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Review Article

REVIEW ON *ANOGEISSUS LEIOCARPUS* A POTENT AFRICAN TRADITIONAL DRUG

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ABSTRACT

Anogeissus leiocarpus (DC.) is belong to the family combretaceae ,Many secondary metabolites including flavonoids, tannins, phenolic acids, and triterpenes etc. have been isolated from this plant. it is used in several traditional medicines in Africa to cure various diseases. *A. leiocarpus* possess antibacterial, antifungal, anthelmintic, antiplasmodial, trypanocidal,Leishmanicidal, hepatoprotective and antioxidant activity. The presented review summarizes the information concerning the botany, constituents,traditional uses, biological activity and toxicity of the plant.

Keywords: *Anogeissus leiocarpus*, constituents, traditional uses, pharmacological studies.

INTRODUCTION

Herbal preparations represent one of the important traditionalmedicine therapies and it is still the mainstay of about 80% of the worldpopulations, mainly in the developing countries for primary health care[1]. It has been estimated that 25% of the modernmedicines are made from plants first used traditionally. The reasons for this are complicated, probablystem from the ability of the plant to produce structurally diversemolecules, these molecules are made from renewable resource of raw by eco-friendly process[1]. Among several factors contributing towards the potential use of phytomedicine are safety, lack of adverse reactions and side effectswhich have been mostly found to particularly influence the use of suchmedicines in developed countries[2]. In rural areas there areadditional cultural factors that encourage the use of herbalpreparations, people believe that where an area give rise to a particulardisease it will also support plants that can be used to cure it, also hundredof primary health care centers which are intended to serve rural areaswhich lack staff, diagnostic facilities and adequate supplies of medicines[3].

Plant taxonomy

Binomial name: - *Anogeissus leiocarpus* (DC.) Gill & Peer
Synonyms*:-Anogeissusschimperi*Hochest. Ex Hutch.& Dalz.
*Concarpusleiocarpus*DC.
Family: - *Combretaceae*
English name: African birch,
Vernacular names: - Fung dialect: Al-Selak.
Arabic: EL-Sahab[4]

Botanical description

Anogeissus leiocarpus is a deciduous tree species that cangrow up to 15–18 m of height and measure up to 1 m diameter. Bark greyish, scaly. Branchesoften drooping and slender, leaves alternate, ovate –lanceolate in shape,2-8 cm long and 1.3-5 cm across. The leaves are acute at the apex andattenuate at the base, pubescent beneath. Inflorescence globose heads, 2cm across, yellow; the flowers are bisexual, petals absent. Fruits areglobose cone like heads; each fruit is broadly winged, dark grey, 3cmacross. It canreproduce by seeds as well as vegetative propagation[4,5].

Distribution and habitat

Anogeissus leiocarpus is typical element of woodlands and savannas of the Sudanian regional centreof endemism.It has large ecological distribution rangingfrom the boarders of Sahara up to the out layer humid tropical forests.InWest Africa, from Senegal to Cameroon and extends to Ethiopia andEast Africa. It grows in dry forests and gallery forests [5,6].

Traditional Uses

Many traditional uses have been reported for the plant. In Sudanese traditional medicine the decoction of the barks isused against cough[4]. Rural populations of Nigeria use sticks for orodental hygiene, the end of the sticks are chewedinto fibrous brush which is rubbed against teeth and gum[7]. Ivory Coast traditional practitioners use the plant for parasiticdisease such as Malaria, Trypansomiasis, Helminthasis and dysenteric syndrome[8] In Togolese traditional medicine itused against fungal infections such as dermatitis and Mycosis, also thedecoction of leaves is used against stomach infections[9]. The plant is also used for the treatment ofdiabetic ulcersgeneral body pain, blood clots, asthma,coughing and tuberculosis[10].

Chemical Constituents

Preliminary phytochemical screening of the *Anogeissusleiocarpus*stem bark for the major secondary constituents showed that,the plant was rich in tannins and having appreciable quantities offlavonoids, terpenes and saponins, however it was devoid of alkaloidsand anthraquinones[11,12]. Polyphenolic compoundssuch as 3,3,4-tri-Omethylflavellagic acid, 3,3,4-tri-O-methylflavellagic acid-4--D-glucoside, gentisic, protocatechuic, gallica cids, chebulagic acid, chebulinic acid and ellagic acidwere isolated.Flavogallonicacid bislactone, castalagin and ellagic acid were isolated from the bark[13-15]**.** Eight flavonoids, namely, *4H-1-Benzopyran-4-one, 7-[(6-deoxy-α-Lmannopyranosyl)oxy]-5-hydroxy-2-(4-hydroxy-3-methoxyphenyl)*,*cathecin*, *quercetin, isoquercetin* , *rutin, vitexin, kaempferol* , and *procyanidin B2* were isolated from the leaves of the plant Five triterpens and triterpene glycosides were isolated, namelysericoside, its related aglyconesericic acid, rachelosperoside; itsrelated aglyconerachelosperogenin, and arjungenin[16].

Pharmacological Studies

Antimicrobial activity

A study of *in vitro* antibacterial activity of *Anogeissusleiocarpus* was done in Nigeria using agar diffusion assay againstbacteria responsible for infections caused by multi-drug resistant*Pseudomonas aeruginosa*and methacillin resistant *Staphylococcusaureus*were carried out, and the results showed that most of theactivities were associated with the methanolic and aqueous extract, withsome activities being associated also with ether and chloroform fractions[17].The aqueous andmethanol extract of the Bark, Fruit, and leaves showed high activity against standard*Staphylococcus aureus , Escherichia coli, Pseudomonas aeruginosa*and*Bacillus subtilis*and clinical isolates of *Staphylococcus aureus, Escherichia coli, Pseudomonas aerugenosa*and *Proteus vulgaris*.Chloroform extract exhibited practically no activity against all standardorganisms[11].Theethanol extract of stem bark of*Anogeissus leiocarpus* inhibited the growth of standard strains of*Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa*and*Candida albicans*[18]. 3,3,4-Tri-o-methylflavellagic acid glucoside isolated from bark possesses antimicrobialeffect on *Staphylococcus aureus, Escherichia coli, Pseudomonasaeruginosa* and *Candida albicans*[19]. A studyconducted in Togo to investigate Antifungal activity of *Anogeissusleiocarpus* against 20 pathogenic fungi demonstrated that hydroethanolicextract possesses *in vitro* antifungal properties, their MIC were in arange of 0.25-4mg/ml[9].

Anthelmintic activity

A research in conducted to investigate *in vitro* Anthelminticpotential of crude ethanolic leaf extracts of *Anogeissus leiocarpus*relative to that of the commercial Anthelmintic febendazole against eggsand infective larvae of *Haemonchuscontrotus* indicated significant dose dependant inhibition of egg hatch and larval motility. The potency of theplant extract was comparable to that of febendazole, the finding suggeststhat this plant could yield natural alternative treatment for *Haemonchuscontrotus*[20]. Studyconductedin sheep naturally infected with gastrointestinal nematodiasis has found that aqueous leaf extract of the plant produceddose dependant reduction in the feacal egg count in the treated groupswhen compared to the untreated controls. The results revealed that therewas reduction in the number of worms recovered from gastrointestinal tract of sheep treated with 400mg/kg of the extract for three days than the untreated control[21]. In a recent study, administrationof ethanolic extract of the roots induced a moderate fecal egg reduction (81 %) and adult worm-burden reduction (87 %)

against *Haemonchuscontortus*and *Trichostrongyluscolubriformis*(82 %). Theplant exhibited high efficacy against adult *Strongyloïdespapillosus*(100 %), *Gaigeriapachyscelis*(90 %), *Cooperiacurticei*(100 %), and *Oesophagostomumcolumbianum*(95 %)but low efficacy against *Trichostrongylusaxei*(67 %) and *Trichurisglobulosa*(79%).[22] *Anogeisusleiocarpus*could find a potential application in the control of parasities.

Antiplasmodial activity

A study to evaluate antiplasmodial activity of plant traditionallyused for malaria in Ivory Coast showed that the strongest *in vitro*antiplasmodial activity was found in the dichloroethane extract of*Anogeissus leiocarpus* leaves, comparable to activity reported inliterature for ethanolic extract of *Artemisia annua.* The study showed that biological efficacy of the plant extract is not due to *in vitro* cytotoxicity[23]. In another study against chloroquine resistant strain of *Plasmodium falcipru m*it was concludedthat methanol extract of leaves and roots of the plant were stronglyactive against malaria in this in vitro model[8]. Thebutanol, ethyl acetate and methanol extracts of *Anogeissus leiocarpus* stem bark were screened for in *vitro* antiplasmodial activity; the better activity was found in the butanol fraction of the plant[13]. The methanolic extract has high antimalarial activities, and capable of boostingHDL level in malaria-infected organisms[24].

Trypanocidal activity

A research to evaluate *in vitro* trypanocidal effect of *Anogeissusleiocarpus* root methanol extract against *Trypansomabrucei* and *Trypansomacongolense*at concentrations of 4mg/ml, 2mg/ml and0.4mg/ml was carried, caused cessation or reduction in motility of theparasites in extract treated blood compared to that of parasite loadedcontrol blood without extract taken as a measure of trypanocidal activity. It was found that there is only slight reduction in motility in *T.congolense*and drastically reduced motility in *T.brucei*compared tocontrol[25]. Methanol extract of leaves, roots and stembarks of the plant showed interesting *in vitro* trypanocidalactivity[8]. The aqueous, butanol fractions of the methanol extract of *Anogeissus leiocarpus* were associated with *invitro* trypanocidal activity against four strains of *Trypanosoma*species.; Castalagin isolated from these fractions showed trypanocidal activity on both, the human and domestic animal pathogens causing trypancomiasis[13].

Leishmanicidal activity

The aqueous, butanol, ethyl acetatefractions of the methanol extract of *Anogeissus leiocarpus* were screened for *in vitro* leishmancidal activity using four strains of promastigotes of leishmania, the best leishmanicidal activity was associated with the aqueous and butanolic fractions; Castalagin isolated from these fractionsas compared to all the isolated compounds displayed the best leishmanicidal activity followed by flavogallonic acid[14].

Antioxidant and hepatoprotective activities

Methanol and ethyl acetate extracts of the plant were investigated for their1,1-diphenyl-2-picryl hydrazyl(DPPH) free radical scavenging activity and Ferric reducing antioxidant power (FRAP). The results revealed thatplants exhibited scavenging ability and strong reducing ability[26-28]. Additionally the methanol extract of the stem bark of the plant was reported to have strong *in vivo* antioxidant, hepatoprotective and ameliorative actvities on hepatocellular injury following pre-treatment or post-treatment with carbon tetrachloride (CCl4).Therefore it may have a protective effects on human carcinogenesis, diabetes, asthma, atherosclerosis, and other degenerative diseases that are associated free radicals[29]. This activity can be attributed to flavonoids, phenolic acids, and tannins.

Toxicological studies

The resultof the investigation of oral acute toxicity of the aqueous leaf extract of the plant in rats revealed no death with oral doses up to 3200 mg/kg body weight; however the rats showed signs of depressionand in appetence, while using intraperitoneal route rats showed dosedependant signs of toxicity ranging from in appetence, depression, unsteady gait, tremor and respiratory distress to death. No gross changes were observed in rats that died followingextract administration. Histopathological changes were also not observedin all organs except the lung which showed congestion, oedema and bronchitis. These results suggest that the aqueous leaf extract of the plantcould be used with some degree of safety especially by oral route[30] Earlier study found that the extracts of the plant were lethal tomice within five seconds after intravenous injection of 8mg/kg bodyweight and within 60 seconds after intraperitoneal injection of 20mg/kgbody weight. Doses of 50mg/kg given orally produced no detectabletoxicity, the post mortem result of the dead mice showed no

pathologicalchanges in the organs and viscera[7].

CONCLUSIONS

The present review emphasizes the knowledge on the plant *Anogeissus leiocarpus*, its botany, habitat, constituents, traditional uses and biological activities. The leaves, roots and barks of the plant have many bioactive phytoconstituents. Constituents of the plant include flavonoids, tannins, phenolic acids, and, triterpenes,properties as shown in the different biological models. The biological research has supported the use of the plant in traditional medicines or revealed the new activities. Reasonably it can be concluded that the plantseems to be potential in various activities, so it can be further explored to find an application in the control of animal or human disorder.

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