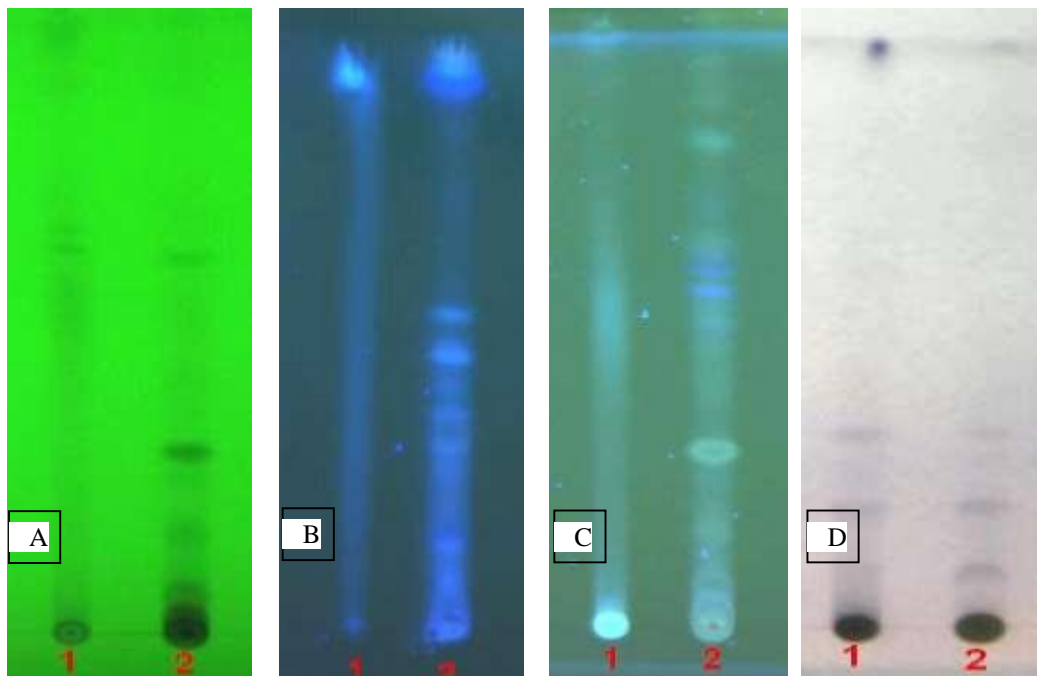


Intestinal Fluid simulated without pancreatic pH=7.5±0.1



Gastric Fluid simulated without pepsin pH=1.2±0.1

Thin layer chromatography (TLC): Wagner (1996)-Reference



TLC fingerprint of Petroleum ether -60-80° track 1) and Methanol extract (track 2) Mobile phase Fig. A&C: Toluene, ethyl formate, formic acid (5:4:1) B: Ethyl acetate, methanol, water (100:13.5:10) D: Toluene, ethyl acetate (93:7) Detection A: UV 254nm B&C: UV 366nm Derivatization D: Vanillin-Sulphuric acid -vis

The toxicological and pharmacological Studies:

Information contained in the literature about the plant: *Moltkiopsis sp.* is a desert plant spreading from Morocco in North Africa to Saudi Arabia and palatable to camels. It is one of the plants that was not pharmacologically studied.

At high polluted localities Ambient O₃ pollution leads to a significant decrease in total sugars, pigments and antioxidant enzymes activity in cultivated plant species. The results also showed that *Bougainvillea spp.*

was more sensitive to O₃ pollution compared to other cultivated plant species, while in non-cultivated *Moltkiopsis ciliata* has more resistance than other plants. This investigation concluded that ozone pollution is responsible for the plant damage in industrial cities of KSA. (Akram, 2010)

The results on the pharmacological and Toxicological studies carried out at ZCHRTM labs. on the aqueous *Moltkiopsis ciliata* extract (Derelanko 2002; Han, 2003) have been given in the following table:

ACTIVITY	RESULTS			
	Strong	Moderate	Mild	Negative
Analgesic (Hot plate & Writhing)			√	
Anti-inflammatory (Paw edema)				√
Effect on rabbit jejunum			√	
Effect on rat fundus strip			√	
Effect on detrusor muscle			√	
Effect on Guinea pig ileum				√
Effect on right rat atria			√	
Anesthetized rat (BP & HR)			√	
Effect on thrombin time ↓	√			
Biochemical studies				√
Hematological studies				√
Locomotor activity test ↓			√	

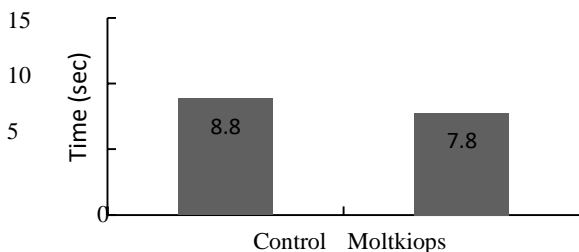
Motor co-ordination (grip strength & motor activity) ↑		√		
Rectal temperature				√
Body weight				√
Mortality				√

Conclusion

Both 70% alcohol and the water extracts showed significant decrease in prothrombin time. Spasmogenic activity of the plant designates the purgative nature of the plant extract in relieving constipation and

gastrointestinal spasms. The plant extract causes very mild relaxation indicating mild Antiurolithic effect.

Effect of Moltkiopsis 70% alcohol extract on prothrombin time



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