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## RESEARCH ARTICLE

### 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.

##### Key words:

*Thottea tomentosa*,  
Phytochemical screening,  
Antioxidant activity and DPPH.

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## 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; Kaczmarek 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 ant 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.

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### 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.

$$\% \text{ Inhibition} = [(A_B - A_A) / A_B] \times 100$$

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

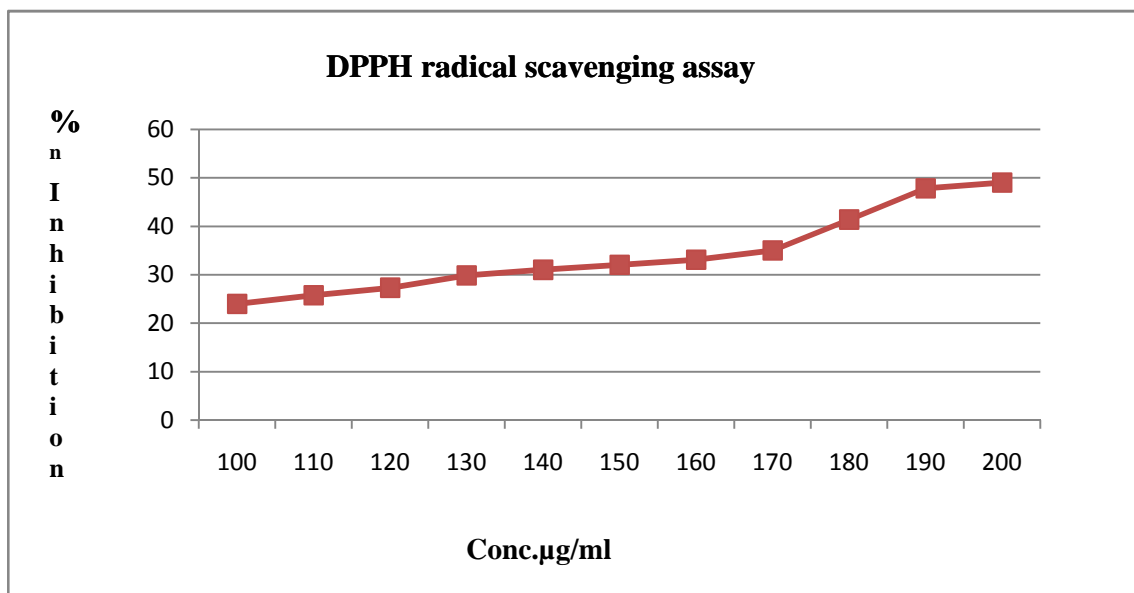
Oxidation reactions are takes place in every living cells of the body that results aging and various diseases as it damaging or killing the cells. An antioxidant is a substance which can prevents or slows down the damage or destruction done by the oxidation ([Dekkers et al., 1996](#)). Antioxidant are 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  $\mu\text{g/ml}$  (Figure 2). It is calculated from the result shown by the sample.



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

**Table 1. Presence or Absence of phytochemicals in methanol extracts of stem and leaf of *Thottea tomentosa* from Assam**

Phytochemical test	TS	TL
1. Alkaloids		
a. Mayer's reagent	-	-
b. Wagner's reagent	+ +	+ +
2. Carbohydrates		
a. Molisch's test	+ ++	+ ++
b. Fehling's test		
3. Glycosides	-	-
a. Borntrager's test		
4. Saponin's		
a. Foam test	+ +	-
5. Protein's and Amino acids		
a. Biuret reagent	-	-
b. Ninhydrin	-	-
6. Phenolic compound's		
a. Ferric Chloride test	+	+
b. Gelatin test	+ +	+ +
7. Flavonoid's		
a. Alkaline test	+ + +	+ + +
8. Terpenoid's		
a. Salkowski test	-	-
9. Fixed oils and fats		
a. Spot test	+ + +	+ + +
	TS- Stem	TL- leaf

**Figure 2. Inhibition of DPPH by the methanolic extracts of stem of *Thottea tomentosa***

## 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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## REFERENCES

- Augusti, K. T. and Cherian, S. 2008. Insulin sparing action of leucopelargonidin derivative isolated from *Ficus bengalensis* Linn. *Indian J. Exp. Biol.*, 33: 608-611.
- Baillie, J. K., Thompson, A. A. R., Irving, J. B., Bates, M.G.D., Southerland, A. I., MacNee, W., Maxwell, S.R. J. and Webb, D.J. 2009. Oral antioxidant Supplementation does not prevent acute mountain sickness: double blind, randomized placebocontrolled trial. *QJM*, 120(5): 8-341.
- Brand-Williams W., Cuvelier M. E. and Berset C.1995. Use of free radical method to evaluate antioxidant activity. *Lebensmittel Wissenschaft und Technologie*, 28: 25-30.

- Das, A. K., Dutta, B. K. and Sharma, G. D. 2008. Medicinal plants used by different tribes of Cachar district, Assam. *Indian J. Traditional Knowledge*, 7(3): 446-454.
- Dekkers, J. C., Doorner, L. J. P. and Hax C. G. 1996. The role of antioxidant vitamins and enzymes in the prevention of Exercise-induced muscle damage. *Sports Med.* 21:213-238.
- Ding Hou 1984. Aristolochiaceae. In: Steenis, C. G. G. J. van & W. J. J. O. de Wilde (Ed.), *Flora of Malesiana I*, 10. Kluwer Academic Publishers, London. 53 – 108.
- Eswani, N., Kudus, K. A., Nazre, M. and Awany Neor, A. G. 2010. Medicinal Plant Diversity and Vegetation Analysis of Logged over hill forest of Tekai Tembling Forest Reserve, Jerantut, Pahang. *J. Agri.Sc.*, 2(3): 189-210.
- Halliwell, B. 1989. Oxidation and central nervous system: Some fundamental question. In oxidant damage relevant to parkinson's disease, Alzheimer disease, traumatic injury or stroke. *Acta Neurol.Scand.*, 126:23-33.
- Hinou, J., Demetzos, C., Harvala, C. and Roussakis, C. 1990. Cytotoxic and antimicrobial principles from the roots of *Aristolochia longa*. *Int. J. Crude Drug Res.*, 28(2):149-151.
- Kaczmarek, M. J., Wojcicki, L., Samochowiec, T. Dulkiwicz and Z. Sych 1999. The influence of exogenous antioxidants and physical exercise on some parameters associated with production and removal of free radicals. *Pharmazine*, 54:303-306.
- Karlsson, J. 1997. Introduction of Neurology and Radical formation. In: Antioxidants and Excercise Illinois: Human kinetics Press. 1-143.
- Karthikeyan, S., Sanjappa and M. and Moorthy, S. 2009. Flowering Plants of India – Dicotyledons Volume I (Acanthaceae – Avicenniaceae). *Botanical Survey of India, Kolkata*. 154 – 157.
- Mabberley, D. J. 2008. Mabberley's Plant Book - A Portable Dictionary of the Vascular Plants, their classification and uses. ed. III. Cambridge University Press. Cambridge, UK. p. 6.
- Mandal, S. C., Maity, T. K., Das, J., Saba, B. P. and Pal, M. 2009. Anti-inflammatory evaluation of *Ficus racemosa* Linn. Leaves extract, *J.Ethnopharmacol.*, 72: 87-92.
- Murugan, C. 2011. A review of the genus *Thottea* (Aristolochiaceae) from the Andaman and Nicobar Islands, including a new record for India. *Rheedea*. 21(2):149-152.
- Sharma, H. and Clark, C. 1998. An expert from the medicinal textbook contemporary Ayurved., *Churchill Livingstone, Edinburgh*. 1-143.
- Tiwari, P., Kumar, B., Kaur, M., Kaur, G. and Kaur, H. 2011. Phytochemical screening and extraction: A review. *Int. Pharm. Scientia.*, 1:98-106.

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