PRELIMINARY PHYTOCHEMICAL SCREENING AND ANTIOXIDANT ACTIVITY OF THOTTEA TOMENTOSA (BLUME) DING HOU (ARISTOLOCHIACEAE) FROM ASSAM

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ABSTRACT

The present paper deals with preliminary phytochemical screening and antioxidant activity of an ethno-medicinal plant, Thottea tomentosa (Blume) Ding Hou (Aristolochiaceae). The study detects different phytochemicals and observed antioxidant activity by using the DPPH radical scavenging assay.

INTRODUCTION

The genus Thottea Rottb. consists of 35 species, distributed in India, Sri Lanka, Bangladesh, Myanmar, Thailand, Hainan, China and Malaysia (Ding Hou, 1984; Mabberley, 2008). Twelve species are reported from India (Karthikeyan et al., 2009) of which two are reported to occur in the Andaman and Nicobar Islands. Thottea tomentosa is an undershrub, reaches up to a height of 10-25 cm, leaves are different on the same plant, oblong, broadly oblong or heart-shaped or egg-shaped, distributed in India, Bangladesh, Malaysia, Myanmar, Peninsular Thailand and South Vietnam (Murugan, 2011) (Figure 1). It is belonging to the family Aristolochiaceae has many pharmacological applications. In Southern part of Assam, Barman tribe uses stem juice of the plant as tonic (Das et al., 2008). In Jerantut, Pahang the plant is used for the medicine of skin disease, snake bites and cough (Eswani et al., 2010). Aristolochic acid derivatives, often isolated as major components from the plant of the genus Aristolochiaceae, have been characterized as tumor inhibitors (Hinou et al., 1990). Antioxidation means “against oxidation”. Several organic substances like vitamin A, vitamin C and vitamin E and carotenoids (Dekkers et al., 1996; Kaczmarski et al., 1999) are serve as an antioxidant. Human cell molecules consist of many atoms that joined by chemical bonds. These bonds normally do not split but when the bonds those are weak in nature may split that causes the formation of free radicals (Halliwell, 1989; Karlsson, 1997). Antioxidant can prevent many diseases like Cancer, Heart disease, Arthritis, Diabetes Mellitus etc. (Sharma and Clark, 1998). Now a day’s the term “antioxidant” is more popular for its anti aging property. Hence the main aim of the present study has to investigate preliminary phytochemical screening and observation of antioxidant activity of methanol extract of Thottea tomentosa.

MATERIALS AND METHODS

Collection of plant materials

The fresh leaves and stems of disease free plants of Thottea tomentosa Blume (Ding Hou) were collected from Assam and washed properly for 3-4 times in running tap water and lastly by distilled water, shade dried and made powder for extraction. The plant Thottea tomentosa and was identified by Botanical Survey of India, Eastern circle, Shillong.
Methanol extract

200g of stem powder was soaked with 1000ml of methanol for 72 hours and shake in Rotary Shaker; the extract was filter using Whatmann no.1 filter paper. To this methanol was added again and the process continued till the colour of the filtrate was pale. All the filtrate were collected and concentrated in Rota Vapor under reduce pressure and stored at 4°C temperature until use.

Preliminary phytochemical screening

The different qualitative chemical tests were performed for establishing the preliminary screening of some phytochemicals of the methanolic extract of the following plant parts. In this study total nine phytochemical tests have been performed according to the standard procedures adapted by the different workers.

DPPH radical scavenging assay

The free radical scavenging activity of plant extract was estimated by using the method of Brand-Williams et al., 1995. The compound if it is antioxidant in nature react with the stable radical 2,2 diphenyl 1 picrylhydrazyl hydrate (DPPH), this antioxidant compound can reduce DPPH by donating hydrogen atom. During this reaction color changes from deep violet to light yellow. 2.0ml of methanol solution of sample in ten test tubes at ten different concentrations were mixed with 3.0ml of DPPH solution in each test tube. The test tubes were kept in dark place at room temperature for 30min, and then the absorbance was measured at 517 nm on light spectrophotometer. Here blank used as methanol. The experiments were carried out in triplicates. Radical scavenging activity calculated by the following formula.

\[ \% \text{Inhibition} = \left( \frac{A_B - A_A}{A_B} \right) \times 100 \]

Where \( A_B \) = absorption of blank sample
\( A_A \) = Absorption of sample

RESULTS AND DISCUSSION

Preliminary Phytochemical analysis

Phytochemicals are bioactive chemicals or secondary metabolites of plant origin. They are naturally produced in plant parts like leaves, stem, bark, root, flowers, fruits etc (Tiwari et al., 2011). These phytochemicals have been detected through preliminary screening. There is abundant literature of preliminary phytochemical study that has showed their chemical constituents. Thus preliminary phytochemical screening can help to identify and utilize the herbal drugs and most importantly it can help in isolation and characterization of the chemical constituents present in those plant extracts. Alkaloids, terpenoid and flavonoids, the secondary metabolites, are included in a large group of natural compounds. The hypoglycemic activities and anti-inflammatory activities of many medicinal plants are responsible for the very important secondary metabolites like alkaloids, flavonoids and saponins (Augusti et al., 2008). The terpenoids have the wonderful property that decrease and stay under controlled blood sugar level of human (Mandal et al., 2009). The phytochemical analysis of methanol extracts of stem and leaf of Thottea tomentosa showed that the presence of alkaloids, carbohydrates and phenolic compounds, flavonoids, oils in both plant parts. Whereas Saponins is present only in stem part. Glycoside and terpenoids are absent in both plant parts (Table 1).

DPPH radical scavenging assay

Oxidation reactions are takes place in every living cells of the body that results aging and various diseases as it damaging or killing the cells. An antioxidant is a substance which can prevents or slows down the damage or destruction done by the oxidation (Dekkers et al., 1996). Antioxidant are widely used in dietary supplement and used to reduce most serious human diseases like cancer, heart problems and altitude sickness (Baillie et al., 2009). DPPH gives a strong absorption band at 517nm in visible region. Result is shown as IC\(_{50}\) value (concentration of antioxidant) that causes 50 % inhibition of DPPH. The results show that IC\(_{50}\) of 203.99 µg/ml (Figure 2). It is calculated from the result shown by the sample.

Figure 1. Thottea tomentosa (Blume) Ding Hou, A: Habit B: Inflorescence
Conclusion

The study revealed that most of the bioactive phytochemicals like alkaloids, phenolic compounds Saponin etc were present in the plant extracts. It suggest that the presence of alkaloids and phenolic compounds and the result of antioxidant activity of the plant extract may have certain therapeutic potential that may contribute in the treatment of various health problems in future and it validate the folklore claims.

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