



The Pharmacognostic and phytochemical studies on the leaves of *Murraya koenigii* (L) Spreng

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Abstract: The leaves of *Murraya koenigii* (L) Spreng (Rutaceae) are reported to have great medicinal value. Pharmacognostic evaluation including examinations of morphological and microscopic characters, determination of leaf content, ash value, powder analysis, and extractive values were carried out. Phytochemical screenings including qualitative chemical examinations were carried out. Phytoconstituent in various extracts gives us clue for further investigation.

Keywords: *Murraya koenigii*, pharmacognostic, curry leaves, phytoconstituent.

Introduction

Leaves of *Murraya koenigii* (L) Spreng (Rutaceae) (Mitha neem) are commonly used as flavoring agent in Indian curry preparation since ancient times. The Indian variety *Murraya koenigii* (L) Spreng (Rutaceae) and Chinese variety *M. paniculata* are the two species available and both have some common medicinal properties. The leaves are imparipinnate with obliquely ovate or rhomboid shape. It has acuminate apex with irregularly crenate or dentate margin. Phytochemically leaves found to contain alkaloid (Atta-Ur-Rahman *et al.*, 1988; Reisch *et al.*, 1992), volatile oil (Wong *et al.*, 1993), Glycozoline (Lal, *et al.*, 2000), Xanthotoxin (Adebajo *et al.*, 2000), and Sesquiterpine from volatile oil (Onayade *et al.*, 2000). The medicinal value of the leaf has been reported as antibacterial (Thomas *et al.*, 1999), anti-inflammatory, antifeedant etc (Srivastava, *et al.*, 1993).

The leaves also reported as antidysentric, externally cures eruptions, anti vomiting, tonic & stomachic purposes. In spite of its various medicinal uses no systematic studies on liver protective activity have been reported. The preliminary successive solvent extraction & chemical test revealed that the presence of phytoconstituent in various extracts gives us clue to further investigation.

Materials and methods

The leaves of *Murraya koenigii* (L.) Spreng (Rutaceae) collected in and around Bhopal were identified in Department of Pharmacy, Barkatullah University, Bhopal. (BUPH/4041 F). A voucher specimen was deposited in the department. The plant was morphologically examined for shape of leaves, apex, base, margin etc. A separate section was prepared and examined for the identification of starch grains by staining with iodine solution. Powder (# 60) of the dried leaf was used for microscopic characters. The powder drug was separately treated with phloroglucinol-HCL solution, glycerin

and iodine solution to determine the presence of lignified cells, calcium oxalate crystals and starch grains (Khim *et al.*, 1982) as a part of quantitative microscopy. Stomatal number, stomatal index, vein islet and veinlet termination number were determined by using fresh leaves of the plant (Anonymous *et al.*, 1985).

Total ash, water and alcohol soluble ash, sulphated ash; alcohol and water-soluble extractive values were determined (Kokate *et al.*, 1994).

Phytochemical studies

The powder of dried leaves was subjected to continuous soxhlet extraction with various organic solvents such as petroleum ether (60-80° c), chloroform, acetone, benzene, methanol & ethanol respectively. After concentration and drying of each extract in vacuum desiccator, identification of phytoconstituents was carried out using thin layer chromatography method with different detecting reagents (Wagner *et al.*, 1989). The leaf powder was also subjected to determine volatile oil content.

Results and discussion

The morphological studies revealed the shape of leaves of *Murraya koenigii* (L.) Spreng (Rutaceae) obliquely ovate or somewhat rhomboid with acuminate obtuse or acute apex; bipinnately compound with exstipulate in alternate arrangement. The petioles were of 20 to 30 cm in length. The leaf had reticulate venation and dentate margin with asymmetrical base. The stomata were distributed on both the sides (Fig.1).

The microscopic studies of leaves of *Murraya koenigii* (L.) Spreng (Rutaceae) showed the presences black, short and stout, thick walled covering trichomes and colourless, thin walled, long unicellular trichomes (Fig.2). Yellow colored fibers in bundles of about 5 to 10 and tips appear fringed. In epidermal layer stomata were observed in green colour and identified as anisocytic. The spongy parenchyma and mesophyll were seen prominently. The xylem and phloem arranged in dicentric vascular bundle with palisade parenchyma in upper epidermis only. The collenchymatous cell replaces this on ventral surface of lower epidermis (Fig. 3).

The powder analysis revealed that stomata and covering trichomes in epidermal layer. The polygonal thin walled mesophyll cells with spiral annular vessels were

Table 1. Successive solvent Extraction of leaves of *Murraya koenigii* (L.) Spreng

Solvents used	Colour & Consistency	Average extractive values in % w/w on dry weight basis
Petroleum Ether	Yellow green oily mass	2.20%
Benzene	Green sticky and oily mass	4.50%
Chloroform	Dark green residue	3.20%
Acetone	Brown sticky mass	2.20%
Methanol	Dark green residue	3%
Ethanol	Dry brown mass	7.88%

Table 2. Chemical examination of various extracts of leaves of *Murraya koenigii* (L) Spreng

Constituents	Extracts					
	P	B	C	A	M	E
Alkaloids	-	-	+	+	+	-
Carbohydrates	-	-	-	-	-	-
Phytosterol	-	+	-	-	-	-
Proteins& amino acids	-	-	-	-	-	-
Saponin	-	-	-	-	+	+
Fixed oil/ fat	-	+	-	-	-	-
Gums/ mucilage	-	-	-	-	-	-
Flavonoids	-	-	-	+	-	+
Volatile oil	+	-	-	-	-	-

P= petroleum ether, B= benzene, C= chloroform, A= acetone, M= methanol, E= ethanol extracts

observed prominently (Fig4).

Successive solvent extraction values in various organic solvent were observed as petroleum ether 2.21%, benzene 4.50%, chloroform 3.20%, acetone 2.20%, and methanol 3.00% as shown in (Table 1).

All extracts subjected to chemical evaluation and results were shown in (Table 2). The petroleum ether volatile oil test was positive. In benzene extract, phytosterol and fixed oil were prominently seen. The chloroform extract showed presence of alkaloid only. Whereas methanol extract was found to contain alkaloid and saponin. The ethanol extract was observed with saponin and flavonoid respectively.

The preliminary phytochemical studies with help of Thin Layer Chromatography (TLC) method revealed that petroleum ether fraction contains volatile oil. The benzene fraction showed presence of fixed oil and alkaloid. The chloroform and methanol fraction showed alkaloid. Acetone fraction has confirmed presence of alkaloid. The fractions were further subjected to TLC in toluene: ethyl acetate (93:7) & ethyl acetate: methanol: water (76.5: 13.5:10) solvent systems with different detecting reagents for further confirmation of phytoconstituents. The alkaloid was prominently found in benzene, chloroform, acetone and methanol extract. The petroleum extract was found to contain volatile oil and

Table 3. TLC screening of various crude extracts of leaves of *Murraya koenigii* (L.) Spreng

Solvent system used	Detection Reagent	Observation	Inference	P	B	C	A	M	E
Ethyl acetate: Methanol: Water (75.5:13.5:10)	KOH	Red. (Vis) Yellow	Antraquinone Anthrone	-	-	-	-	-	-
	Vanillin sulphuric acid	Red/yellow/ brown/blue-green	Bitter principle	+	+	+	-	+	-
	Dragendorffs reagent	Orange Red (vis)	Alkaloid	+	+	+	+	+	-
	NP/PEG & UV VS reagent	Yellow/green/orange Blue (vis)	Flavonoid Saponin	-	-	-	+	-	+
Toluene : ethyl acetate (93: 7)	VS reagent	Red/ yellow/brown/blue-green	Essential oil	+	+	-	-	-	-
	Hcl/acetic acid	Blue brown	Valepotriate	-	-	-	-	-	-
	NH3 / KOH	Light Blue brown	Coumarin	-	-	-	-	-	-

P=petroleum ether, B= benzene, C= chloroform, A= acetone, M= methanol, E= ethanol extracts

Table 4 Evaluation of leaves *Murraya koenigii*(L.) Spreng (*Rutaceae*)

Name of Analysis	Values obtained on dry weight basis (w/w)
Moisture content	15%
Total ash	73.33%
Acid insoluble ash	26%
Sulphated ash	80%
Water soluble ash	89.5%
Water insoluble ash	10.5%
Acid soluble ash	74%

ash 80%, water soluble ash 89.5%, water insoluble ash 10.5%, acid soluble ash 74% (Table 4).

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