

Trema orientalis L. – The Waste Land Tree as a Source of Hydroquinone

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Abstract- Thousands of plant parts have been utilized for treatment of diseases since centuries worldwide. According to World Health Organization reports, about 80% of the world population, primarily in the developing countries, is still depending on herbs for primary health care. *Trema orientalis* L., from hemp family, Cannabaceae is usually considered as a waste land tree. This tree is widely distributed in warm humid regions of Asia. It is commonly called as Pigeon Wood Tree or Gunpowder Tree. In Malayalam it is known as Amathali. The tree has got various traditional medicinal uses in a wide range of cultures. The leaves and the bark are used to treat coughs, sore throats, asthma, bronchitis, gonorrhoea, yellow fever, toothache and as an antidote to general poisoning. Bark infusion is reportedly taken to control dysentery. A preliminary phytochemical study of the aqueous extract of the bark samples of *Trema orientalis* was done at All India Coordinated Research Project at College of Horticulture, Vellanikkara. The study revealed the presence of many secondary metabolites in bark including a medicinally important phytochemical hydroquinone. The chemical Hydroquinone (benzene-1,4-diol) has got a variety of uses as a water soluble reducing agent. Hydroquinone is a main component in sunscreen creams as well as creams used to lighten the dark-colored patches of skin caused by pregnancy, birth control pills, hormone medicine, or injury to the skin. The presence of hydroquinone in the bark of *Trema orientalis* opens up a new scope for utilizing this wasteland tree as a source of hydroquinone or as a raw drug useful in skin creams and ointments. But detailed further research are necessary on this line.

Key words- *Trema orientalis*, hydroquinone

I. INTRODUCTION

Thousands of plant parts have been utilized for treatment of diseases since centuries worldwide. According to World Health Organization reports, about 80% of the world population, primarily in the developing countries, is still depending on herbs for primary health care. *Trema orientalis* Linn. Blume, from Ulmaceae family, is usually considered as a waste land tree. This tree is widely distributed in warm humid regions of Asia. It is commonly called as Pigeon Wood Tree or Gunpowder Tree. In Malayalam it is known as Amathali. The tree has got various traditional medicinal uses in a wide range of cultures. The leaves and the bark are used to treat coughs, sore throats, asthma, bronchitis, gonorrhoea, yellow fever, toothache and as an antidote to general poisoning. Bark infusion is reportedly taken to control dysentery¹⁻³. A preliminary phytochemical study of the aqueous extract of the bark samples of *Trema orientalis*

was done at All India Coordinated Research Project at College of Horticulture, Vellanikkara. The study revealed the presence of many secondary metabolites in bark including a medicinally important phytochemical hydroquinone. Compounds present in the plant include tannins, saponins, flavanoids, triterpenes, phytosterols, and xanthenes. The chemical Hydroquinone (benzene-1,4-diol) has got variety of uses as a water soluble reducing agent. **Hydroquinone**, also known as **benzene-1,4-diol** or **quinol**, is an aromatic organic compound which is a type of phenol, having the chemical formula C₆H₄(OH)₂. Its chemical structure, has two hydroxyl groups bonded to a benzene ring in a *para* position. It is a white granular solid at room temperature and pressure. Hydroquinone has a variety of uses principally associated with its action as a reducing agent which is soluble in water. It is a major component in most photographic developers where, with the compound metol, it reduces silver halides to elemental silver. The disodium diphenolate salt of hydroquinone is used as an alternating comonomer unit in the production of the polymer PEEK. As a polymerization inhibitor, hydroquinone prevents polymerization of acrylic acid, methyl methacrylate, etc. It is also used as a raw material of herbicides, rubber antioxidants, and dyestuffs. Hydroquinone is a main component in sunscreen creams as well as creams used to lighten the dark-colored patches of skin caused by pregnancy, birth control pills, hormone medicine, or injury to the skin⁴. The presence of hydroquinone in the bark of *Trema orientalis* opens up a new scope for utilizing this wasteland tree as a source of hydroquinone or as a raw drug useful in skin creams and ointments. But detailed further research are necessary on this line.



Fig .1. *Trema Orientalis* Tree

II. MATERIALS AND METHODS

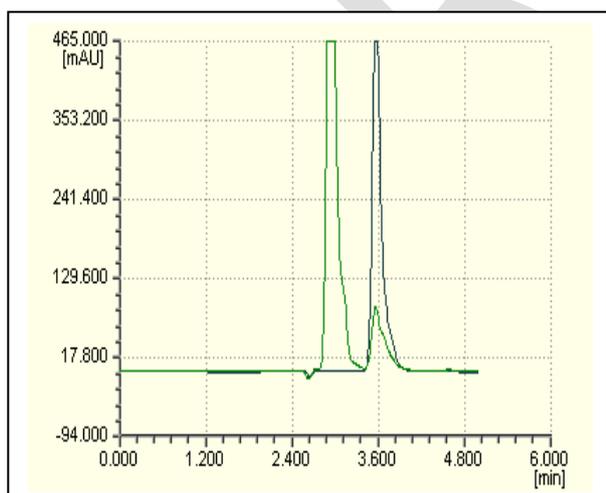
The stem bark of *Trema orientalis* Linn. was freshly collected from herbal garden of College of Horticulture, Vellanikkara campus, identified by the botanist. For chemical analysis, the plant material was dried powdered. This powder was used for further experiments. 10g/100ml hot methanol (HPLC grade methanol) extract was prepared from this powder and used for developing HPLC fingerprint profile. Standard hydroquinone solution (1mg/10ml) was also prepared.

Development of High Performance liquid chromatographic (HPLC) profile: Methanol extract of the plant (HPLC grade, 10%) was injected (7 μ l) into a C18 Reverse Phase (RP) column kept at 25 $^{\circ}$ C. Mobile phase used was methanol:water (Ratio 65:35, UV-detector, 225 nm). The specific fingerprint developed was recorded. The same was repeated with standard hydroquinone solution (1 g/10ml). Both fingerprints were overlaid and matched for phytoequivalence.

III. RESULTS AND DISCUSSION

HPLC profile developed for *Trema orientalis* showed a peak in its profile which matches and overlays with an elution peak obtained for standard hydroxyquinone confirming the presence of the compound hydroquinone in the methanol extract of the plant. This is a preliminary report. Further research is necessary on this line. Hydroquinone has been reported to be present in a few other plants namely *Arctostaphylos uva-ursi*, *Pyrus communis* and *Majorana hortensis*⁵.

Figure2. HPLC Profiles of Trema and Hydroquinone



HPLC at 225nm, Methanol:water

Black – hydroquinone standard

Green- Trema bark aqueous extract

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