

Scientific Name: *Avicennia marina* (Forssk.) Vierh

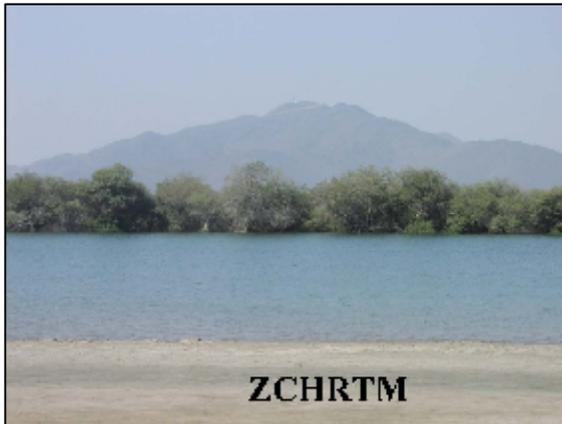
Synonym: *A. officinalis* L., *Sceura marina* Forssk

Local Name: Qurm, Gurm

Arabic Name(s): Shorah, Qurm, Mangrove

Common name: Mangrove, Grey mangrove, Tivar

Family: Avicenniaceae(Verbenaceae)



Plant habitat



Herbarium Sample



Fruit



Flowers

Description of the Plant:

Small evergreen tree, up to 10m high, stem erect with fine pale gray scales. Leaves simple leathery, opposite, ovate, petiolate with entire margin and acute tip, dark glossy green on the upper surface, dull greyish on the lower surface with excreted salt crystals. Inflorescence cymose, in small terminal or axillary clusters on short stalks, flowers bracteate, scented; calyx lobes 2-4 mm long, obtusish, fine fimbriate-margined; corolla dark yellow, exceeding the calyx with 4 unequal spreading lobes exceeding the tube. Fruit 2-valved capsule, globose, pale green, 1.5-2.5cm long; seeds 2-4 large. As *Avicennia* is growing in a specialized habitat, which is poorly aerated, it is adapted to life in this habitat by the presence of erect leafless outgrowths of the roots called pneumatophores or breathing roots up to 50 cm long, they stick out above water and absorb air, which thought to oxygenate the roots.

Habitat & Distribution:

Avicennia is found growing in the inter- tidal mudflats with extremely limited wave action i.e. below the high watermark along the shores of the seas and oceans from east Africa to New Zealand. In U.A.E it inhabits nearly all shores and Khor Kalba on the east coast; now it is planted in many coasts, creeks and islands throughout the country.

Part(s) used:

Leaves, flowers, bark, fruits.

Traditional & Medicinal Uses:

Bark astringent and used as aphrodisiac, for scabies, antifertility agent and has tanning properties. Flowers for perfumes. Leaves are aphrodisiac and used for toothache, Leaves and seeds forage for camels and animals. Wood was used as fuel and in traditional buildings. The plant is known for the quality of its honey and the charcoal has special uses.

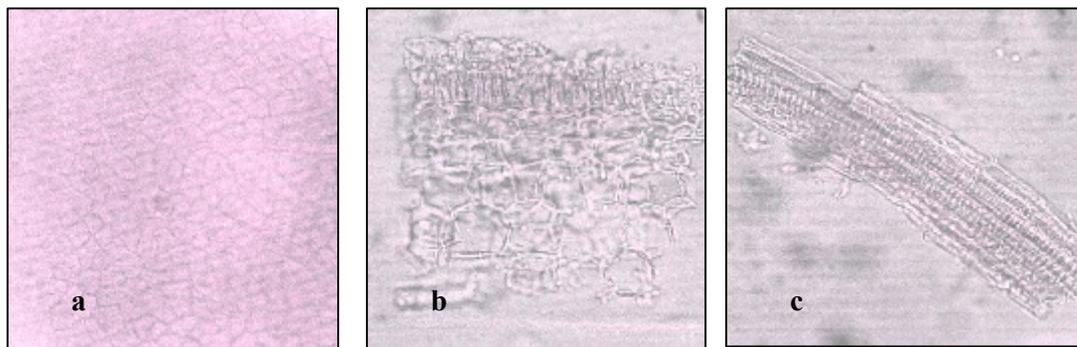
Pharmacognosy and Phytochemistry

Parts studied: Leaves

Microscopical Description:

Leaves :The upper epidermis is covered with a fairly thick cuticle. The upper epidermal cells are compact, polygonal with thick straight cell walls and they are rich in plastids and granular contents. Attached to the epidermis are few unicellular oblong tapering covering trichomes with unicellular or multicellular basal cells. The upper epidermis also bears few short glandular trichomes each with a large flat or mushroom-shaped glandular head and two to three basal cells. The epidermal cells are slightly papillose. The hypodermis is composed of cells having slightly sinuous thin walls of various sizes containing yellow pigments. The palisade cells are of different shapes and sizes and they have thin cell walls and are loosely arranged. The spongy mesophyll is composed of inconspicuous small semi-round cells filled with dark yellow and brown pigments. The spongy mesophyll is embedding normal, long, short, oblong and semi-triangular spirally and annularly thickened vessels. The lower epidermis is bearing several, compactly arranged, long unicellular covering trichomes. No starch granules or stomata have been observed and water pores are expected to

exist. In the powder, few fragments of the air shoots are represented by compact vascular strands containing fibers and borderly pitted vessels together with layers of oblong and semi-round pitted sclerenchymatous cells. (PPS ZCHRTM unpub.Results)



(a). Surface view of the upper epidermis of the leaf showing the relatively small polygonal cells with their straight cell walls and cicatrices of detached covering trichomes. (b).A fragment of the leaf showing a portion of the hypodermal cells (top left) containing yellowish pigments underlain by cylindrical palisade cells followed by cleared semi-rounded spongy mesophyll cells. (c). Adjacent spirally and annularly thickened vessels of the leaf midrib with accompanying short fibres. (Magnifications: All x 250).

Organoleptic characteristics:

Appearance: Coarse powder
 Colour: Brownish gray
 Odour: Aromatic
 Taste: Saltish

Physicochemical constants:

Loss in weight on drying at 105⁰C (%) : 8.40-8.80

Solubilities (%)

Alcohol solubility: 12.00
 Water solubility: 18.00-18.40
 10% ethanolic extractive: 46.00

Ash values (%)

Total ash: 12.40-12.60
 Water soluble ash: 9.20-9.60
 Acid-insoluble ash: 0.20

Successive extractive (%)

Petroleum ether (60-80⁰C): 3.30
 Chloroform: 2.20-2.30
 Absolute alcohol: 13.00-13.50
 Distilled water: 19.40-19.60

pH values

pH of 1% solution:	5.88-5.90
pH of 10% solution :	5.76

Chemical constituents:

Contains betulinic acid ,taraxerol , taraxerone and hydrocarbon. Sterols (β sitosterol & stigmasterol) ,triterpene alcohols ,iridoid glycosides and high amount of carbohydrates , lipids and proteins (Ghazanfar 1994, DPS, ZCHRTM Unpub. results).

Pharmacological and Toxicological studies:

Avicinnia marina (Mangrove), being main forage for camels has been studied for on its ecological and phytochemical aspects. In folklore medicine mangrove plants have proven activity against human, animal and plant pathogens but only limited investigations have been carried out to identify the metabolites responsible for their bioactives. Little work has been carried out on pharmacology ad toxicology of the plant.

Subchronic treatment with the extract did not affect significantly the body and liver weights, the water intake, faecal and urinary output, leucocyte count, haemoglobin or haematocrit. No significant changes in plasma biochemistry were observed except for a 15% increase in AST activity. Histopathological findings showed no changes as compared to the control values (Ali & Bashir 1998).

The pharmacological and toxicological studies carried out in our laboratory and the results in brief, on *Avicennia marina* (10% ethanolic extract) have been given below.

The results presented without references showed unpublished data (UPD, ZCHRTM, DBMS).

ACTIVITY	RESULTS
Anti-inflammatory activity-Rat paw oedema	Extract did not show any anti-inflammatory activity.
Antinociceptive activity-Hot plate	Extract did not show any antinociceptive activity.
Antinociceptive activity-Tail flick	Extract did not show any antinociceptive activity.
Antinociceptive activity-Writhing	Extract did not show any antinociceptive activity.
Anti-hypertension activity-Anaesthetic rats	Blood pressure not affected. Increased Heart rate.
Vasorelaxant activity-Isolated aortic strip	Did not show the relaxation in the contracted strip.
Locomotor activity-Acute effect	No significant change in the locomotory activity was recorded.
Locomotor activity-Sub acute effect	No significant change in the locomotory activity was recorded.
Cardiotonic activity & HR-Isolated rat atria	Extract did not change the rate and force of contraction.
Effect on GIT smooth Muscle-Isolated guinea pig ileum	No change in resting tension was observed.
Effect on GIT smooth Muscle-Isolated rabbit jejunum	Reduced amplitude of the contraction.
Gross behavioral studies-Tremor/Twitches	No toxic symptoms were observed.
Gross behavioral studies-Writhing	No toxic symptoms were observed.
Gross behavioral studies-Diarrhea, Urination	No diarrhea and urination observed.
Mortality	No death was recorded.
Motor co-ordination (String & Platform test)	Motor co-ordination not affected.

Tonic activity-Physical endurance studies	No significant change was noticed.
Acute toxicity studies	Not toxic symptoms observed.
LD₅₀ evaluation (Oral)	>6400 g/k.
LD₅₀ evaluation (i.p.)	>3200 g/kg.

Summary of the results:

Avicennia marina (10% ethanolic extract) showed no significant antiinflammatory activity, antinociceptive activity, locomotor activity, Cardiotonic activity, and vasorelaxant activity. The extract also did not show antihypertension activity. Acute toxicity evaluations reveal no toxic signs and symptoms.

Antimicrobial activity

An aqueous extract exhibited a moderate antifungal activity. Seeds of *Avicennia marina* elaborate antifungal enzymes “compounds” (beta-1,3-glucanase and chitinase) that might suppress fungal proliferation during hydrated storage (Mahasneh AM, 2002).

References:

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