Juniperus oxycedrus L.
Cupressaceae

Compiled by: Dr. Driss Lamnauer
Edited by: Prof. Kamal Batanouny

Morphological description
An evergreen tree, 1-8 m, branches spreading, drooping. The leaves are of medium size, awl-shaped, sharp pointed, with 2 bands on the upper surface. Flowers are inconspicuous. Fruits are 12 mm. thick, yellow to red/brown at maturity after 2 years, shining, with 2 white lines on apex.

Geographical distribution
Local: Middle Atlas, High Atlas.
Regional: Morocco, Algeria and Tunisia.
Global: South Europe, Mediterranean basin.

Ecology
Grows in full sun, in all climate zones and most soils, garrigue, maquis, forest, up to 2500 m.

Status
Not an IUCN threatened species.

Part used
The wood, fruits (berries) and oil.
Oleum Cadinum. Oil of Cade: An empyreumatic volatile oil obtained from the wood. It is a dark brown, clear, thick liquid, with a tarry odor, warm, faintly aromatic, with a bitter taste. It is slightly soluble in water, imparting to it an acid reaction,

Juniperus oxycedrus L.
Juniperus rufescens Link ; *Juniperus tenella* Antoine; Oxycedrus Clus

Arabic: aaraar, taga. العرعر- تق
Berber: taqqa, taka, tiqqi, teki,
English: prickly cedar, medlar tree, juniper bush, juniper bark, juniper berry, sharp cedar.
French: cade, genévrier oxycèdre, oxycèdre, cadier.

partially soluble in alcohol, petroleum, benzene and completely soluble in ether, amyl alcohol, chloroform and glacial acetic acid.

Constituents
The constituents of the plant are flavonoids, flavones, terpenoids, monoterpenoids, sesquiterpenoids, volatile oil, resin, tannin and extractive (acetic acid, pyroligneous acid, acetone, methyl alcohol, etc.).
Cade oil contains phenols -17 to 26% phenols- (mainly guaiacol about 12%), cadinene (sesquiterpenoid), carburs and alcohol (cardinol). The principle component of *Juniperus Oxycedrus* Tar is cadinene, a sesquiterpene, but cresol and guaiacol are also found.
The leaves contain terpenoids, monoterpenoids, and fatty acid: sabinic. The leaf oils were mainly composed of alpha-pinene (40-57%) and manoyl oxide (5-10%).
The infructescence and fruits contain: terpenoids, sesquiterpenoids, monoterpenoids and diterpenoids. The (unripe) berry oils were dominated by alpha-pinene (65%) with moderate amounts of myrcene, limonene, germacrene D or gamma-murolene. They were reported to also contain canfene, junene, terpinole and cadinene.
The chemical composition of the plant as given in the Phytochemical Database, USDA / ARS / NGRL, Beltsville Agricultural Research Center, Beltsville, Maryland, is as follows:
Plant: 11 beta-hydroxymanooy-oxide; cedrene; methyl-trans-communate; methyl-cis-communate; methylimbricalate; methylimbricatolate; myrecommunic-acid; ylangene.
Wood: guaiacol, L-beta-caryophyllene 3,500 ppm;

L-cadinene 4,000 ppm; L-cadinol 6,000 ppm; pseudocedrol 375 - 750 ppm; viridiflorol.
Fruit: myrecommunic-acid-methyl-ether; p-Cresol 45 ppm; pinene.

Pharmacological action and toxicity

Cade oil is a well known anti-parasitic, antimicrobial, antiseptic and vulnerary. It is said to be very effective for skin complaints, dermatitis, eczema, and haemorrhoids.
Extracts of *Juniperus oxycedrus* leaves and stems were tested on animals and found to have significant anti-inflammatory effects on rats. Some analgesic effects were also noted. Spasmolytic properties and effects on arterial blood pressure were also reported.
The juniper berry contains essential oils, flavone glycosides, organic acids and terpenes, which are reported to stimulate the kidneys and bladder. It should be noted that with prolonged usage of the berries, or in excessive amounts, this herb could cause irritation to the kidneys and the urinary tract. It is not recommended for those with kidney problems or for pregnant women. The oil is an irritant and can cause inflammation and blisters. People with gastric inflammation should avoid this herb.
Prickly juniper is said to be an irritant, and allergic dermatitis can probably result from the application of oil of cade. Acneiform eruptions can also result from the use of oil of cade.
Juniperus oxycedrus tar was reported to be genotoxic in several tests.
Juniperus oxycedrus represents a newly characterized pollen species of the Cupressaceae that cross-reacts with other members of the same family. Subjects with cypress allergy have in vivo and in vitro positive test responses for *Juniperus oxycedrus* and can show symptoms when exposed to its pollen.
ABORTIFACIENT. Not to be used if pregnant.

Traditional medicine and local knowledge

- Method of collection:

Cade oil is produced by the destructive distillation of the wood of *Juniperus oxycedrus*.
It should be dry (downward) distilled from the heartwood, as far tar. Pieces of wood are laid carefully on one another and covered with earth, except for an opening at the top, thus permitting slow combustion. Inverted iron pots are filled with billets, surrounded with serap wood and set on fire, producing sufficient heat for distillation; product is caught in receptacles and, set aside 15-20 days for the separation of the tarry and aqueous layers, the upper oily one constituting the product.

- Uses:

Juniper tar produced by the destructive distillation of dry wood is used as an antiseptic for skin diseases, for curing wounds and sores, and as an antiparasitic.
The fruits are used as a diuretic, stimulant, vermifuge and for asthma.
Skin disorders: scalp care, eczema, scale affections, alopecia, loss of hair, psoriasis. Skin injuries: wounds, ulcers.
Cade oil is mostly used in the treatment of animal's skin diseases. It is also used to heal wounds, and as an insect repellent to keep insects away from wounds in equines, applying it directly.
The oil is also sprayed on water jars and cups as an antiseptic and to flavour drinking water. The fruits are consumed and said to be good for asthma and other ailments.

History

Oil of cade has been used from remote times to treat animal's skin diseases, and more recently in medicines for psoriasis, chronic eczema, etc.
Prickly cedar is mentioned by Ibn Al-Baytar (Leclerc, 1877-1883, n° 1317) as a variety of sarbin (the big variety being the cedrus). Al-Wazir Al-Ghassani (n° 228) and Abderezak (Leclerc, 1984, n° 16328) describe it under the name taqqa and Umdat at-tabib (n° 1646) under the name aaraar. It was also mentioned in *Tuhfat al-ahbab* (n° 352458).

Modern uses

Cade oil is also used in men's scents and as a food flavouring, giving a smoky taste.
The essential oil is for external use only and should always be diluted with suitable carrier oil such as sweet almond oil, before being applied to the skin. Keep it away from children and pets. It is reported to be non-toxic and non-irritant but with possible sensitization in some individuals.
Rectified cade oil is a clear orange-brown to dark-

brown oily liquid with an intense tar-like, smoky phenolic odour. Its use in perfumery is limited to situations where a smoky, leathery, woody phenolic, dry and warm note is required (e.g. scented notepaper, leather products, pine for men's scent, etc.).
Cade oil is reported to have certain disinfectant properties that allow it to be used in soap perfuming.
It is occasionally used to impart a smoky flavor to meat and seafood.
In a recent report on the safety assessment of *Juniperus oxycedrus* and other *Juniperus* extracts, it was underlined that the available toxicological data on the oils cannot be extrapolated and more data is needed using National Toxicology Program (NTP) methods. The conclusion drawn was that the available data was insufficient to propose that these ingredients were safe in cosmetic formula.

Diseases/Properties

It is used for skin disorders, scalp care, eczema, scale affections, alopecia, loss of hair, psoriasis wounds, and ulcers. It is reported to be antiparasitic, diuretic, stimulant and vermifugal.

Other uses of the plant (Ethnobotany)

The wood is used for heating fuel, charcoal.
In other Mediterranean countries the mature fruits are used as condiments to flavour roasted meat and in other savoury preparations, as condiments and pickles.
Cade oil is also used in men's perfume and gives a smoky taste to food.

Records from the countries of the region about this species

In some Mediterranean countries the fruits are used:

- as a decoction, to pass kidney stones
- boiled (until the seeds are dissolved), for haemorrhoids
- pounded and mixed with flour, boiled and applied to the abdomen, for bloating
- to treat abdominal pain and loss of appetite; pounded fruits are roasted in a pan for a short time and mixed with grated onion and pine tar, then spread on a cloth and applied to the abdomen.
- to treat common colds and coughs; the fruit and the tar are put in boiling water and the patient inhales the vapour under a blanket.
- as an expectorant to treat catarrh; pounded red fruits are boiled and concentrated, then filtered through a muslin and cooled overnight. The extract thus obtained is drunk every morning and evening.
- to treat calcinosis in joints; pounded decocted fruits are drunk 3 times daily

The root is used to treat stomach disorders; powders are externally used for ulcers and abscesses; fresh stems and leaves are burned to control house pests.

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