



PHYTOCHEMICAL AND THIN LAYER CHROMATOGRAPHIC STUDIES ON A MEDICINAL PLANT OF GUWAHATI CITY

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ABSTRACT :

Vitex negundo is an example of medicinal plant found in home gardens of Guwahati city. It is used for the treatment of joint pain, pneumonia, and different skin diseases in Assam. Phytochemical investigation on ethanolic leaf extracts proves the presence of different important chemicals in this medicinal plant. Thin layer chromatography also indicates the presence of multiple compounds in this medicinal plant.

Keywords: *Vitex negundo*, pneumonia, abscesses, stomachic.

I.Introduction:

North-eastern region is one of the biodiversity hotspot in India (Choudhury *et al.*, 2011). Assam is an evergreen state having an abundance of medicinal plants known to the native people (Bhattacharya *et al.*, 1991; Buragohain and Konwar, 2007). *Vitex negundo* is one of the medicinal plants used by people of Assam in different health related problems. Leaf paste of *Vitex negundo* is applied on abscesses and allergy by the Mishing, Sonowal Kachari, Motok, Ahom and Deori people of upper Assam; also, they prescribe root juice for septic ulcer (Buragohain and Konwar, 2007).

Koch Rajbangshi people of Bongaigaon use heated leaf to get relief from joint pain (Das *et al.*, 2013). *Vitex negundo* is used as stomachic by the tea garden tribes of Darrang and Udalguri and the local people of Lakhimpur (Saharia and Sharma, 2011; Sharma *et al.*, 2013). Local people of Dibrugarh use leaves of *Vitex negundo* as insecticide (Abujam and Shah, 2012).The ethnic communities of Tinsukia apply leaf paste of *Vitex negundo* on scabies and decoction is given in pneumonia (Buragohain, 2011). Leaves and roots of *Vitex negundo* are used as febrifuse and



tonic by Mising Tribe of upper Assam (Gogoi *et al.*, 2013). In upper Assam, leaf paste of *Vitex negundo* is applied on forehead as antipyretic (Saikia and Khan, 2011). Leaf juice boiled with garlic and mustard oil is applied externally by different tribes of Cachar to get relief from rheumatic pain (Das *et al.*, 2008).

II. Objectives of the Study:

The main objectives of the Study are-

- a) The phytochemical study of *Vitex negundo* of Guwahati city of Assam.
- b) The thin layer chromatographic study of *Vitex negundo* of Guwahati city of Assam.

III . Methodology:

Samples Collection: The samples of *Vitex negundo* is collected from home gardens of Guwahati city of Kamrup (Metro) of Assam; and were washed with distill water. Then the samples were dried and stored for further experiment (Kalita, 2015; Kalita, 2016).

Preparation of extract: 5 gm of the grinded leaf sample was continuously refluxed with 150 ml of dry ethanol for about 2 days using Soxhlet apparatus. After filtration, the filtrate was concentrated on a

rotary evaporator before stored in a refrigerator (Kalita, 2015; Kalita, 2016).

Phytochemical assessment of the extracts:

The ethanolic extracts were subjected to different chemical tests using standard procedure (Harborne, 1998). The presence of carbohydrates was tested with Fehling test, Benedict test and iodine test; for protein, ninhydrin test, biuret test, lead acetate test, and xanthoprotein test were carried out. Phenols and tannins were detected by ferric chloride test, lead acetate test, bromine water test, acetic acid test and potassium permanganate test. Similarly, presence of flavonoids was confirmed by pew test, alkaline reagent test, lead acetate test and ferric chloride test. Dragendorff test, Wagner test and Mayer test were performed for confirmation of alkaloid. Liebermann test, Salkowski test, Keller-kilani test and Legal test were used to test the presence of glucosides. Steroid was identified using Liebermann's test. Chloroform-sulfuric acid method was used to identify Terpenoid. Stable foam formation method was used to detect saponins (Chitravadivu *et al.*, 2009; Kumar *et al.*, 2009; Sharma *et al.*, 2012; Srivastava *et al.*, 2011; Yadav and Agarwal, 2011)



Thin layer chromatography: Glass plates coated with silica gel were used to study thin layer chromatographic behavior. The samples were spotted on this glass plates and then developed with different solvent systems. Then iodine was used as visualizing reagent to detect spots on this glass plates (Kalita, 2015; Kalita, 2016).

Table-1 shows the different results obtained during phytochemical study on ethanolic extract of Vitex negundo. From the Table-1, it is seen that leaf extract of Vitex negundo contains carbohydrates, proteins, alkaloids, flavonoids, glycosides, steroids, phenols and tannins. Glycosides, terpenoids and saponins were not detected in the leaf extract.

IV. Analysis and Discussion:

Table 1: Chemical constituents present in leaf extracts [(+) = Present; (-) = absent]

Phytochemicals	Test name/ Reagent	Extract of
Carbohydrates	Fehling test	+
	Benedict test	+
	Iodine test	
Proteins	Ninhydrin test	+
	Biuret test	-
	Lead acetate test	-
	Xanthoprotein test	-
Phenols and tannins	Ferric chloride test	+
	Lead acetate test	-
	Bromine water test	-
	Acetic acid test	-
	Potassium permanganate	-
Flavonoids	Pew test	-
	Alkaline reagent test	-
	Lead acetate test	+
	Ferric chloride test	-
Alkaloids	Dragendorff test	-
	Wagner test	-
	Mayer test	+
Glycosides	Liebermann test	-
	Salkowski test	-
	Keller-kilani	-
	Legal test	-
Steroids	Liebermann test	+
Terpenoids	Chloroform-sulfuric acid	-
Saponins	Shaking test for foaminess	-



Table-2 shows that ten different solvent systems were used to study thin layer chromatography of *Vitex negundo*. In Table-2, it is observed that with leaf extract of *Vitex negundo* five spots were obtained with solvent system Sl. No.1 (Hexane: Ethyl acetate in the ratio 5:1) and with other systems two, three or four spots were

obtained. The presence of multiple compounds in this medicinal plant is indicated by the appearance of number of spots in thin layer chromatographic plates. These results explain that some chemicals of leaf extracts may be separated and isolated using chromatographic technique.

Table 2: TLC of *Vitex negundo*

Sl. No.	Solvent System		Observations	
	Composition	Ratio	Number of spots	R _f values
1	Hexane: Ethyl acetate	5:1	5	0.5, 0.6, 0.7, 0.8
2	Hexane: Ethyl acetate	10:1	3	0.1, 0.2, 0.4
3	Ethyl acetate: Petroleum ether	1:5	4	0.4, 0.6, 0.7, 0.9
4	Ethyl acetate: Petroleum ether	1:10	3	0.4, 0.5, 0.9
5	Hexane: Acetic acid	9:1	2	0.1, 0.2
6	Ethyl acetate: Methanol: Water	5:1:1	3	0.5, 0.6, 0.8
7	Toluene: Ethyl acetate	9:1	4	0.3, 0.5, 0.8, 0.9
8	Hexane: Ethyl acetate: Acetic acid	5:4:1	3	0.36, 0.60, 0.78
9	Chloroform: Methanol	1:5	2	0.7, 0.8
10	Chloroform: Methanol	1:10	4	0.2, 0.2, 0.5, 0.8

V. Findings:

(1) The phytochemical study confirms the presence of different phytochemical in *Vitex negundo* of Guwahati city.

(2) The thin layer chromatographic study confirms the presence of more than five



chemical compounds in *Vitex negundo* of Guwahati city.

VI. Conclusion:

Guwahati is the capital city of Assam having beautiful forest areas surrounding it containing different important medicinal plants. Some medicinal plants are also found in home gardens of the local people of the city. *Vitex negundo* is an example of such plant which is found in home gardens of the city. Phytochemical

investigation on ethanolic leaf extracts of *Vitex negundo* proves the presence of carbohydrates, proteins, alkaloids, flavonoids, glycosides, steroids phenols and tannins. As the thin layer chromatographic plates gave multiple spots with different solvent systems, further study on leaf extracts of the samples may lead to possible discovery of new chemicals present in this plant.

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