

Cochlospermum planchonii

General description

Scientific Name with Author

Cochlospermum planchonii Hook.f.

Synonyms

Cochlospermum planchonii Hook.f. ex Planch.; *Cochlospermum niloticum* Oliv.; *Cochlospermum niloticum* var. *glabrum* A. Chev.

Family

Cochlospermaceae

Vernacular Names

False cotton (English); Faux cotonnier (French); Soasga (Mooré); N'Dribala (Dioula).

Botanical Description

Shrub with woody subterranean rootstock from which, in the rainy season, annual, leafy shoots up to 2.5 m tall are produced. **Leaves** alternate, palmately (3-)5-lobed; stipules subulate; petiole up to 10 cm long; blade in outline, base cordate to cuneate, lobes oblong, basally connate for half to two-thirds of their length, apex rounded, margin entire, rarely dented, upper surface dark green and almost glabrous, lower surface paler and soft-hairy. **Inflorescence** terminal, with 3-7 fascicled branches, rarely lax; bracts triangular. **Flowers** bisexual, actinomorphic, 5-merous; sepals unequal, elliptical-oblong to broadly ovate, the outer 2 shorter than the inner 3, usually velvety; petals obovate, shallowly emarginate, golden yellow; stamens numerous; ovary superior, globose, style elongate, linear. **Fruit** a 3-5-valved capsule, ovoid, obovoid or pyriform. **Seeds** reniform, black, with loosely attached, long, white hairs.

Cochlospermum planchonii flowers towards the end of the rainy season. Fruits are produced 1-2 months after flowering.

(http://database.prota.org/PROTAhtml/Cochlospermum%20planchonii_En.htm)



Photo LABIOCA 1. *Cochlospermum planchonii*

Origin and Distribution

Cochlospermum planchonii is distributed from Senegal eastward to Chad.

Plant Part Used

Medicinal uses

Roots; Leaves



Photo LABIOCA 2. Samples of *Cochlospermum planchonii*. (A): Roots; (B): Leaves

Ethnobotanical information

Major Ethnopharmacological Uses

The root decoction is the most frequently used part of the plant in the treatment of malaria and enteric fever, infertility, premenstrual pain, gonorrhoea and diabetes. The decoctions obtained from tuberous roots of *Cochlospermum planchonii* and/or *Cochlospermum tinctorium* are commonly and indifferently used by traditional healers to treat malaria and fevers (Benoit-Vical et al., 2003). The rhizomes and leaves are separately used locally in the treatment of jaundice, malaria, diabetes and diarrhoea. The rhizomes are also used in the treatment of stomach disorders, typhoid fever and urinary tract infections (Isah et al., 2013; Nafiu et al., 2011; Yakubu et al., 2010). The powder or decoction of the macerated leaves and concoction of the roots together with *Entada africana* and *Erythrina senegalensis* are used for the treatment of malaria, neuralgic malaria, fever and jaundice. Also, the root of the plant mixed with fresh stem bark of *Erythrina senegalensis*, as a concoction is used for the treatment of stomach disorder, typhoid fever and urinary tract infection (Togola et al, 2008).

Chemical constituents

Compounds

Stem; leaves: Carbohydrates, glycosides, anthraquinones, saponins, steroidal triterpenes, flavonoids, tannins, cardenolides, dienolides (Nafiu et al. 2011; Isah et al. 2013).

Whole plant: Cochlospermine A, B, C, D (Achenbach, 1986)

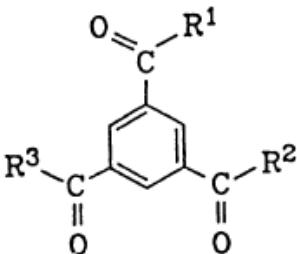
	Compounds	R1	R2	R3
	Cochlospermine A	H ₃ C(CH ₂) ₁₀	H ₃ C(CH ₂) ₁₀	H ₃ C(CH ₂) ₁₀
	Cochlospermine B	H ₃ C(CH ₂) ₁₂	H ₃ C(CH ₂) ₁₀	H ₃ C(CH ₂) ₁₀
	Cochlospermine C	H ₃ C(CH ₂) ₁₂	H ₃ C(CH ₂) ₁₂	H ₃ C(CH ₂) ₁₀
	Cochlospermine D	H ₃ C(CH ₂) ₁₂	H ₃ C(CH ₂) ₁₂	H ₃ C(CH ₂) ₁₂

Figure 1. Structure of some cochlospermines

Quality control

Solubility

MeOH solubility of leaves: 13.9%

MeOH solubility of roots: 6.42%

TLC

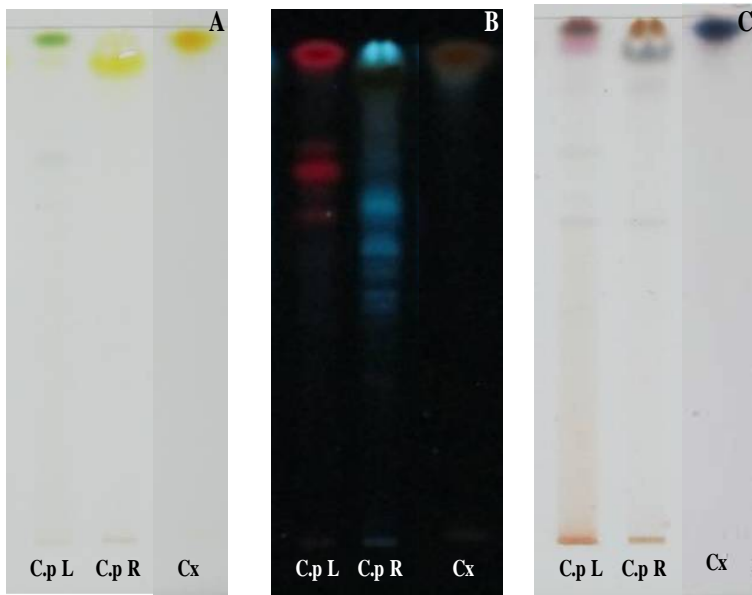


Figure 2. Chromatograms of acetone extract of *Cochlospermum planchonii*

System: EtOC/MeOH/H₂O (77/13/10)

A: Visible light

B: Anisaldehyde/UV 366nm light

C: Anisaldehyde/visible light

C.p L: *Cochlospermum planchonii* Leaves

C.p R: *Cochlospermum planchonii* Roots

Cx: Cochloxanthin

Adulterants and Adulterations

Cochlospermum tinctorium

Standard Preparations

Decoction, Maceration, Powder

Pharmacological properties

In Vitro Experiments

Antimalarial activity

Dichloromethane roots extract of the leaves inhibited the growth of the *Plasmodium falciparum* K1 chloroquine-resistant strain (IC₅₀ 4.4 µg/ml) (Vonthron-Sénécheau et al., 2003). A crude leaf extract and essential oil prepared from the leaves showed both antiplasmodial activity and the leaf oil yielding the best antimalarial effect (IC₅₀ = 22–35 µg/ml) (Benoit-Vical et al., 1999). The epiderma tubercle essential oils presented an interesting antimalarial activity against *Plasmodium falciparum* Nigerian strain (IC₅₀ 9 µg/ml) and *Plasmodium falciparum* FcB1 strain (IC₅₀ 10 µg/ml) after 72 h of treatment (Benoit-Vical et al., 2001).

Antibacterial activity

The methanol stem leaf extract was sensitive at 80 mg ml⁻¹ to the following microbes: *Staphylococcus aureus*, *Streptococcus pyrogenes*, *Salmonella typhi*, *Pseudomonas aureginosa*, *Proteus mirabilis* and *Trychophyton sp.* The MIC determination showed that the extract inhibited the growth of *S. aureus*, *S. pyrogenes*, *S. typhi* and *P. mirabilis* at a concentration of 10 mg ml⁻¹; while it inhibited *P. aeruginosa* and *Trychophyton sp.* at 20 mg ml⁻¹. The MBC showed that at 20 mg ml⁻¹, *S. pyrogenes* and *P. mirabilis* were exterminated, while it was observed for *S. aureus*, *S. typhi*, *P. aeruginosa* and *Trychophyton sp.* at 40 mg ml⁻¹ of the plant extract (Isah et al., 2013).

In Vivo Experiments

Antimalarial activity

Saye (combination of *Cochlospermum planchonii*, *Cassia alata* and *Phyllanthus amarus*) and N'Dribala (*Cochlospermum planchonii* roots) preparations revealed prophylactic activity, reducing parasitaemia in treated mice, with respect to controls, by 52.0% (CI₉₅ 46.1-57.9) and 45.5% (CI₉₅ 44.5-46.5), respectively (Yerbenga et al., 2012). N'Dribala appeared safe and statistically as efficient as chloroquine for the treatment of uncomplicated *Plasmodium falciparum* malaria. At day 5 (D5), 57% of chloroquine-treated and 52% of N'Dribala-treated patients were cured with no detectable parasitemia (parasite density (Pd): 0) and more than 90% of whole patients were asymptomatic (Benoit-Vical et al., 2003).

Anti-diabetic activity

The roots aqueous extract have been demonstrated to reduce the blood glucose (86.7%) of alloxanized rats at a dose of 25.5 mg/kg b.w. (Yakubu et al., 2010).

Anti-diarrhoeal activities

The methanolic root bark extract (1000 mg/kg) significantly ($P < 0.05$) reduced the rate of gastric emptying into the duodenum in a dose dependent manner. Oral administration of the extract (500 and 1000 mg/kg) and the reference drug diphenoxylate (5 mg/kg) significantly ($P < 0.05$) decreased the distance covered by the charcoal plug in the intestine of mice with the highest dose of the extract (1000 mg/kg) producing similar percent inhibition of the charcoal plug with the reference drug by 44% and 44% respectively. In castor oil induced enteropooling, the extract significantly ($P < 0.05$) decreased the intra luminal fluid content in mice. The highest reduction was recorded at 1000 mg/kg of the extract (Ezeja & Anaga, 2010)

Anti-inflammatory and analgesic activities

The anti-inflammatory effect of the aqueous methanol root extract induced biphasic inhibition of paw edema development. The extract (250 mg/kg bw, p.o.) caused about 40% inhibition of carrageenan induced paw edema at 1 h, which declined to zero at 3 h post-administration of the extract in the first phase observation. The second phase of paw edema inhibition by the extract commenced immediately, gradually increased, and peaked (50%) at 6 h after administration of the extract. The aqueous methanol root extract at 250 and 500 mg/kg bw (p.o.) significantly ($p < 0.05$) decreased the number of abdominal writhings with percentage inhibition of 65.14% and 74.05%, respectively (Anaga & Oparah, 2009).

Anti-hyperglycemic activity

The aqueous methanol root extract (250, 500, 1000 mg/kgbw p.o.) significantly ($p < 0.05$) decreased blood glucose levels in alloxaninduced hyperglycemic mice in a dose- and time-dependent manner (Anaga & Oparah, 2009). The aqueous extract at the doses of 50, 100, and 250 mg/kg body weight significantly ($p < 0.05$) reduced the activities of alkaline phosphatase (ALP), acid phosphatase (ACP) and lactate dehydrogenase (LDH) in the liver, ALP and ACP of the kidney, LDH in the small intestine, plasma γ -glutamyl transferase (γ -GT), urea, creatinine, and albumin content of the animals while there was no significant effect on the liver γ -GT activity of the mice. The reduction in the LDH manifested only in the kidney at 100 and 250 mg/kg body weight of the extract (Nafiu et al., 2013). The oral administration of aqueous methanol root extract (70%) was also demonstrated to be well tolerated

(250- 3000 mg/kg bw, per os) by the albino Wistar mice. Brine shrimps lethality test gave LC₅₀ of 4.42 ppm at 95% confidence interval (Anaga & Oparah, 2009).

Safety data

Single Dose Toxicity

K562 cell line (human erythroblastic cell line) : IC₅₀ = 1600 µg/mL (Benoit-Vical et al., 2001)

L6 cells (rat skeletal muscle myoblasts): IC₅₀ = 67.3 µg/mL (Vontron-Sénécheau et al., 2003)

Key (proposed) usage

Therapeutic Indications

Malaria, Hepatitis, Constipations, Bilarzioses, Stomach aches

Pregnancy and Lactation

Ineffective

Adverse Effects

Nausea, dizziness

Overdose

Nausea, Vomit

Trade information

Nature of plant material

Novembre-Mars

Conservation status

Vulnerable

Processing and Storage

Cut roots

Sun drying

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