

## PHARMACOLOGICAL STUDIES OF *MELIA DUBIA* CAV.-A REVIEW

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### ABSTRACT

*Melia dubia* Cav. belongs to family Meliaceae, is having timber value and medicinal properties. This fast growing multipurpose tree is distributed in many parts of Indian subcontinent. This deciduous to semi evergreen tree flowers in February to March and fruits from October to February. Inflorescence is axillary panicle with greenish white small flowers. Wood is used in making furniture, frames, pencils, match sticks, agricultural implements, packing industry etc., The secondary metabolites of this plant are also having medicinal importance and can be used in the herbal drug preparations. The present review gives a detailed pharmacological work done which can be a great help for the research community to undertake different research works in this plant.

**Keywords:** Pharmacological Activity, *M. dubia*, Medicinal Properties

### INTRODUCTION

India is a hot spot for the Rich diverse Forest plants, with medicinal value. Global interest in such medicinal plants is growing year by year due to the adverse effects of allopathic medicines. In primary health care most of the population is depending on the herbal medicines (Valentina *et al.*, 2013), because of their non-toxicity. *Meila dubia* Cav., is a multipurpose tree belonging to family Meliaceae. This plant grows in loamy and red soils, and is considered as the deciduous to semi evergreen. It grows more than 8-20m height with dark brown, long strips peels of rectangular bark. It is a multipurpose tree, with much significance for the timber, which can be used in the manufacture of furniture, construction works, preparation of agricultural implements etc., as it is having anti-termite and anti-fungal properties (Suprapti and Hudiansyah, 2004). *M. dubia* is also having a number of phytochemicals which are mainly responsible for its medicinal value as anthelmintic, colic and skin diseases which were mentioned in the Dictionary of Indian medicinal plants (1992). Preliminary studies have revealed the presence of a number of secondary metabolites such as flavonoids, saponins, alkaloids, tannins, glycosides, terpenoids, steroids, essential oils, proteins and carbohydrates (Purushothaman *et al.*, 1984; Nagalakshmi *et al.*, 2001; 2003; Murugesan *et al.*, 2013; Valentina *et al.*, 2013).

#### **Pharmacological studies and evidences**

##### **Anti-microbial activity**

Preliminary studies of antimicrobial activity were first reported published by Anonymous (1999). Nagalakshmi *et al.*, (2003) later reported the antibacterial activity using the leaf essential oil. They have reported the antibacterial and antifungal activity in their investigations. Chanthuru *et al.*, (2014) reported antimicrobial effect using the crude ethyl acetate extract of leaf and roots of *M. dubia*. They have reported leaf extract to be effective in inhibiting the growth of *Salmonella typhi* and *Salmonella paratyphi*. Both extracts inhibited the growth of *Escherichia coli*, *Staphylococcus aureus* and *Klebsiella pneumonia*. Karthikeyan *et al.*, (2014) attempted for the bactericidal activity of green synthesized silver nano particles, using disc diffusion method. These nano particles inhibited the growth of *Proteus mirabilis*, *Vibrio cholera*, *Klebsiella pneumonia* and *Bacillus subtilis*. Chanthuru *et al.*, (2014) reported antimicrobial effect using the crude ethyl acetate extract of leaf and roots of *M. dubia*. They have reported leaf extract to be effective in inhibiting the growth of *Salmonella typhi* and *Salmonella paratyphi*. Both extracts inhibited the growth of *Escherichia coli*, *Staphylococcus aureus* and *Klebsiella pneumonia*.

#### **Antioxidant activity**

Valentine *et al.*, (2013) reported antioxidant activity of *M. dubia* leaves using ethanolic extract using nitric oxide radical scavenging method. Ahmed *et al.*, (2012) has attempted for antioxidant activity using *M. azedarach* leaves (DPPH scavenging assay). Phenols are responsible for this activity (Cai *et al.*, 2004). Shah *et al.*, (2016) attempted to evaluate antioxidant property using DPPH scavenging assay with in vitro raised callus. Total phenol content in callus was found to be  $2.97 \pm 0.17$  mg gallic acid equivalent (mg GAE) per gram dry weight of the plant material. Total flavonoid content was found to be  $0.56 \pm 0.08$  mg quercetin equivalent (mg QE) per gram dry weight of the plant material.

#### **Larvicidal and ovicidal activities**

Malarvannan *et al.*, (2009) investigated the ovicidal activity of crude extract of *M. dubia* against *Helicoverpa armigera* and reported slight ovicidal activity. Chanthuru *et al.*, (2014) reported the larvicidal activity of ethyl acetate using leaf and root extracts of *M. dubia*. They have reported larvicidal effect against *Culex quinquefasciatus* mosquito larvae, using 1500 ppm concentration and reported 98.27% and 96.65% of mortality. They have attributed this death of mosquito for lack of oxygen in water at this concentration. Karthiravan *et al.*, (2014) also attempted to check the larvicidal property of *M. dubia* using silver nano particles. They have used larvae of the filarial vector *C. quinquefasciatus*, and reported 95.12% mortality of 4<sup>th</sup> instar larvae after 72 hrs (5ppm concentration) and confirmed this larvicidal activity. These studies confirms the biopesticidal effects of *M. dubia*.

#### **Antidiabetic activity**

Susheela *et al.*, (2008) evaluated the antidiabetic effect using the ethanol extract of fruit in mice. They have reported 300mg/kg dose of extract to be 52.14% effective. Valentine *et al.*, (2013) reported  $\alpha$ -amylase inhibitory activity using ethanolic extract as best among different tested extracts like, hexane, petroleum ether, acetone, ethanol and water extracts. Mamun-or-Rashid *et al.*, (2014) in his review has reported that Liminoid was responsible for the antidiabetic activity in this plant.

#### **Anticancer activity**

Karthiravan *et al.*, (2014) attempted to evaluate the anticancer activity using silver nanoparticles of *M. dubia* aqueous leaf extract. They have used human breast cancer (KB) cell lines for knowing the cytotoxicity activity. Silver nanoparticles showed promising effect in this regard. They have characterized the silver nanoparticles using XRD (X-ray diffraction spectrometer), SEM-EDS (Scanning electron microscopy–Energy dispersive X-ray spectroscopy) and UV- visible (Ultraviolet-visible spectroscopy). They have reported remarkable cytotoxicity effect of this leaf extract against KB cell lines.

#### **Anti-inflammatory activity**

As *M. dubia* and *Melia azedarach* are synonyms, we have included the results of *M. azedarach* in the present paper. Vishukanta and Rana (2010) reported that roots of *M. azedarach* are having anti-inflammatory activity with their investigations. They have reported that 100-200mg/kg extract of roots inhibited 82.23% and 88.94% of writhing and reduced 15.08% and 26.45% paw induced edema in experimental animals. Khadse and Kakde (2014) reported the anti-inflammatory activity of *M. dubia* fruit aqueous extract. They have used Carrageenan induced paw edema method with Wistar albino rats. Performed, *in vitro* protocol of inhibition of albumin denaturation and membrane stabilization tests. Thermally induced protein denaturation and hypo tonicity induced lyses of erythrocytes (erythrocytes membrane stabilization) was inhibited at a concentration of 200  $\mu$ g/ml. Both of these *in vivo* and *in vitro* methods proved significant effect of this plant as anti-inflammatory one.

#### **Anti urolithiatic activity**

Senthil *et al.*, (2014) reported that *M. azedarach* is having anti urolithiatic activity using male albino rats and aqueous and ethanol extract of leaves are having significant activity. They have induced Lithiasis using ethylene glycol in male albino rats and oral administration. They have checked the levels of calcium, oxalate and phosphate in urine.

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