

Research Paper

**PHYTOCHEMICAL CONSTITUENTS OF FOUR MEDICINAL PLANTS IN
KARNATAKA REGION****ISMAIL SHAREEF, M¹, P. JAGAN MOHAN REDDY^{1*}, S. M. GOPINATH^{1**}, K. S.
DAYANANDA¹, AJAY MANDAL² AND H.M. MOUNA²**¹Department of Biotechnology Engineering, Acharya Institute of technology, Bangalore-560107, Karnataka, India.²Research Scholar, ¹Department of Biotechnology Engineering, Acharya Institute of technology, Bangalore-560107, Karnataka, India.**ABSTRACT**

The phytochemical constituents of leaves of four medicinal plants viz: *Terminalia chebula*, *Terminalia arjuna*, *Xanthium strumarium* and *Heliotropium indicum*, which are traditionally used as medicine in Karnataka region. Qualitative analysis carried out on each plant leaves shows that alkaloids, phenolics, flavonoids, saponins, tannins, were present in all the plants. These plants leaves were also subjected to quantitative analysis and the results indicated that Alkaloids and phenolics distribution were highest in *Terminalia chebula* followed by *Heliotropium indicum* while *Xanthium strumarium* has the lowest distribution. Flavonoids distribution was highest in *Xanthium strumarium* followed by *Terminalia chebula* while *Terminalia arjuna* has the least distribution. Saponins was highest in *Heliotropium indicum* followed by *Xanthium strumarium* while *Terminalia arjuna* has the least. Tannins distribution was highest in *Heliotropium indicum* followed by *Terminalia chebula* and while *Bryophyllum pinnatum* has the least.

Key words: *Terminalia chebula*, *Terminalia arjuna*, *Xanthium strumarium**Corresponding Author: jaganmohan@acharya.ac.in**INTRODUCTION**

The world is blessed with natural and unique medicinal plants (Krishnaiah *et al* 2009). A medicinal plant is any plant, which in one or more of its organs contains active ingredients which can be used for therapeutic purposes or contain foundation compounds that can be used for the synthesis of useful drugs. Medicinal plants have invariably been a rich source of new drugs and many drugs in use today were either obtained from plants or developed using their chemical structure as templates (Ajaiyeoba *et al* 2006). The medicinal value of these plants lies in bioactives phytochemical constituents that produce definite physiological action on the human body (Akinmoladun *et al* 2007). Phytoconstituents are the natural bioactive compounds present in plants which combined with nutrients and fibers to form an integrated

part of human defence mechanisms against diseases and stress conditions (Khandare N.A 2012). Phytochemicals are basically divided into two groups that is primary and secondary constituents according to their function in the plant metabolism. Primary constituents comprises common sugars, amino acids, proteins and chlorophyll while secondary constituents consists of alkaloids, flavonoids, phenolics, saponins and so on (Dhawale P.G.2013). The important values of some plants have long been published but a large number of them remain unexplored as yet. So there is a necessity to explore their uses and to conduct pharmacognostic and pharmacological studies to ascertain their therapeutic properties(Mustaqet *al* 2009).*Terminalia chebula*, *Terminalia arjuna*, *Xanthium strumarium* and *Heliotropium indicum* were chosen to study because they were some of the traditionally used medicinal plants in the Karnataka regions for the treatment of inflammation and wound healing. The present study aims at drawing attention to the phytochemical constituents of these plants and comparing them with a view to providing useful information towards effective utilization of these plants. And also bring into focus the scientific rationale behind the usage of these plants in traditional medicine.

MATERIALS AND METHODS

Collections of plant samples.

The medicinal plant Species *Terminalia chebula*, *Terminalia arjuna* and *Xanthium strumarium* were collected from Karnataka region. These plants were identified by a Botanist. Leaves of these plants were processed and analyzed.

Processing of plants samples

The leaves of the plants were air-dried for about 2 weeks and then pulverized using a mechanical grinder. 20g of each sample were weighed and soaked in 100 ml of methanol at room temperature for 72 hrs under regular shaking. Extract of each sample was then filtered using Whatman filter paper. The filtrates were evaporated to dryness using evaporating dish at 350C. qualitative and quantitative phytochemical analysis were conducted on each sample using standard methods (Edeogaet *al* 2005). These tests were based on the visual observation of colour modification, or precipitate formation after the addition of specific reagents.

III. Results

Qualitative analysis

Qualitative analysis carried out on each plant leaves sample showed the presence of pyhthochemical constituents and the results are summarized in Table 1. It shows that alkaloids, phenolics, flavonoids, Saponins and tannins were present in all plants under investigation. The results of quantitative analysis on five major groups of pyhthochemical constituents of leaves of four medicinal plants investigated were summarized and shown in Table 2. *Terminalia chebula* has the highest yield of alkaloid and phenolics which are 965.67 ± 15.30 and 61.70 ± 0.60 followed by *Heliotropium indicum* which are 860.00 ± 0.11 and 52.77 ± 0.20 respectively and *Terminalia arjuna* contained 325.67 ± 0.11 and 34.16 ± 0.16 while *Xanthium strumarium* has the lowest yield of alkaloids and phenolics with the values of 242.30 ± 6.65 respectively. From the results shown in Table 2, *Xanthium strumarium* has the highest values of flavonoids which is 872.3 ± 20.80 followed by *Terminalia chebula* which is 535.67 ± 25.10 . *Heliotropium indicum* has the value of 245.67 ± 0.15 while *Terminalia arjuna*

has the least value which is 215.20 ± 0.18 . However, *Heliotropium indicum* has the highest values of saponins with the values of 517.46 ± 0.24 followed by *Xanthium strumarium* with the values of 455.20 ± 12.56 . *Terminalia chebula* has the value of 430.67 ± 25.10 while *Terminalia arjuna* has the lowest yield with the values of 174.00 ± 0.20 . In respect of tannins *Heliotropium indicum* also has the highest quantity (111.30 ± 0.16) followed by *Terminalia chebula* (85.66 ± 2.60). *Terminalia arjuna* has tannins yield of 65.66 ± 0.11 while *Xanthium strumarium* has the lowest quantity of tannins with the values of 52.77 ± 0.20 .

Table 1: Qualitative analysis on phytochemical constituents

Plants	Saponins	Alkaloids	Tannins	Phenolics	Flavonoids
<i>Terminalia chebula</i>	++	+++	++	+++	+++
<i>Terminalia arjuna</i>	++	++	+	++	++
<i>Xanthium strumarium</i>	++	+	++	++	++
<i>Heliotropium indicum</i>	++	+++	++	+++	+++

Key: High presence of phytochemical constituents: +++

Moderate presence of phytochemical constituents: ++

Low presence of phytochemical constituents: +

Absences of phytochemical constituents: -

Table 2: Quantitative Analysis of phytochemical constituents (mg/100g)

Plants	Saponins	Alkaloids	Tannins	Phenolics	Flavonoids
<i>Terminalia chebula</i>	430.67 ± 25.10	965.67 ± 15.30	85.66 ± 2.60	61.70 ± 0.60	535.67 ± 25.10
<i>Terminalia arjuna</i>	174.00 ± 0.20	325.67 ± 0.11	65.66 ± 0.11	34.16 ± 0.16	215.20 ± 0.18
<i>Xanthium strumarium</i>	455.20 ± 12.56	242.30 ± 6.65	66.67 ± 0.11	11.40 ± 0.40	872.3 ± 20.80
<i>Heliotropium indicum</i>	517.46 ± 0.24	860.00 ± 0.11	111.30 ± 0.16	52.77 ± 0.20	245.67 ± 0.15

Values are mean of triplicate determinations \pm standard deviation

DISCUSSION

Phytochemical analysis of the samples of four medicinal plants under investigation revealed the presence of tannins, Saponins, flavonoids, phenolics and alkaloids in their leaves. This is in tandem with the report of Stauth (Stauth D 2007), who also detected the presence of saponins, tannins and alkaloids in the methanol leaf extract of these plants. Flavonoids and sugars derived from selected medicinal plants from some parts of the world, were shown to exhibit antidiarrhoeal properties (Suleimanet al 2007). Reports by different authors (Agunuet al 2005; Longangaet all 2000; Suleimanet al 2007). Have shown that the active ingredients in

a number of medicinal plants which enable them to exhibit antibiotic properties were due to alkaloids, flavonoids, tannins, saponins and reducing sugars present in them. The presence of alkaloids, saponins, phenolics, flavonoids and tannins explains the reason why the leaves of these medicinal plants are used for the treatment of various diseases. For example, flavonoids are known to act as antioxidant by removing the highly unstable molecules called free radicals which damaged the body cells, thereby contributing to a variety of diseases such as cancer, inflammation, heart diseases and aging (Krishnaiah *et al* 2009; Stauth D 2007). Flavonoids also responsible for the antipyretic (fever-reducing), analgesic (pain-relieving) and spasmolytic (spasm-inhibiting) properties of these plants (Krishnaiah *et al* 2009; Olaleye M.T 2007). According to Dweck and Mitchell (Dweck *et al* 2002). Ayurveda herbal formula called chayavanprasha which is used as a sexual vitality tonic is believed to contain phenolic constituents. Tannins has high potency for the treatment of intestinal disorders such as diarrhea and dysentery (Akinpelu *et al* 2006; Olaleye M.T 2007). The presence of alkaloids and saponins explains the reason why these medicinal plants are used to treat hypertension because alkaloids and saponins prevent the excessive intestinal absorption of cholesterol and thus reduce the risk of cardiovascular diseases such as hypertension (Akinpelu *et al* 2006).

REFERENCES

Agunu, A., Yusuf S., Andrew G.O., Zezi, A.U and Abdurahman, E.M (2005). Evaluation of Five Medicinal Plants used in Diarrhoea Treatment in Nigeria. *Journal of Ethnopharmacology* 101, 27 – 30.

Ajaiyeoba E., Falade M, Ogbola O., Okpako L, and Akinboye D. (2006). In vivo Antimalaria and Cytotoxic Properties of Terminaliachebula Extract. *Afr. J. Trad. CAM* 3 (1) : 137 – 141.

Akinmoladun A.C, Ibukun, E.O., Afor E., Obuotor E.M., and Farombi E.O. (2007). Phytochemical Constituents and Antioxidant Activity of Extract from the Leaves of *Ocimum gratissimum*. *Sc. Res. Essay 2*: Pp. 163 – 166.

Akinpelu D.A, and Onakoya, T.M. (2006). Antimicrobial Activities of Medicinal Plants used in Folklore Remedies in South-Western. *Afri. J. Biotechnol.* 5 : 1078 – 1081.

Dhawale P.G. (2013). Phytochemical Analysis of some Medicinal Plants from Yanatmal District (Ms) India. *The International Journal of Engineering and Science* 2 (1) Pp. 65 – 66.

Dweck A.C, and Mitchell, D. (2002). *Emblica Officinalls (syn: phyllanthus Emblica) or Amia: the Ayurvedic wonder*. Chesham Chemicals Ltd. London.

Edeoga H.O., Okwu, D.E and Mbaebie B.O. (2005). Phytochemical Constituents of some Nigerian Medicinal Plants. *Afri. J. Biotechnol* 4 (7) : Pp. 685 – 688.

Khandare, N.A (2012). Qualitative Poytopchemical Analysis of Ethanomedicinally Important Plant Capparis Aphyla Roth (Capparidaceae) from Akola Distric, Maharashtra, India. *IRJP* 3(4) pp 206 – 207.

Krishnaiah D., Devi T. Bomo A and Sarbatly R. (2009). Studies on Phytochemical Constituents of Six Malaysian Medicinal Plants. *Journal of Medicinal Plants. Journal of Medicinal Plants Research* Vol. 3 (2) Pp. 067 – 072.

LongangaOtshudi, A., Vercruysse A., Forlers A. (2000). Contribution to the Ethinobotanical Phytochemical and Pharmacological Studies of Traditionally used Medicinal Plants in the Treatment of Dyseutery and Diarrhea in Lomela Area, Democratic Republic of Congo (DRC) *Journal of Ethnopharmacology* 71, 411 – 423.

Mustaq A.Q, Rahmatullah, A. Muhammad A.K Mirand and Muhammad Z. (2009). Traditional Herbal Remedies used for the Treatment of Diabetes from District Attock (Pakistan) *Pak. J. Bot.*, 41 (6) : 2777 – 2782.

Olaleye M.T (2007). Cytotoxicity and Antibacterial Activity of Methanolic Extract of Hibiscus Sbdariffia. *J. Med. Plants Res.* 1(1) : 009 – 013.

Stauth D. (2007). Studies Force New View on Biology of Flavonoids. Oregon State University, U.S.A.

Suleiman M.M, Dzenda T and Sani C.A (2007). Antidiarrheal Activity of the Methanol Stem-nbark Extract of Terminaliachebula Pers. (*Annonaceae*) *Journal of Ethnopharmacology* 116 : 25 – 130.

Afolabi F, And Afolabi O.J, Phytochemical Constituents of Some Medicinal Plants in South West, Nigeria, *PP* 76-78, (2013).