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Research Article

**EXTRACTION, PHYTOCHEMICAL & THIN LAYER
CHROMATOGRAPHY OF HYDROALCOHOLIC EXTRACT OF
MEDICINAL PLANT (*VACHELLIA NILOTICA*) STEM**Akash, Dr. Vivekanand Katare*¹, Ms. Sadhna Mangrole¹, Dr. Prabhat Kumar Jain²¹Vivekanand College of Pharmacy, Bhopal (M.P.), ²Scan Research Laboratories, Bhopal (M.P.)**Article Received:** December 2022 **Accepted:** December 2022 **Published:** January 2023**Abstract**

The herbal products are today are the symbol of safety in contrast to the synthetic drugs, that are regarded as unsafe to human being and environment. Although herbs had been priced for their medicinal, flavouring and aromatic qualities for centuries, the synthetic products of the modern age surpassed their importance, for a while. However, the blind dependence on synthetics is over and people are returning to the naturals with hope of safety and security. It's time to promote them globally. *Vachellia nilotica* (L.) is also known as Gum Arabic tree, Babul, Egyptian thorn, or Prickly *Vachellia* is multipurpose nitrogen fixing tree legume Babul plant is therapeutic used as anti-cancer, anti tumours, antiscorbutic, astringent, antioxidant, natriuretic, antispasmodial, diuretic, intestinal pains and diarrhea, nerve stimulant, cold, congestion, coughs, dysenter, fever, hemorrhages, leucorrhoea, ophthalmia and sclerosis. *V nilotica* is the most important tree and almost all its parts are used in medicine, including leaves, bark, root, flower, pods, gum, etc. Powder of the root is useful in leucorrhoea, wound healing, and burning sensation. This study deals with Extraction, Phytochemical & Thin layer chromatography of hydroalcoholic extract of *Vachellia nilotica* Stem. The stem of plant was collected & subjected to extraction by methanol as solvent. Further phytochemical screening & TLC was performed. The results showed that % yield was found to be 6.32%. Phytochemical screening was revealed for the presence of alkaloids, glycosides, carbohydrates, tannins, resins, flavonoids, steroids, proteins and amino acids. The TLC profile has revealed that presence of flavonoids and phenol in the tested plant extract. From these results it can be concluded that the stem of *V nilotica* is enriched with phenol & flavonoids.

Keywords: *V. nilotica*, TLC, Phytochemicals, Herbal medicines, Phenol, Flavonoid**Corresponding author:****Vivekanand Katare,**

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INTRODUCTION:

Our country has a vast knowledge base of Ayurveda whose potential is only being realized in the recent years. However, the drug delivery system used for administering the medicine to the patient is traditional and out-of-date, resulting in reduced efficacy of the drug. In case of herbal extracts, there is a great possibility that many compounds will be destroyed in the highly acidic pH of the stomach. Other components might be metabolized by the liver before reaching the blood. As a result, the required amount of the drug may not reach the blood. If the drug does not reach the blood at a minimum level, which is known as 'minimum effective level' then there will be no therapeutic effect [1,2].

Phytopharmaceuticals are pharmaceuticals using traditional compounds derived from botanicals instead of chemicals. Natural ingredients are more easily and more readily metabolized by the body. Therefore, they produce fewer, if any, side effects and provide increased absorption in the bloodstream resulting in more thorough and effective treatments. Pharmaceuticals made from chemical compounds are prone to adverse side effects. The human body will have a tendency to reject certain chemical compounds which do not occur naturally. These rejections occur in the form of side effects; some as mild as minor headaches, and others as severe as to be potentially lethal. It is important to note while phytopharmaceuticals produce fewer to no side effects, chemical interactions with other prescription drugs can occur. Furthermore, as they are single and purified compounds, they can be easily standardized making it easier to incorporate them in modern drug delivery systems compared to herbs. Herbal medicines have been widely used all over the world since ancient times and have been recognized by physicians and patients for their better therapeutic value as they have fewer adverse effects as compared with modern medicines. The drugs of ayurvedic origin can be utilized in a better form with enhanced efficacy by incorporating in modern dosage forms [3,4]

Vachellia nilotica (L.) is also known as Gum Arabic tree, Babul, Egyptian thorn, or Prickly Vachellia is multipurpose nitrogen fixing tree legume. It occurs from sea level to over 2000m and withstand at extreme temperature (>50°C) and air dryness but sensitive to frost when it is young. It is widely spread in subtropical and tropical Africa from Egypt to Mauritania southwards to South Africa, and in Asia eastwards to Pakistan and India. *Vachellia nilotica* is a pioneer species, relatively high in bioactive secondary compound and are important for a variety

of functions is economically used as a source of tannins, gums, timber, fuel and fodder [5,6].

Babul plant is therapeutic used as anti-cancer, anti tumours, antiscorbutic, astringent, antioxidant, natriuretic, antispasmodial, diuretic, intestinal pains and diarrhea, nerve stimulant, cold, congestion, coughs, dysenter, fever, hemorrhages, leucorrhoea, ophthalmia and sclerosis. *V nilotica* is the most important tree and almost all its parts are used in medicine, including leaves, bark, root, flower, pods, gum, etc. The leaves are astringent, tonic to the liver and the brain, antipyretic, enriches the blood. The tender leaves infusion used as an astringent and remedy for diarrhoea and dysentery. Decoction of bark is largely used as an astringent douche in gonorrhoea, cystitis, vaginitis, leucorrhoea, prolapse of the uterus and piles. Powder of the root is useful in leucorrhoea, wound healing, and burning sensation. It use as in diarrhoea and dysentery, premature ejaculation and seminorrhoea. The pods are used for impotency, urino-genital disorder and in a dry cough. The seeds and leaf extracts are used for general body vigour. The gum is said to be very useful in diabetes mellitus [7,8].

MATERIAL AND METHODS:**Collection of Plant:**

The stem of selected plant namely *Vachellia nilotica* was identified and collected from Bhopal, Madhya Pradesh. The collected plant drug (Stem) was cleaned, shade dried, pulverized into moderately coarse powder and stored in airtight container for further use.

Extraction:

The collected stem was cleaned properly and washed with distilled water to remove any kind of dust particles. Cleaned and dried plant drug was converted into moderately coarse powder in hand grinder. Maceration was carried out in a closed conical flask for 72 h. (50 g) powdered plant drug sample and methanol as the extraction solvent was used. The solvent free methanol extracts obtained was evaluated. The extracts obtained with each solvent were weighed to a constant weight and percentage w/w basis was calculated [9].

Preliminary Phytochemical Screening:

Preliminary phytochemical screening means to investigate the plant material in terms of its active constituents. In order to detect the various constituents present in the methanolic extract of *Vachellia nilotica*, was subjected to the phytochemical tests as per standard methods. [10,11].

Evaluation of the TLC plates:

TLC was produced with the aim of identifying the individual substances in a mixture and also testing for purity or for separation of mixtures. The height of the solvent front and center of spots were measured in the form of R_f value. The R_f value indicates the position the position at which a substance was located in the chromatogram.

The results showed that % yield was found to be 6.32%. Phytochemical screening was revealed for the presence of alkaloids, glycosides, carbohydrates, tannins, resins, flavonoids, steroids, proteins and amino acids. The TLC profile has revealed that presence of flavonoids and phenol in the tested plant extract. From these results it can be concluded that the stem of *V nilotica* is enriched with phenol & flavonoids.

RESULTS & DISCUSSION:**Table 1: Extractive values obtained from *Vachellia nilotica***

S.N.	Solvent	Time of extraction (Hours)	Color of extract	% Yield
1	Methanol + water	24	Brown	6.32%

Table 2: Preliminary phytochemical screening of *Vachellia nilotica*

S. No.	Phytoconstituents	Test Name	Extract
1	Alkaloids	Hanger's Test	Present
2	saponins	Froth test	Present
3	Diterpines	Copper Acetate test	Present
4	phenols	Ferric chloride test	Present
5	Carbohydrates	Gelatin Test	Present
6	Flavonoids (I)	Lead acetate	Present
7	Flavanoids (II)	Alkaline Test	Present
8	Proteins & Amino acids	Precipitation test	Absent

TLC of Flavonoid:**Short UV:****Table 3: R_f value of various sports**

Sport	R_f value(cm)
1.	0.46
Standard	0.48

Long UV:**Table 4: R_f value of various sports**

Sport	R_f value(cm)
1.	0.48
2.	0.88
Standard	0.48

Visible light:**Table 5: R_f value of various sports**

Sport	R_f value(cm)
1.	0.48
Standard	0.48

TLC of Phenol:**Short UV:****Table 6: Rf value of various sports**

Sport	Rf value(cm)
1.	0.50
2.	0.96
Standard	0.28

Long UV:**Table 7: Rf value of various sports**

Sport	Rf value(cm)
1.	0.18
2.	0.42
Standard	0.28

Visible light:**Table 8: Rf value of various sports**

Sport	Rf value(cm)
1.	0.22
Standard	0.28

CONCLUSION:

Vachellia nilotica (L.) is an important ornamental and medicinal plant of tropical and sub-tropical regions belongs to family Fabaceae of genus Acacia commonly known as babul, is a source of many active secondary metabolites which may serve as potential candidates for drug development with greatest possibility of success in near future. An exhaustive survey of literature has revealed that tannins, flavonoids, alkaloids, fatty acids and polysaccharides (gums) constitute major classes of phytoconstituents of this plant. Pharmacological data base reports have revealed significant anti-inflammatory, antioxidant, antidiarrhoeal, antihypertensive and antispasmodic, antibacterial, anthelmintic, antiplatelet aggregatory, anticancer and acetyl cholinesterase (AChE) inhibitory activities.

From the result of proximate phytochemical analysis, Concluded that the *A. nilotica* plant were found to contain phytoconstituents like alkaloids, flavonoids, saponins and tannins which are reported clinically to combat various diseases and disorders in human beings. This study prompted us for the identification, isolation, characterization and investigation novel bioactive compounds.

From the above study, it is concluded that a number of Phytoconstituents are identified in the hydroalcoholic extract of *Vachellia nilotica* stem such as Flavonoids, Alkaloids and Diterpenes. The

TLC profile has revealed that presence of flavonoids and phenol in the tested plant extract.

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