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ScienceDirect
Journal of Ethnopharmacology 110 (2007) 189–199
Journal of ETHNO-PHARMACOLOGY
www.elsevier.com/locate/jethpharm

Review

Woodfordia fruticosa: Traditional uses and recent findings

Pratap K. Das *, Suchandra Goswami, Annalakshmi Chinniah, Nilendu Panda, Sukdeb Banerjee, Niranjan P. Sahu, Basudeb Achari

Indian Institute of Chemical Biology, 4 Raja S.C. Mullick Road, Jadavpur, Kolkata 700032, India

Received 25 February 2006; received in revised form 18 December 2006; accepted 19 December 2006
Available online 28 December 2006

Abstract

Woodfordia fruticosa Kurz of the family Lythraceae is a plant of tropical and subtropical region with a long history of medicinal use. A wide range of chemical compounds including tannins (especially those of macrocyclic hydrolysable class), flavonoids, anthraquinone glycosides, and polyphenols have been isolated from this species in recent times. Extracts and metabolites of this plant, particularly those from flowers and leaves, possess useful pharmacological activities. A comprehensive account of the chemical constituents and the biological activities is presented and a critical appraisal of the ethnopharmacological issues is included in view of the many recent findings of importance on this plant.

Keywords: *Woodfordia fruticosa*; Medicinal plant; Traditional uses; Chemical constituents; Biological activities

Contents

1. Introduction

Plant-derived drugs occupy an important place in both traditional and modern medicine (Akerelo, 1993; Baker and Alvi, 2004). Ethnopharmacological and ethnobotanical knowledge are percolating down to these days among the tribal population, but much of this information is empirical at best, and lacks preclinical scientific validations (Houghton, 1995; Fong, 2002). While working in a national programme wherein the Indian biodiversity is being screened in new biology-based disease models with a view to reassessing traditional wisdom, we came across the plant *Woodfordia fruticosa* as a potential candidate for peptic ulcer diseases (Goswami et al., 2005; Das et al., 2006). A survey of the literature revealed that the plant has been recommended for use in various traditional systems of medicine for the treatment, among others, of bowel disorders (Sharma, 1956; Shome et al., 1981). Since only one compilation on *Woodfordia fruticosa* dealing with general pharmacognostic issues is available

* Corresponding author. Tel.: +91 33 24733491; fax: +91 33 24735197.
E-mail address: pratapdas@iicb.res.in (P.K. Das).

0378-8741/$ – see front matter © 2007 Elsevier Ireland Ltd. All rights reserved.
doi:10.1016/j.jep.2006.12.029

Fig. 1. *Woodfordia fruticosa* Kurz (Lythraceae) flowers (courtesy: http://www.allayurveda.com/product_month_july2005.htm and http://www.kepu.net.cn/english/banna/folk/fol103.html).

as on date (Shome et al., 1981), we thought it worth updating in view of the recent structure determinations of macromolecules and delineation of their activities through bioevaluations. This review is intended to provide the currently available information on traditional and local knowledge, ethnobotanical and ethnomedical issues, identification of pharmacologically important molecules, and biochemical and pharmacological studies of this useful plant. A critical appraisal of the ethnopharmacological issues is also included.

2. Morphological features

Woodfordia fruticosa Kurz (syn. *Woodfordia floribunda* Salisb.) belongs to the family Lythraceae, which also includes other medicinally important plants like *Ammania baccifera* Linn., *Lawsonia inermis* Linn., *Lagerstroemia flos-reginae* Retz. Obs., etc. English names that are frequently used for the plant are Fire Flame Bush and Shiranjitea. The plant is abundantly present throughout India, ascending up to an altitude of about 1500 m, and also in a majority of the countries of South East and Far East Asia like Malaysia, Indonesia, Sri Lanka, China, Japan and Pakistan as well as Tropical Africa (Kirtikar and Basu, 1935).

The local and traditional names are innumerable, especially in India, because of widespread traditional use. The original Sanskrit name *Agnijwala* or *Tamra-pushpi* appears to be derived from the bright red colour of the flower and the bark. In India, a few popularly known names are *Dhataki*, *Dawi*, *Jargi*, *Dhai*, *Harwari*, *Phulsatti*, *Dhavdi*, etc. (Shome et al., 1981; Khare, 2004).

The full-grown leafy shrub is about 3.5 m high, having long and spreading branches with fluted stems. The bark, characteristically cinnamon-brown coloured and smooth, peels off in fibres and the young shoots are terete, often clothed with fine white pubescence. The leaves are opposite or sub-opposite in nature. Flowers are brilliant red, innumerable, arranged in dense axillary paniculate-cymose clusters, with short glandular pubescent pedicels (Fig. 1). The calyx is long, striated, covered with glandular dots, with a small campanulate base and a long slightly curved bright red tube that contracts above the included capsule. The petals are slightly longer than the calyx-teeth, narrowly linear, extended at the apex to a long fine point. The fruits are small capsules, ellipsoid and membranous, usually splitting the calyx near the base, and are irregularly dehiscent. The seeds are brown, numerous, very minute, smooth, shining, angular and obovated (Kirtikar and Basu, 1935; Shome et al., 1981; Khare, 2004).

3. Traditional and local uses

The plant is a well-known non-wood forest produce that has long been in regular demand amongst practitioners of traditional medicines in different South East Asian countries. In India, it is a much-used medicinal plant in Ayurvedic and Unani systems of medicines (Chopra et al., 1956; Watt, 1972; Dymock et al., 1995). Although all parts of this plant possess valuable medicinal properties, there is a heavy demand for the flowers, both in domestic and international markets specialized in the preparation of herbal medicines (Oudhia, 2003).

According to the Indian Systems of Medicine, this flower is pungent, acrid, cooling, toxic, alexiteric, uterine sedative, and anthelmintic, and is useful in thirst, dysentery, leprosy, erysipelas, blood diseases, leucorrhoea, menorrhagia and toothache. It is considered as '*Kapha*' (mucilage type body secretion) and '*Pitta*' (energy-dependent metabolic activity) suppressant in the Ayurvedic concepts of medicine (Sharma, 1956). Many marketed drugs comprise flowers, fruits, leaves and buds mixed with pedicels and thinner twigs of the plant (Dutt, 1922; Nadkarni, 1954; Chopra et al., 1956; Ahuja, 1965). The flowers are being used in the preparation of Ayurvedic fermented drugs called '*Aristha*'s and '*Asava*'s (Atal et al., 1982), and very