Pavetta crassipes

General description

Scientific Name with Author

Pavetta crassipes K. SCHUM

Synonyms

Pavetta barteri Dawe;. *Pavetta utilis* Hua

Family

Rubiaceae

Vernacular Names

Mokbiisri (**Mooré**); kurkadé (**Peul**); kumuba, kumbafura (**Bambara**)

Botanical Description

Shrub or small tree 1-8 m tall; young branches glabrous, stout, angled; older branches covered with thin greyish, buff or rarely blackish cracking bark. **Leaves** usually clustered near the apices of the branches, paired, or occasionally ternate or quadrate, glabrous; blades 8-30 × 1.3-7.5 cm, linear to narrowly elongate-oblong or oblanceolate, rounded or sometimes obtuse at the apex, obtuse to attenuate at the base; lateral nerves in 8-11 main pairs. **Inflorescences** corymbose, crowded, (3)7.5-17 cm across (excluding corollas**). Flowers** white and green, pedicellate, with shortly dentate, glabrous tubular calyx, glabrous tubular corolla about 12-18 mm long. **Fruit** black, shiny, 6-8 mm in diameter; pedicels slightly accrescent; calyx limb persistent. **Seeds** greyish-brown, 5-5.5 mm wide, slightly rugulose on convex face (Nacoulma, 1996; Arbonnier, 2002).

Tree

Leaves

fruits

Origin and Distribution

Benin, Burkina Faso, Burundi, Central African Republic, Côte ivory, Ethiopia, Ghana, Guinea, Malawi, Mali, Mozambique, Niger, Nigeria, Tanzania, Zambia. From senegal to Cameroon, as far as Sudan, tropical Africa (Nacoulma, 1996; Arbonnier, 2002).

Plant Part Used

Medicinal uses

Leaves: schistosomiasis or haematuria, malaria, splenosis, fever, conjunctivitis, syphilis sores, diarrhoea, stiffness, weakness, respiratory diseases, hypertension. **Roots**: laxative, constipation, gonorrhoea. **Bark**: snake bite, febrifuge, thyroid stimulating. **Roots + leaves**: fever, vitamin deficiency, kwashiorkor**. Fruit**: vermifuge.

Other uses

Leaves: condiment**. Fruit:** consumed fresh

(Nacoulma, 1996; Arbonnier, 2002, Aliyu et al., 2008)

Roots **Leaves**

Possible Alternative Source Species

Ethnobotanical information

Major Ethnopharmacological Uses

In Malawi, dried ground leaves of Pavetta crassipes are claimed to be used to increase libido in men, roots are used for snakebites and bark as purgative. The leaves are also used in Tanzania in the treatment of gonorrhoeae. In Central Africa, the acid infusion of the leaves is taken as a cough remedy. The leaves are eaten by some native tribes pounded up with other food, or boiled in the slightly fermented water in which cereals have been left to steep, and mixed with porridge. The plant has various other ethnomedical uses for instance, the boiled leaf powder is used to treat blood in the urine, fevers and abdominal disorders. In Nigeria, the leaves of this plant are used medicinally in the management of respiratory infections and abdominal disorders.

Toxicology

Other Relevant Uses

Chemical constituents

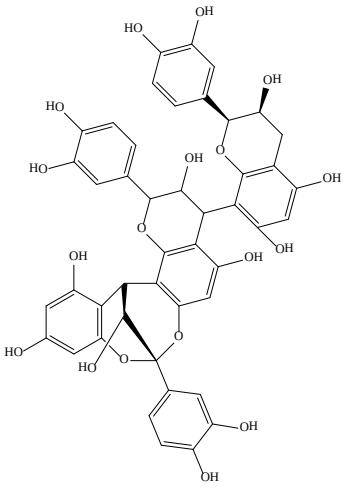
Compounds

Leaves: Tannins, saponins, alkaloids, flavonoids, reducing sugars, , carbohydrates, proteins, amino acids (Asp, Glu, Leu), organic acids (citric, ascorbic), sterols, anthraquinones and terpenes/ steroids (Nacoulma, 1996; Amos et al., 1998; Ibekwe et al., 2012).

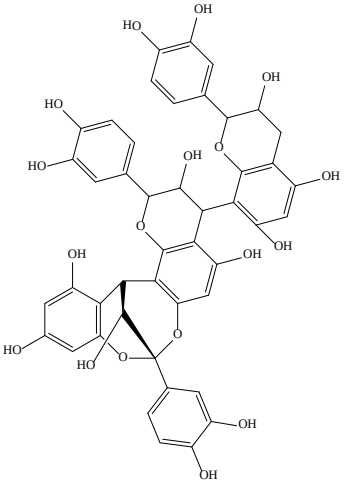
Identified compounds

Leaves: Quercetin-3-O-rutinoside (Bello et al., 2011; Mponda, 2012), chlorogenic acid, methyl chlorogenate (Mponda, 2012)

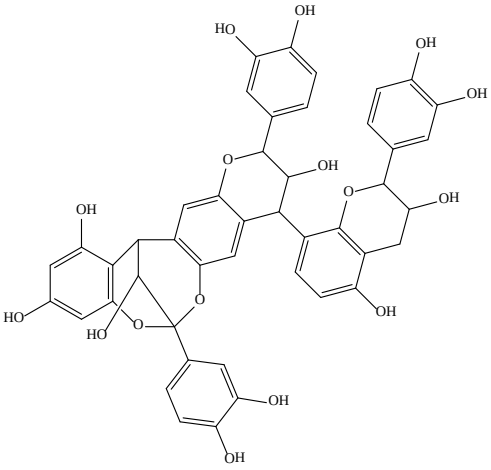
Stem barks: Dimeric and trimeric proanthocyanidins: aceatats of cinnamtannin B1, pavetannin B1, B3, B4 and B5 (Mponda, 2012)



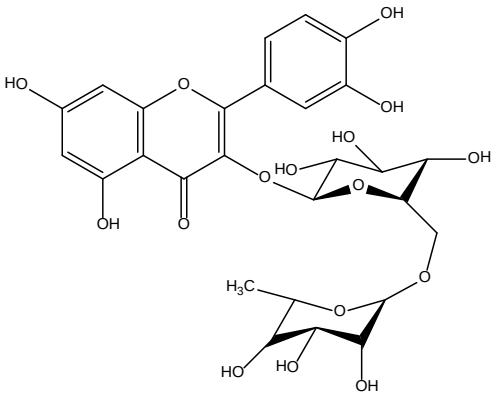
Pavetamin B1



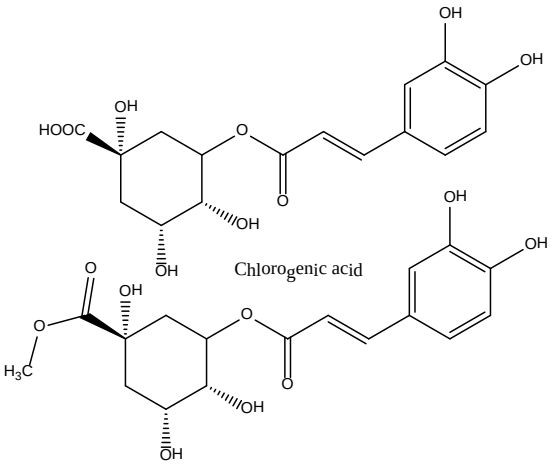
Pavetamin B2



Pavetamin B3, B4



Quercetin-3-rutoside



Methyl-chlogenate

Quality control

Identification

Organoleptic Properties (couleur, goût, odeur)

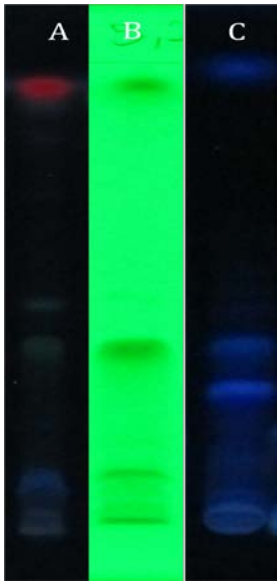
Macroscopic Characteristics (description des bottes vendues dans les marchés)

Solubility (leaves MeOH extract yield6.6-20.4%, Root-MeOH extract: 6.2% acetone, eau, éthanol) cf Aline

Moisture Content (Leaves: 1.56-2.51%, Root: 3.60%)

Total ash (leaves: 6.98-15.68%)

TLC / HPLC / GC



Leaves methanol extract A: 365 nm, B: Anisaldehyde under UV 365nm, Leaves Aqueous extract Anisaldehyde under UV 365nm

Adulterants and Adulterations (*Pavetta barteri* Dawe; *Pavetta utilis* Hua)

Standard Preparations (decoction, maceration)

Pharmacological properties

Pharmacodynamie Properties

ln Vitro Experiments

Antiplasmodial activity

The alkaloid extracts of leaves are effective against W2 chloroquine-resistant strain and the D6 chloroquine-sensitive strain with IC_{50} values of 1.230 ng/mL and 1.020 ng/mL, respectively (Sanon, et al., 2003). The alkaloid extracts of leaves (PcF3) and its fraction (PcF3.4) exhibited antimalarial activity with an IC_{50} of 2.2 and 0.71 µg/ml, respectively, against *Plasmodium falciparum* (Baldé et al., 2010). The alkaloid leaf extract has also demonstrated to possess an interesting antiplasmodial activity (IC_{50} of 5 µg/ml) (Ouattara et al., 2014).

Antileishmanial and antitrypanosomal activity

The antileishmanial IC_{50} values were similar for the PcF3.2 (2.03 µg/ml) and PcF3.4 (2.0 µg/ml) fractions obtained from alkaloid extracts of leaves, whereas PcF3.4 had greater selectivity (SI of 2.71). *Trypanosoma cruzi*, was more sensitive to the PcF3.2 and PcF3.4 extract fractions (IC_{50} of 1.75-1.86 µg/ml) than *Leishmania infantum* (IC_{50} of 2.00-2.03 µg/ml). Both PcF3.2 and PcF3.4 were significantly more active against *Trypanosoma brucei* (IC_{50} of 1.0 and 0.25 µg/ml, respectively) (Baldé et al., 2010).

Antimicrobial activity

The aqueous extract of leaves inhibited the growth of some pathogenic microorganisms which included *Streptococcus pyogenes* (MIC 12.5 mg/mL), *Corynebacterium ulcerans* (MIC 6.25 mg/mL), *Klebsiella pneumoniae* (12.5 mg/mL), *Neisseria gonorrhoeae* (12.5 mg/mL), *Pseudomonas aeruginosa* (6.25 mg/mL), and *Escherichia coli* (6.25 mg/mL) (Bello et al., 2014). The alkaloid extracts of leaves (PcF3)

and its fraction (PcF3.1, PcF3.2 and PcF3.4) exhibited antibacterial activity in *Staphylococcus aureus* and had an MIC range of 4.7–35.0 µg/ml (Baldé et al., 2010).

Antitumor activity

The alkaloid fraction (PcF3.4) and its equivalent fraction PcF2.2.2, obtained from the methanol extract, exhibited inhibition of PC3 cell growth (10 µg/ml < IC_{50} <50 µg/ml) (Baldé et al., 2010).

ln Vivo Experiments

Leaf aqueous extract was presented anti-inflammatory and anti-asthma activity in rats (ip) at concentrations of 250 mg/kg and 500 mg/kg (Amos and al. 1998). It seems that its activities could involve an inhibitory effect on calcium influx or the release of prostaglandin (Amos et al. 1998). The same authors also report that in vivo, the ethanolic extract has hypotensive properties and that these effects are mediated via β-adrenergic receptors or a synergistic mechanism with these receptors (Amos et al. 2003). Leaves extract presented a sedative effect on the central nervous system with a probable direct action on dopamine receptors or GABBA (Amos et al., 2004).

Ex vivo studies

The effects of the aqueous extract of *Pavetta crassipes* leaves were studied on gastrointestinal and uterine smooth muscle preparations isolated from rabbit jejunum, guinea pig ileum and rat uterus. The extract produced a concentration-dependent inhibition of the spontaneous motility or elevated tone in these preparations. The inhibitory effects of the extract were not affected by pre-treatment with propranolol or yohimbine, but were completely blocked by verapamil pre-treatment (Amos et al. 1998).

Clinical Studies

Pharmacokinetic Properties

Safety data

Ethnie Use Safety Data

Root bark and leaves extract have been used for many years with no side effects.

Preclinical Safety Data: none

Single Dose Toxicity: none

Repeated Dose Toxicity: none

Mutagenic Potential : none

Carcinogenicity: none

Sensitizing Potential: none

Clinical Safety Data: none

Key (proposed) usage

Therapeutic Indications (malaria, maceration)

Dosage Method and Duration of Administration (until healing)

Contraindications Special Warnings and Precautions for Use

Effects on Ability to Drive and Use Machines

Interactions

Pregnancy and Lactation: none

Adverse Effects (vomiting)

Overdose (vomiting))

Evaluation of Efficacy (None)

Trade information

Volume of production in the country: none

Volume of domestic consumption: none

Volume of export: none

Average price: none

Nature of plant material (everytime)

Conservation status: vulnerable (reference)

Nature of plant products

Processing and Storage (leaves, stem bark, dry in shade or sun, store in plastic

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