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Invited Mini Review

Trichilia emetica (Meliaceae) – A review of traditional uses, biological activities and phytochemistry

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ABSTRACT

Trichilia emetica, a plant native to Africa, is used in traditional medicine to treat various ailments such as abdominal pains, dermatitis, haemorrhoids, jaundice and chest pain. This species also known as Natal Mahogany is used for its emetic, diuretic and purgative properties and for induction of labour. The extensive traditional use of this species has encouraged scientists to explore several biological activities including anti-infective, anti-inflammatory, antischistosomal, antiplasmodial, anticonvulsant, anti-trypanosomal, anti-oxidant, antitussive, antimutagenic and hepatoprotective properties. Several limonoids have been isolated from the stem bark. *Trichilia* substance Tr-B and nymania 1 exhibited selective inhibitory activity towards DNA repair-deficient yeast mutants and exerted antifungal, bactericidal, antiviral, antifeedant and growth regulating properties. Polysaccharides have been isolated and the pectin rhamnogalacturonan type I with side chains of arabinogalactan type II exhibited fixation ability suggesting the possible mode of action as a wound healing remedy. This review aims to coherently unite results obtained from various studies on this ethnomedicinally important species.

Contents

1. Introduction

Trichilia emetica Vahl (also known as Natal Mahogany "Musikili") belongs to the Meliaceae (Mahogany family). The genus name "*Trichilia*" is derived from Greek "tricho" referring to

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Fig. 1. Leaves of *T. emetica*.

the 3-lobed fruits and "*emetica*" referring to the emetic properties of the tree.

Many *Trichilia* species are planted for ornamental purposes, while others are used in traditional cosmetic formulations (Grundy and Campbell, 1993). About 20 *Trichilia* species have been identified in the southern African region (Allaby, 1998) of which *T. emetica* and *T. dregeana* are confined to the Limpopo and KwaZulu-Natal regions. These two species are considered close taxonomic allies thus causing confusion among local communities in terms of identification (Palmer and Pitman, 1972).

T. emetica is an evergreen tree reaching 20–35 m in height and grows naturally throughout sub-Saharan Africa. The bark of the tree is smooth dark grey-brown and the diameter varies between 1.8 and 15 m. *T. emetica* produces three to five pairs of leaflets with prominent veins on the lower surface. The characteristic dark glossy leaves (Fig. 1) reach a length of up to 70 cm (Allaby, 1998; Coates-Palgrave, 2000; Pooley, 1993). The flowers vary in colour from creamy to pale yellowish-green and are produced on short congested axillaries with five thick petals, which are about 2 cm long (Fig. 2). Flowering occurs between spring and summer (October and December) (Coates-Palgrave, 2000; Pooley, 1993).

The furry fruits are rounded and red to brown in colour with three valve capsules (Fig. 3). These capsules split into three or four parts to reveal three to six shiny black seeds (18 mm long and 8 mm broad) each with a fleshy orange to red aril (Fig. 3). Fruiting occurs mainly between January and May (Allaby, 1998; Coates-Palgrave, 2000).

Fig. 2. Flowers of *T. emetica*.

Fig. 3. Fruits and seeds of *T. emetica*.

T. emetica is widely distributed and grows naturally throughout sub-Saharan Africa extending from KwaZulu-Natal in the South, through Swaziland, Mpumalanga and Limpopo Provinces (South Africa), into Zimbabwe and northwards into Cameroon, Sudan and Uganda (Germishuizen and Meyer, 2003). It has a preference for areas with a high rainfall and is abundant along coastal areas (Cronquist, 1981).

2. Medicinal and non-medical uses

T. emetica is a coveted multipurpose tree which has been used throughout Africa for several centuries. The bark is used for carving ornaments, furniture and household implements. In the 19th century, it was used for repairing ships in the KwaZulu-Natal region (van Wyk et al., 2000; Coates-Palgrave, 2000). The VaVhenda tribe (South Africa) use the wood of *T. emetica* "Musikili" to construct the frame of an African traditional musical instrument called "mbila". The valuable oleic acid-rich oil obtained from *T. emetica* is rubbed on "mbilas" and used to soften animal skin (Palmer and Pitman, 1972). *Trichilia* seeds and flower nectar are consumed by birds, while the fruits and flower buds are enjoyed by monkeys and baboons. The leaves are eaten by wild animals such as the nyala and kudu and the Zulu tribe use it in burial rituals (Palmer and Pitman, 1972).

Table 1 provides a summary of traditional medicinal uses and preparation methods of *T. emetica*. In African traditional medicine, the bark is commonly soaked in warm water and the extract used as an enema (Coates-Palgrave, 2000). The Zulu tribe regularly uses a decoction of the bark to treat stomach ailments and an infusion of the leaf or bark is used to offer relief from backache (Bryant, 1966; Hutchings et al., 1996; Watt and Breyer-Brandwijk, 1962). The Xhosa tribe uses the bark decoction as an enema and to treat kidney problems (Watt and Breyer-Brandwijk, 1962).

The leaves are claimed to have a soporific effect if placed in bed at night. A hot infusion of the leaves is used for healing and soothing of bruises (Hutchings et al., 1996; Coates-Palgrave, 2000). In Nigeria, the leaves are used for treating syphilis and in Zimbabwe the bark is used as a purgative (Hutchings et al., 1996). In Mali the leaves are used as a wound healing remedy (Diallo et al., 2003). The seeds are edible once the seed coat has been removed and the seed arils are cooked as vegetables or crushed to yield a milky juice that is added to spinach for flavour (van Wyk et al., 2000; Coates-Palgrave, 2000). The seeds are rich in