

# [Mukia maderaspatana antioxidant properties](https://assignbuster.com/mukia-maderaspatana-antioxidant-properties/)

Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions and to defend against attack from predators. Mukia maderaspatana (L.)M. Romer, is an annual monoecious climber, belonging to Cucurbitaceae family. This plant specify many medicinal properties such as constipation, cough, vertigo, burning sensation, dyspepsia and dental pain.. In this study, ascorbic acid content from fresh leaves and fruits were carried out. Also, the phytochemical analysis such as Total flavonoid, total phenolics contents of the plant were characterized, and found that leaves of M. maderaspatana is rich in ascorbic acid, an antioxidant than that of fruits and also contains adequate amount of phenolics and flavonoid contents in leaves as compared to fruits.

Keywords: Mukia maderaspatana, Phytochemical activity, Antioxidant activity.

## Introduction:

Plants (fruits, vegetables, medicinal herbs, etc.) may contain a wide variety of free radical scavenging molecules, such as phenolic compounds (e. g. phenolic acids, flavonoids, lignans, tannins), nitrogen compounds, vitamins, terpenoids (including carotenoids), and some other endogenous metabolites, which are rich in antioxidant activity (; Zheng and Wang, 2001; Cai et al., 2003). Phytochemicals present in plants have been shown to have diverse biological activities like cardioprotective, cancer prevention and inhibiton of bone resorption. One of the most common activities of the phytochemicals is the antioxidant .(B. R. Srilatha and S. Ananda., 2012). The total antioxidant activity of plant foods is the result of individual activities of each of the antioxidant compounds present such as vitamin C, carotenoids, and phenolic compounds, the latter being the major phytochemicals responsible for antioxidant activity of plant materials (Javanmardi, Stushnoff, Locke, & Vivanco, 2003;)

Plants are the natural source for many biochemicals, fragrance, food coloures , flavors and medicines with less side affects. Most valuable phytochemicals are the products of secondary metabolism . The use of plants as medicines predates written human history. All the plants produce chemical compounds as a part of their normal metabolic activity. The scientific interest in identifying novel natural antioxidants for use in foods has considerably increased in recent years, because the use of synthetic antioxidants as food additives is limited by specific regulations in various countries, established on the basis of their safety.(Spiridon Kintzios et al. 2010). Many plants synthesize substances that are useful to the maintenance of health in humans and other animals. Compounds like flavonoids, phenolics are widely distributed in plants fulfilling many functions. They are most common group of polyphenolic compounds in human diet, and are known for their antioxidant activities. Pharmaceuticals and food manufactures have become interested in these compounds for their medicinal properties especially their putatitive role in inhibiting cancer or cardiovascular diseases. Antioxidant plays an important role in the living system and it prevents the oxidative damage that may result in cancer, cardiovascular diseases and diabetes. (Sangilimuthu Alagar Yadav et al., 2012) Ascorbic acid , which is commonly known as vitamin C is common antioxidant . Ascorbic acid present in medicinal plants has attracted the attention of many researchers because of the wide range of their biological activities. (Mallika Jainu et al., 2008). Many studies have correlated high intakes of vitamin c, with low rates of cancer, particularly cancers of mouth, larynx and esophagus. Use of plants to treat diseases is almost universal among non industrialized societies, and are often more affordable than purchasing expensive modern pharmaceuticals. Many of the pharmaceuticals currently available to physicians have long history of use as herbal remedies including aspirin, digitalis, quinine and opium.

## Leaves and Fruits of Mukia maderasapatana

Melothria madraspatana (Syn. Mukia maderaspatana L.) is an annual climber with hair shoots. It is an edible plant typically low in calories, low in fat, high in dietary fibre, high in iron and calcium and very high in phytochemicals such as Vitamin C, vitaminK, carotenoids, lutein, folate and polyphenolics compounds such as flavonoid etc. The whole plant is useful as it has valuable medicinal properties, cough, dental pain, burning sensation, and ayurvedic properties such as Rasa, Guna, Virya, vata, pita. In scientific literature M. maderaspatana has been shown to be anti-inflammatory, anti arthiritic Immunomodulatory, anti platelet , hepato protective and antimicrobial. (B. R. Srilatha and S. Ananda., 2012). So the present study was carried out to evaluate the total phenolics, flavonoid and ascorbic acid contents in the leaves and the fruits of the plant.

## Materials and methods

Plant material: M. maderaspatana were collected from vellore institute of technology (VIT) garden, vellore, Tamilnadu, State of India.

## Chemicals:

Ascorbate, Trichloroacetic acid, DNPH (2, 4 – Dinitro phenylhydrazine) reagent, Thiourea solution, FC ( Folin ciocalteau)reagent, Catechol, Sodium carbonate, Ethanol, Quercetin, Aluminium Chloride, Potassium acetate.

## Estimation of Ascorbic acid

The amount of ascorbic acid present in leaves and fruits of M. maderaspatana was estimated by method of (Roe and Keuther1943). Fresh leaves and fruits (1gm) were homogenized with 10ml of 4% TCA and centrifuged at 2000 rpm. The supernatant obtained was treated with pinch of activated charcoal for 10 min. Centrifugation was repeated and clear supernatant was obtained. Two different aliquots of supernatant (0. 5 and 1. 0ml) were taken as test sample . The volume was made upto 2. 0ml with 4% TCA , 0. 5ml of DNPH, 2drop of 10% thiourea solution was added and incubated for 3 hour at 37Ëšc . 2. 5ml of 85% sulphuric acid was added and absorbance was read at 540 nm against blank . Ascorbate was used as standard. The ascorbic acid was expressed as mg equivalent per gram of extract.

## Preparation of ethanolic extract for phenolics:

The leaves and the fruits of the plant were shade dried and powdered in the grinder. The powder leaves and fruits (25gm) was extracted with 85% ethanol (100ml) and kept overnight. The ethanol was evaporated next day using water bath and the residue was dried and used for further analysis.

## Estimation of phenolics:

The total phenolic content present in leaves and fruits were assayed by (Mallick and Singh 1980). 10mg of plant extract was dissolved in 1ml of 80% ethanol. Further dilution were made up to 1mg /ml and different concentrations ( 10µl, 50µl, 100µl and 250µl) were taken and made up to 3ml with distilled water. 0. 5ml of Folin ciocalteau reagent was added and incubated for 3min at RT. 2ml of sodium carbonate was added and kept in boiling water bath for 1min, cooled and absorbance was measured at 650 nm against blank . Catechol was used as standard. The total phenolic content was expressed as Catechol equivalent in mg per gram of extract.

## Estimation of flavonoids:

The total flavonoids contents present in leaves and fruits were assayed by (Chang et al., 2002). 10mg of plant extract was dissolved in 1ml of 80% ethanol, further dilution were made upto 1mg/ml and different concentrations ( 10 µl, 50µl, 100µl and 250µl )were taken, 0. 1ml of 10% aluminium chloride and 0. 1ml of 1M potassium acetate and reaction mixture were made upto 3ml with distilled water. After 30min incubation at RT, the absorbance was measured at 415nm, against blank. Quercetin was used as standard. The flavonoid content was expressed as Quercetin equivalent in mg per gm of extract.

## Results:

Standard graphs of Ascorbate, Catechol and Quercetin for Ascorbic acid, Phenolics and Flavonoid respectively are shown below, and The total content of these phytochemicals, present in M. maderaspatana were assayed using these standard graph

The amount of Ascorbic acid, Total Phenolics and Flavonoids present in the leaves and fruits were investigated. The amount of Ascorbic acid is expressed as mg ascorbate /g. Graph1: (Standard curve equation Y= 0. 007 x, r2 = 0. 992), The total amount of phenolics is expressed as mg Catechol/g. Graph 2: ( Standard curve equation Y = 0. 029 x, , r2 = 0. 995) and The total amount of Flavonoid is expressed as mg Quercetin /g. Graph 3: (Standard curve equation Y = 0. 012 x, r2 = 0. 993) is tabulated below.

## Discussion:

Medicinal plants are reported to be rich in antioxidants, namely polyphenols, flavonoids, vitamin A, C, E and several other constituents, which are necessary for maintaining good health and useful for therapeutic purposes against various diseases (Scalbert, Johnson,& Saltmarsh, 2005) Medicinal plants are gaining a lot of importance as an alternate medicine against therapy and prevention from various diseases.(Raj Kumar Dutta et al., 2012). The result of present study in quantitative analysis of Ascorbic acid in leaves of Mukia maderaspatana were high (99. 046 ± 1. 413 µg/g) comparatively to that of fruits, (24. 52 ± 1. 43 µg/g) and various studies have revealed that ascorbic acid is an antioxidant vitamin that acts synergistically with tocopherol to preserve antioxidant function in chronic disease states (Bruno et al., 2006; Traber & Stevens, 2011, Nuri Andarwulan et al ., 2012). And Total Phenolics (31. 08 ± 0. 5291 µg/g) and Flavonoid (25. 388 ± 0. 0174 µg/g) contents were also high in leaves to that of fruits (14. 97 ± 1. 127 µg/g ),( 6. 47 ± 0. 012 µg/g ) respectively . In the whole, leaves showed the higher amount of contents as compared to that of the fruits, and the antioxidant property of ascorbic acid were high when compared to phenolics an flavonoid contents in M. maderaspatana plant.

## Conclusions:

The data presented in the study showed that Mukia maderaspatana is rich in antioxidant properties, especially Ascorbic acid, which is necessary for the treatment and prevention of scurvy and reduce neurological defects. The plant also contain adequate amount of flavonoid and phenolic content, which have anti-germ activities, anti tumor and anti inflammatory properties with reduced risk of heart disease and many chronical diseases. Thus determining the antioxidant activities from M. maderaspatana could be valuable for pharmaceuticals and even for the food industries as they are abundantly found.