



E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2015; 3(5): 66-72
Received: 25-11-2014
Accepted: 09-12-2014

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Ethnomedicinal uses and phytochemistry of *Abutilon indicum* (Linn.) Sweet: an overview

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Abstract

Abutilon indicum is one of the renowned plant species used to treat a large number of human ailments. The whole plant or its specific parts (leaves, stem, roots, fruits and seeds) are known to have medicinal properties and have a long history of use by indigenous and tribal people in India. Traditionally, the plant is used for treatment of inflammation, piles, gonorrhoea and as an immune stimulant. In general, its root and bark are used as aphrodisiac, anti-diabetic and diuretic. Seeds are used in the treatment of cough, urinary disorders and as a laxative in piles. More importantly, the juice from its leaves has been used to formulate an ointment for quick ulcer healing properties. Besides, it is widely used in folk medicine for treating fever, cough, lung disease, urine output, deafness, ringing in the ears, mumps and pulmonary tuberculosis. Some important essential oil constituents like α -pinene, caryophyllene, caryophyllene oxide, endesmol, farnesol, borenol, geraniol, geranyl acetate, elemene and α -cineole have been reported from plant. Phytoconstituents like β -Sitosterol, caffeic acid, fumaric acid, vanillin, p-coumaric acid, p-hydroxybenzoic acid, sesquiterpene including lactones, alantolactone and isosalantolactone have also been reported from different part of the plant. The present paper highlights evidence-based overview of phytochemical and ethnomedicinal properties of *A. indicum*, which may be helpful to establish a standard natural drugs for further research.

Keywords: *Abutilon indicum*, antidiabetic, ethnomedicine, folk medicine, phytochemistry.

1. Introduction

Plants have been used as medicines for thousands of years. People depend on plants for several purposes like for wood, timber, non-timber forest products, food, medicine etc. [1]. They have always been used as a rich source of biologically active drugs and have numerous traditional uses to serve mankind for many thousand years [2-7]. Now days, they are used widely because of growing awareness of people towards unwanted side effects and high cost of the allopathic medicines [8-9] which makes them beyond the reach of common people. According to WHO (World Health Organization) report, about 80% of the population, mostly in developing countries still depends on traditional medicinal system for their primary health care. India is one of the twelve mega-biodiversity centers with 4 hot-spots of biodiversity. Ethnobotanical knowledge has been reported from its several parts [10-13]. The different systems of medicinal usage like Ayurveda, homeopathy and Unani which are the local health traditions, focuses on the use of plant products for the treatment of human and animal diseases. Medicinal plants contain numerous biologically active compounds which are helpful in the treatment of various diseases and improving the life. The presence of various life sustaining constituents in plants made scientists to investigate them for their uses in treating certain infectious diseases and management of chronic wounds. In addition to being a good source of anti-infective agents, they are also cost-effective and have fewer side effects [14-17].

The information on medicinal plants has been accumulated in the course of several centuries based on various systems of medicine. India has very rich plant diversity and houses about 47,000 plant species but traditional healers' uses only 2500 plant species out of which about 100 species of plants serve as natural principles source of medicine [18]. A large number of plants still remain unexplored with regard to their medicinal properties and they can also be sources of potentially active compounds for the development of new drugs to treat various diseases. The present review is on *Abutilon indicum* (Linn.) Sweet, it is commonly called as 'Country mallow' in English and 'Kanghi' in Hindi. A systematic scientific study has been conducted regarding the efficacy of different plant parts in the treatment of various diseases. There is a need to review the information available in literature on *Abutilon indicum* to answer the gaps between ethnomedicinal uses and phytochemical studies, so that it would aid future research by phytochemists, pharmacologists, clinicians, researchers, scientists and toxicologists.

The information collected has been compiled and made easily available at one place in the interest of the scientific community.

2. Botany of plant

2.1. Distribution

The *abutilon* genus of the Malvaceae family comprises approximately 150 plant species; those are widely distributed in tropical and subtropical countries of Asia, Africa, Australia and America. *Abutilon indicum* is a hairy herb or under shrub found in the outer Himalayan tracts from Jammu to Bhutan up to an altitude of 1500 m and extending through the whole of northern and central India. It can grow in dry and poor soil and require hot conditions. In India it is very common on roadsides and waste places generally to grow after the rainy season.

2.2. Taxonomic status ^[19-20]

| | | |
|------------|---|-----------------|
| Kingdom | : | Plantae |
| Subkingdom | : | Tracheobionta |
| Division | : | Magnoliophyta |
| Class | : | Magnoliopsida |
| Subclass | : | Dilleniidae |
| Order | : | Malvales |
| Family | : | Malvaceae |
| Genus | : | <i>Abutilon</i> |
| Species | : | <i>indicum</i> |

2.3. Vernacular names ^[21-22]

| | | |
|-----------|---|--|
| Hindi | : | Jhampi, Kandhi, Kangahi, Kangai, Kanghani, Kanghi, Kanghi-ka-pat, Tepari |
| English | : | Country mallow |
| Sanskrit | : | Atibala, Bala, Balika, Balya, Bhuribala, Ghanta, Kankati, Kankatika, Mahabala, Pitapuspa, Rishiprokta, Shita, Shitapushpa, Vatyapushpika, Vikankata, Vrishyagandha, |
| Arabic | : | Deishar, Mashtul-gh-oul, Mashtulghola, Mashtulghou, Mast-ul-ghoul |
| Kannada | : | Baralu kaddi, Giduthingi, Gidutingi, Haagade, Hettukisu, Tutti, Kisangi gida, Hetthukisu, Mudre gida, Hetthutthi, Hettutti, Srimudre gida, Srimudrigida, Tutti gida, Srimudre, Thurubee gida, Thuthi gida, Shrimudrigida |
| Malayalam | : | Beloeren, Katturam, Katturan, Kuruntotti, Pettaka, Pettaka-putti, Pitikkapattu, Tutti, Tuvatti, Uram, Velluram |
| Marathi | : | Akakai, Kangain, Kansuli, Karandi, Madmi, |

| | | |
|--------|---|--|
| Tamil | : | Mudra, Mudrika, Petari, Pidari, Pitari, Duddi, Nallatutti, Pamyarattutti, Paniyarattuti, Perun-tutti, Perundutti, Peruntutti, Thuthi, Thuththi, Tutti, Ventutti |
| Telugu | : | Adavi benda, Adavibenda, Botiabenda, Botla benda, Doodi, Doodi chettu, Dudi, Erri benda, Erribenda, Kamalaku, Muttavashirubenda, Noogubenda, Nugu-benda, Thuthi, Thuthura benda, Thutirichettu, Thutthi, Thutthurubenda, Tutiri-chettu, Tutti, Tutturu-benda |
| Urdu | : | Kanghi |

2.4. Plant Description

Abutilon indicum is herbaceous weed and found abundantly in wastelands. The stem of the plant is stout, branched, about 1-2 m tall and 0.3-0.9 cm in diameter. The stem of the plant is yellow and often found tinged with purple colour. The leaves are ovate, acuminate, toothed, rarely subtrilobate and 1.9-2.5 cm long. The flowers are yellow in colour, peduncle jointed above the middle. The petioles 3.8-7.5 cm long; stipules 9 mm long and pedicels often 2.5-5 mm long. They are axillary solitary, jointed very near the top; calyx 12.8 mm long, lobes ovate, apiculate and corolla 2.5 cm in diameter, yellow and open. The fruits are capsule, densely pubescent, with conspicuous and horizontally spreading beaks. The seeds are 3-5 mm in size, reniform, tubercled or minutely stellate-hairy, black or dark brown ^[23-26]. The root of the plant is with smooth surface, cylindrical, 1.2 to 1.5 cm in diameter, fragrant, salty taste and yellow in colour.

3. Scope of Review

The review of *Abutilon indicum* is predominantly needed to answer the gaps between ethnomedicinal uses and phytochemical studies. An attempt has been made to provide the complete information on ethnomedicinal uses and phytochemistry of the plant, so that it would aid in future research on this species by phytochemists, pharmacologists, scientists, researchers and toxicologists etc. The review highlighted the ethnobotanical uses (Table1) and phytochemicals isolated (Fig-1-2) from various parts of the plant to provide a comprehensive idea to the readers.

4. Ethnomedicinal Uses

Abutilon indicum is one of the plant species with potential medicinal properties. The whole plant and different parts of the plant are used to cure many human ailments. It is an Asian phytomedicine plant and it has anti-diabetic and anti-bacterial activities ^[27]. The paste of leaves and seeds is applied to penis to cure syphilis ^[28-30]. It is reported that the dried aerial parts are used decreasing the symptoms of bronchial asthma as it increases pulmonary function in patient. The leaf paste is also taken orally to relieve body pain and to cure piles ^[31]. The fruit decoction mixed with ammonium chloride is used against haemorrhagic septicaemia ^[32]. It is found that the aqueous and ethanolic extract of the plant leaves has immunomodulatory

| | | | |
|--|--|---|-------------|
| | | Rectum of children affected with thread worms | 40-41 42 |
| | | Used as | |
| | | Tonic | 19-20 |
| | | Expectorant | 19-20 |
| | | Laxative | 13 |
| | | Aphrodisiac | 13 |
| | | Emollient | 42 |
| | | Demulcent | 42 |

5. Phytochemistry

The phytochemical screening of various extracts of *Abutilon indicum* showed the presence of alkaloids, glycosides, carbohydrates, tannins, phenolic compounds, proteins, amino acids, saponins, flavonoids, terpenoids, gums and mucilages [43] (Table-2). Hussain *et al.* [44] give the quantitative estimation of two biologically active steroid compounds from the plant, including stigmasterol triterpenoid and luepol using high performance liquid chromatography (HPTLC). Many important phytoconstituents like β -Sitosterol and tocopherol were isolated from the plant [45-46]. The plant essential oil constituents mainly of α -pinene, caryophyllene, caryophyllene oxide, endesmol, farnesol, borenol, geraniol, geranyl acetate, elemene and α -cineole (Fig-1) along with number of many other minor constituents [47].

The plant was found to contain some amino acids like leucine, histidine, threonine, serine, glutamic acid and aspartic acid and carbohydrate (p- β -Dglucosycoxybenzoic acid, glucovanilloyl glucose, fructose, galactose, glucose) [45]. The plant is a very rich source of fatty acids like linoleic acid, palmitic acid, oleic acid, stearic acid etc.

Other chemical compounds like caffeic acid and fumaric acid, vanillin, p-coumaric acid, p-hydroxybenzoic acid, sesquiterpene including lactones alantolactone and isovalanto-lactone are also reported [48] (Fig. 2). It also contains flavonoids like luteolin, chrysoeriol, luteolin-7-O- β gluco pyranoside, chrysoeriol 7-O- β gluco pyranoside, apigenin 7-O- β -gluco pyranoside, Quercetin 3-O- β -gluco pyranoside, Quercetin 3-O- α rhamnopyranosyl, β -gluco pyranoside [49].

Table 2: Qualitative phytochemical profile of *Abutilon indicum*

| Extract | Solvent | Alkaloids | Carbohydrate | Flavanoids | Glycosides | Phenols | Saponins | Steroids | Sterols | References |
|---------|-----------------|-----------|--------------|------------|------------|---------|----------|----------|---------|------------|
| Leaf | Petroleum ether | - | - | + | + | + | + | + | + | 50 |
| | Ethyl acetate | + | + | - | - | + | - | - | - | |
| | Chloroform | + | + | + | + | + | - | - | + | |
| | Methanolic | + | + | + | + | + | + | + | + | |
| | Aqueous | - | + | - | + | - | + | + | + | |
| Stem | Hydro-alcoholic | - | + | + | - | + | - | + | - | 51 |
| | Methanolic | - | + | + | + | + | - | - | - | |
| | Aqueous | - | + | + | + | + | - | + | - | |

(+) Indicate presence of phytochemicals and (-) indicate absence of phytochemicals

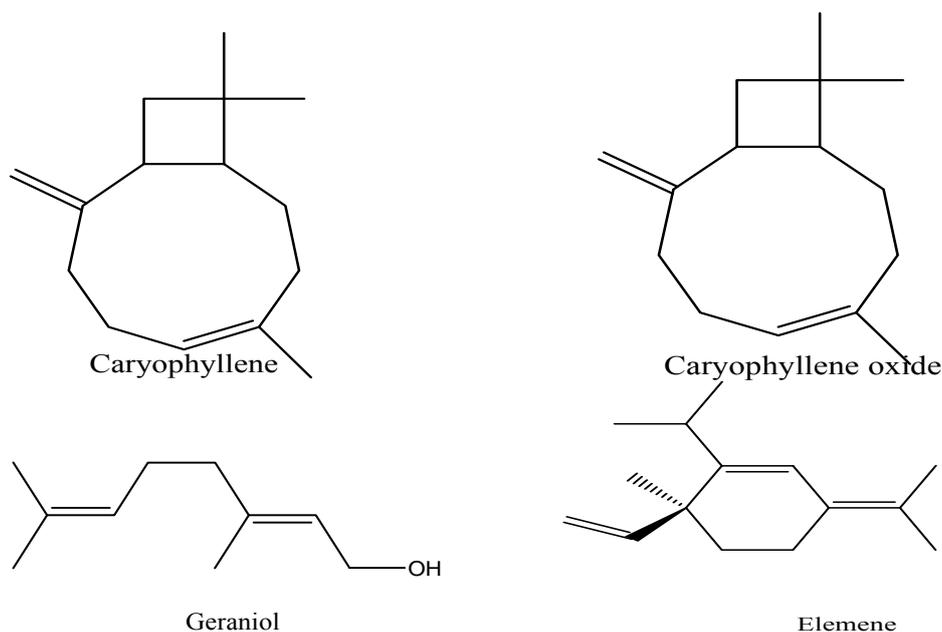


Fig 1: Structure of some important essential oil constituents reported from *Abutilon indicum*

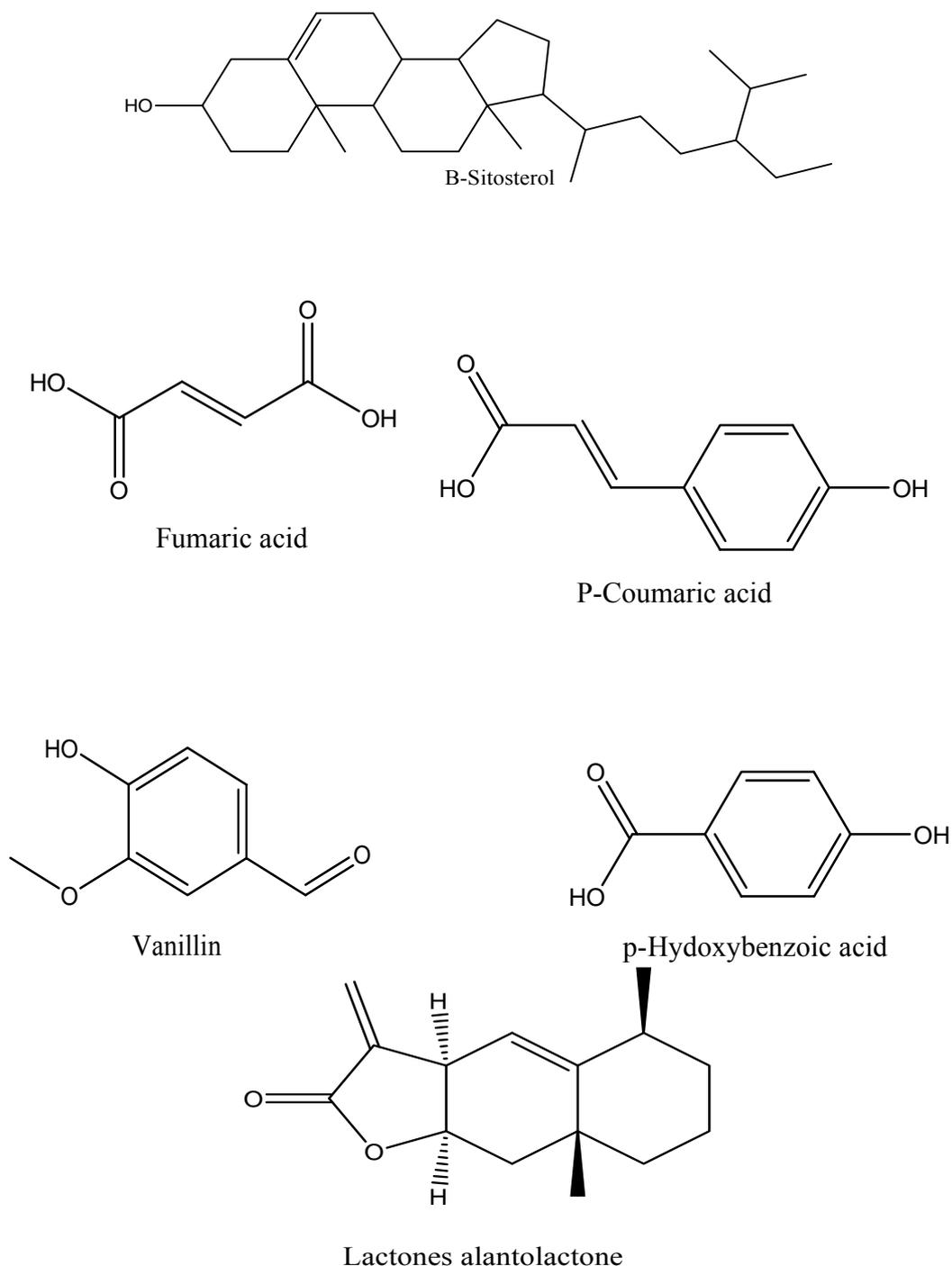


Fig 2: Structure of some important phytoconstituents of *Abutilon indicum*

6. Conclusion

Based on numerous therapeutic properties in traditional medicinal system, it can be concluded that the plant *Abutilon indicum* is a valuable medicinal herb. The leaves and seeds of plant are most commonly used as ethnomedicine. The plant contains several remarkable biologically active compounds like β -Sitosterol, tocopherol oil, caffeic acid, fumaric acid, vanillin, p-coumaric acid, p-hydroxybenzoic acid, sesquiterpene (lactones alantolactone and isoalanto-lactone) and many constituents of essential oils like α -pinene, caryophyllene, caryophyllene oxide etc. Numerous studies have been conducted in different parts of *A. indicum* but the plant has not been yet developed as a drug by pharmaceutical

industries. A detailed and systematic study is required for identification, cataloguing and documentation of plants, which may provide a meaningful way for the promotion of the traditional knowledge of the herbal medicinal plants. In view of the nature of the plant, more research work should be carried out so that drugs with multifarious effects would be available in the future.

7. References

1. Jain A, Katewa SS, Galav P, Sharma P. Medicinal plant diversity of Sitamata wildlife sanctuary, Rajasthan, India. *Journal of Ethnopharmacology* 2005; 102:143-157.

2. Kirtikar KR, Basu BD. Indian Medicinal Plants. Vol. I-IV. International book distributor's booksellers and publishers, Dehra Dun, 1999.
3. Nadkarni KM. Indian plants and drugs with their medicinal properties and uses, Asiatic publishing houses, New Delhi, 2001.
4. Rajendran K, Balaji P, Basu J. Medicinal plant and their utilisation by villagers in southern district of Tamil Nadu. Indian Journal of Traditional Knowledge 2008; 7(3):417-420.
5. Balakrishnan V, Prema P, Ravindran KC, Robinson JP. Ethanobotanical studies among villagers from Dharapuram Taluk Tamil Nadu, India. Global Journal of Pharmacology 2009; 3(1):8-14.
6. Natarajan D, Balaguru B, Nagamurugan N, Soosairaj S, Natarajan E. Indian J. Traditional Knowledge 2010; 9(4):768-774.
7. Abu-Rabia A. Urinary diseases and ethnobotany among pastoral nomads in middle east. J Ethnobiol Ethnomedicine 2005; 1(4).
8. Dhanalakshmi S, Lakshmanan KK, Subramanian MS. Pharmacognostical and Phytochemical studies of *Abutilon indicum* L. Journal of Research and Education in Indian Medicine 1990; 21-25.
9. Jain A, Katewa SS, Chaudhary BL, Galav P. Folk herbal medicines used in birth control and sexual diseases by tribal's of southern Rajasthan, India. Journal of Ethnopharmacology 2004; 90:171-177.
10. Prakshanth V, Neelam S, Padh H, Rajani M. Search for antibacterial and antifungal agents from selected Indian medicinal plants. Journal of Ethnopharmacology 2006; 107:182-188.
11. Ganeshan S, Ramar PN, Banumathy N. Ethnomedicinal Survey of Alagarkoil Hills (Reserved forest), Tamil Nadu, India. Electronic journal of Indian Medicine 2007; 1:1-19.
12. Mohapatra SP, Sahoo HP. An Ethno-Medico-Botanical study of Bolangir, Orissa, India: native plant remedies against gynaecological diseases. Ethnobotanical Leaflets 2008; 12:846-850.
13. Singh AK, Raghubanshi AS, Singh JS. Medical Ethnobotany of the tribals of Sonaghati of Sonbhadra district, Uttar Pradesh, India. Journal of Ethnopharmacology 2002; 81:31-41.
14. Samy PR, Thwin MM, Gopalakrishnakone P, Ignacimuthu S. Ethnobotanical Survey of folk plants for the treatment of snakebites in southern part of Tamil Nadu, India. Journal of Ethnopharmacology 2008; 115:302-312.
15. Ignacimuthu S, Ayyanar M, Sakarasivaraman K. Ethnobotanical study of medicinal plants used by Paliyar tribals in Theni district of Tamil Nadu, India. Fitoterapia 2008; 79:562-568.
16. Nayak S. Influence of Ethanol Extract of *Vinca rosea* on Wound Healing in Diabetic Rats. Online Journal of Biological Sciences 2006; 6(2):51-55.
17. Samsam SH, Moatar F. Natural medicines and plants. Mashal Publications, Tehran 1991, 123-130.
18. Pei SJ. Ethnobotanical approaches of traditional medicinal studies: some experience from Asia. Pharma Biol 2001; 39:74-79.
19. Gautam GK, Vidyasagar G, Dwivedi SC. Study on medicinal plants from Indian origin, a text book of Indian medicinal plants, Lambert Academic Publication, Germany, 2012.
20. *Abutilon indicum*. www.wikipedia.org/wiki/Abutilon_indicum, 19 Dec, 2014.
21. Khare CP. Indian medicinal plants, An Illustrated Dictionary. Springer-Verlag Heidelberg, New York, 2007, 3-4.
22. Gautam GK, Vidhyasagar GS, Dwivedi SC, Dwivedi S. Anti-diabetic activity of aqueous and methanolic extract of *Abutilon muticum*. International Journal Pharmacy Teaching & Practice 2013; 4(1):522-526.
23. Kirtiar KR, Basu BD. Indian Medicinal Plants, Edn 2, Vol. I, Dehradun 1994, 314-317.
24. Prajapati ND, Purohit SS, Sharma AK, Kumar T. In A handbook of Medicinal Plants, Edn 1, Agrobios, Jodhpur India, 2003.
25. Chopra RN, Nair SL, Chopra IC. Glossary of Indian Medicinal Plants, CSIR, Edn 2, New Delhi, 1956.
26. Nadakarni AK. Indian Materia Medica, Popular Prakashan (Pvt) Ltd., Bombay, 1995, 8-9.
27. Partap M, Alagesan A, Kumari BDR. Anti-bacterial activities of silver nanoparticles synthesized from plant leaf extract of *Abutilon Indicum* (L.) Sweet. J Nanostruct Chem 2014; 4:106.
28. Jain A, Katewa SS, Chaudhary BL, Galav P. Folk herbal medicines used in birth control and sexual diseases by tribals of southern Rajasthan, India. Journal of Ethnopharmacology 2004; 90:171-177.
29. Kaushik P, Kaushik D, Khokra S, Choudhary B. *Abutilon indicum* (Atibala): Ethanobotany, Phytochemistry and Pharmacology- A Review. International Journal of Pharmaceutical and Clinical Research 2009; 1(1):4-9.
30. Lakshmayya RNN, Kumar P, Agarwal NK, Shivaraj GT, Ramachandra SS. Phytochemical and pharmacological evaluation of leaves of *Abutilon indicum*. Indian Journal of Traditional Knowledge 2003; 2(1):79-83.
31. Prakshanth V, Neelam S, Padh H, Rajani M. Search for antibacterial and antifungal agents from selected Indian medicinal plants. Journal of Ethnopharmacology 2006; 107:182-188
32. Ali ZA. Folk veterinary medicine in Moradabad District (Uttar Pradesh), India. Fitoterapia 1999; 70:340-347.
33. Dashputre NL, Naikwade NS, Immunomodulatory activity of *Abutilon indicum* linn. On albino mice. International journal of Pharma Sciences and research 2010; 3:178-184.
34. Kaladha DSVGK, Swathi SK, Varahalarao V, Nagender SY. Evaluation of Anti-inflammatory and Anti-proliferative Activity of *Abutilon indicum* L. Plant Ethanolic Leaf Extract on Lung Cancer Cell Line A549 for System Network Studies. Journal of cancer research and therapeutics 2014; 6:6.
35. Shrikanth VM, Janardhan B, More SS, Muddapur UM, Mirajkar KK. *In vitro* anti snake venom potential of *Abutilon indicum* Linn leaf extracts against *Echis carinatus* (Indian saw scaled viper). Journal of Pharmacognosy and phytochemistry 2014; 3(1):111-117.
36. Giri RK, Kaungo SK, Patro VJ, Das S, Sahoo DE. Lipid lowering activity *Abutilon indicum* (L) leaf extract in rats. Journal of Pharmacy Research 2009, 1725-1727.
37. Dhanalakshmi S, Lakshmanan KK, Subramanian MS. Pharmacognostical and phytochemical studies of *Abutilon* L. Journal of Research and Education in Indian Medicine 1990, 21-25.
38. Kaladhar DSVGK. Traditional and Ayurvedic medicinal plants from India: Practices and treatment for human diseases. Lap lambert Academic Publishing 2012; 176.

39. Ali ZA. Folk veterinary medicine in Moradabad District. (Uttar Pradesh), India. *Fitoterapia* 1999; 70:340-347.
40. The Ayurvedic Pharmacopoeia of India, Part-I, Vol. 1. Sahacara (Whole plant): 25-28.
41. Kumar GG, Gali V. Phytochemical screening of *abutilon muticum* and *Celosia argentea* Linn. *International Journal of Pharma & Bio Sciences* 2011; 2(3):463-467.
42. Buriani A, Garcia-Bermejo ML, Bosisio E, Xu Q, Li H *et al.* Omic techniques in systems biology approaches to traditional Chinese medicine research: present and future. *J Ethnopharmacol* 2012; 140:535-544.
43. Dhawale PG. Phytochemical analysis of eight medicinal plants from Amravati district (MS) India. *International Journal of Scientific and Research Publications* 2013; 3(1):1-3.
44. Hussain MS, Fareed S, Ali M, Alam MS, Rahman MA, Srivastava AK. Phytochemical investigation and simultaneous estimation of bioactive lupeol and stigmaterol in *Abutilon indicum* by validated HPTLC method. *Journal of coastal life medicine* 2014; 2(5):394-401.
45. Gaid KN, Chopra KS. Phytochemical investigation of *Abutilon indicum*. *Planta Medica* 1976; 30:174-185.
46. Baxi AJ, Parikh AR. Isolation of some non saponifiable principles from the leaves of *Abutilon indicum* (Linn.) Sweet. *Ethnobotany Res* 1980; 1(4):534-537.
47. Wu TS. Chemical constituents from *Abutilon indicum*. *Journal of Asian Natural Products Research* 2008; 10:689-693.
48. Sharma PV, Ahmed ZA. Two sesquiterpene lactones from *Abutilon indicum* (Linn.) Sweet. *Phytochemistry* 1989; 28(12):35-25.
49. Matlawska I, Sikorska M. Flavonoid compounds in the flowers of *Abutilon indicum* (L.) Sweet (Malvaceae). *Acta Pol Pharm* 2002; 59(3):227-9.
50. Chakraborty GS. Pharmacognostical and phytochemical evaluation of leaf of *Abutilon indicum* (Linn.). *International Journal of Pharmaceutical Sciences and Drug Research* 2009; 1(1):28-31.
51. Chakraborty GS, Ghorpade PM. Pharmacognostical and Phytochemical Evaluation of stem of *Abutilon indicum* (Linn.). *International Journal of Pharmaceutical Sciences and Drug Research* 2009; 1(3):188-190.