

The Analytic Aspect of Phyto-Chemicals of *Adhatoda vasica* Medicinal Plant of Khetri Region, Rajasthan

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Abstract: The district consists of three rivers which are seasonal by their nature of water stream flow point of view viz; Basai river, Kantli river, and Chandravati river. All these rivers fall under the pattern of the total area under internal drainage system of the district.

RESEARCH AREA

The area under study i.e. Khetri Region is located in South-eastern part of Jhunjhunu district, Rajasthan state with it's geographical extension in between $27^{\circ} 40' 24''$ to $28^{\circ} 17' 12''$ N latitude and $75^{\circ} 39' 59''$ to $76^{\circ} 12' 59''$ E longitude.

The area under study is facing the problem of excess of fluoride contents in the water which has average value of 7.5 ppm and suffering from the disease of Fluorosis at many places which are scattered throughout the area under study.

REVIEW OF LITERATURE

Being an applied researcher I feel my prime most duty to present here the specific interpretation of the studies who have carried out the research work of the analytic aspect of the nature, contents and details of available phyto-chemicals which are investigated or traced out within the applied parts and portion of medicinal plant species, with specific reference to my study area i.e. Khetri region of Rajasthan.

With the end of third decade of 20th century, the study on analytic aspect of phyto-chemicals of medicinal plants had already been started, during that period in 1929-30 Chopra, R.N. and Chosh, S. studied on “Medicinal Plants Used in Indigenous Medicine”, Further in this context in 1984 studied in 1956-58 Chopra,R.N. on “Medicinal Plants” whereas in 1984 Basu, B.D. and Kirtikar, K.R.studied on “Indian medicinal plants”, respectively.

It will be very interesting to mention here a descriptive account of certain medicinal plant species analytic aspect of available phyto-chemicals by some researchers, are being illustrated here in the following paragraph which alphabetically covers the medicinal plant.

Phytochemicals of applied parts and portion of medicinal plant - *Albizia lebbeck* (A tree species) was studied by Tripathi, S.N. et al. in 1978, Tripathi, R.M. et al. in 1979, and Das, P.K. et al. in 1983. Another medicinal shrub/ tree species i.e. *Adhatoda vasica* was studied in 1983 by Kanwal, P. et al. *Asparagus species* (Herb species) was studied by Inamdar, A.C. and Mahabale, T.S. in 1980. *Azadirachta indica* (Neem tree) a

multipurpose medicinal plant species was studied by several researchers but the phyto-chemicals analytic aspect studied by K.C. Sinha et al. in 1984 with specific reference to Neem Oil is worthwhile to mention here.

Boerhavia diffusa (herb species) was studied by Srivastava, K. et al. in 1980 for it's phyto-chemicals contents. In 1980 Dennis, T.J. et al. and in 1984 Pachnanda, V.K. et al. studied the phyto-chemicals of *Boswellia serrata* (Medicinal tree species). In 1981, the phyto-chemicals of *Corchorus depressus* (Medicinal herb species) was studied by Vohara, S.B., et al. in 1981. A very important multipurpose medicinal shrub species - *Commiphora mukul* was studied by some researchers from phyto-chemicals analytic aspect point of view which are as - Baldwa, V.S. et al. in 1978, Mester L. in 1978, Bordia, A. and Chuttani, S.K. in 1979 and Kotiyal J.P. in 1979. Sharma, H.K. et al. studied the phyto-chemical of *Cassia species* in 1982.

Occimum sanctum - a under shrub medicinal plant species phyto-chemically was studied by Bhargava, K.P. and Singh, N. in 1981. Phyto-chemicals of *Solanum nigrum* in 1982 was studied by Brindha, P. et al. In very early during 1932-33 Pandse, G.P. and Dutt. S. worked out the phyto-chemicals of an important medicinal climber species - *Tinospora cordifolia*. In earlier studies, Venkataraghavan S. et al. in 1980 traced out the phyto-chemicals which are found in applied parts and portion of two plant species namely - *Boerhavia diffusa* and *Withania somnifera* - a multi-purpose medicinal shrub species was phyto-chemically studied by some researchers which are as - Kuppurajan, S. et al. in 1980, Singh, N. et al. in 1982, Verma, V. in 1983 and Sharma, M. K. in 2007.

Although all of them as above mentioned researchers, botanists and authors contributed their valuable work from time to time but none of them upto now presented their work on exact lines of the analytic aspect of phyto-chemicals of *Aloe vera* medicinal plant of Khetri Region, Rajasthan.

OBJECTIVES

Being a field of applied phyto-researcher with specific reference to the study of medicinal plants, naturally it become a significant aim to illustrate the applied parts and portion of medicinal plants which are being used to cure certain disease.

Further in this context, the research study objective also covers the illustration of analytic aspect of phyto-chemicals of the applied parts and portion of medicinal plants i.e. in other words to say phyto-chemistry descriptive interpretation due to which the particular medicinal plant has applied values as drug to cure certain kind of diseases for the welfare of healthy environment of human beings.

HYPOTHESIS

1. I also hope that there may be a marked variation in the percentage of vegetational group of medicinal plants and their families. Naturally, the author presume that all parts of every medicinal plant should not be useful as drug but some specific parts and portion should be useful, it may be traced out during the course of study of research work details of analytic aspect of phyto-chemicals in this concerned.

2. The author may find or trace out that the region may include many medicinal plant species which may be useful according available phyto-chemicals one side for the cure of one disease particular, and another side many single medicinal plant species which may be useful as drug in the cure of many different kind of diseases.

METHODOLOGY

Phytochemical study of the crude medicinal plant parts, several of these medicinal herbs will be chemically analysed and their biologically active chemical compounds recorded. Literatures will be searched to know those chemicals which give them their medicinal properties. The chemicals searched for would mainly their Alkaloid, Steroid, Glycoside, Saponin, and Tannin contents for the area under investigation i.e. the Khetri region of Rajasthan.

INTRODUCTION AND MORPHOLOGY

The plant belongs to the family - Acanthaceae. From vegetational group point of view, the plant belongs to the group of "Tree", it is a medium sized tree, in nature sometimes it is also observed in the form of shrub. It is tall, much branched (branches are terete) and mostly evergreen tree. The leaves of the plant are lanceolate, large and dark green in colour.



Plate : Adhatoda vasica Plant

The plant shows more or less frequent phytogeographic distribution through out the area under study but it varies with the change in nature of Habitat. The plant shows it's frequent occurrence at many places. The plant also shows no occurrence on the top of sand dunes Habitat as well as on hilly Habitat. As far as the field study is concern it shows that rare distribution at Kharkhara, Bilwa and Rasulpur localities. It shows again rare occurrence in riverine and aquatic Habitat of the area under study. It shows frequent phytogeographic pattern of

spatial distribution at Mansamata and Dadafatehpura localities (rocky and stony Habitat).

PHYTO-CHEMICAL (MEDICINAL) USES

The plant has some significant Phyto-chemical applied aspect in the cure of some disease viz; in asthma, in bronchitis, in cough, normal fever, pneumonia, orthodox as a native medicine.

PHYTO-CHEMICAL ANALYSIS OF PARTS AND PORTION

The plant's phyto-chemicals are also studied by Kanwal et al. In 1983 on seasonal variation of alkaloids.

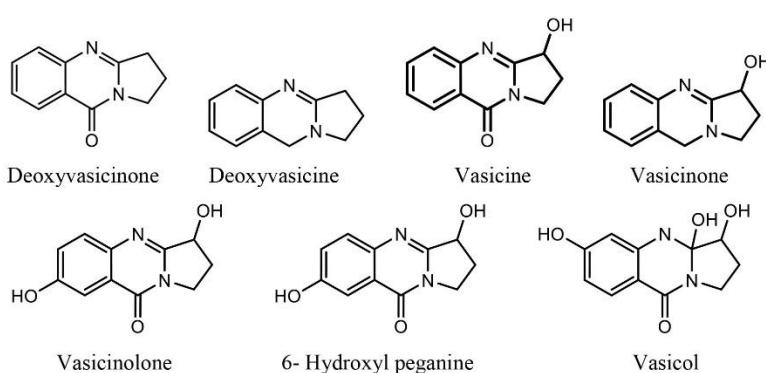


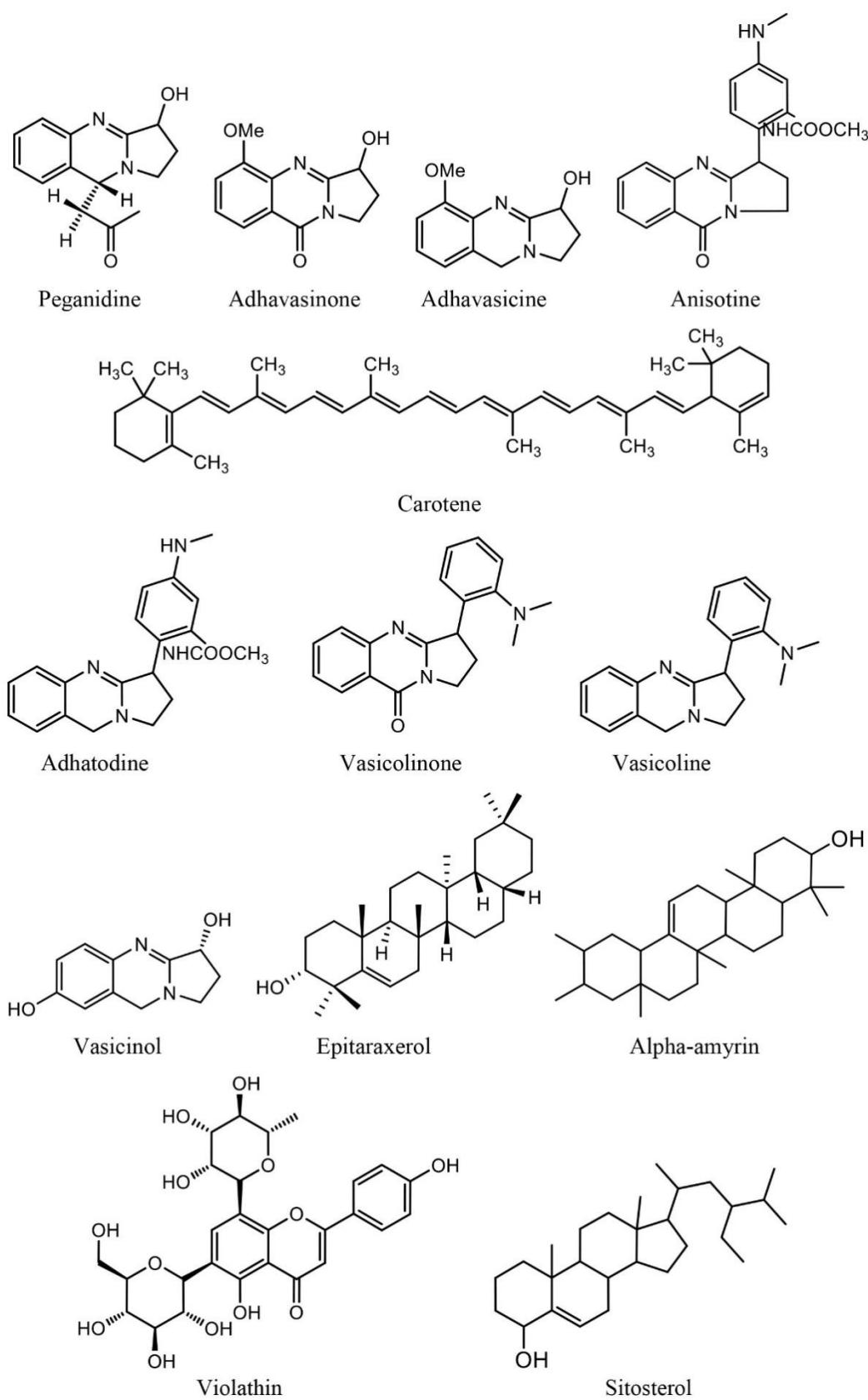
Plate : *Adhatoda vasica* Leaves

The chemical compounds found in *Adhatoda vasica* plant includes essential oils, betaine, steroids and alkanes. The leaves contain two major alkaloids called vasicine and vasicinone. The pharmacological activities of vasicine and vasicinone are well known. Recent investigations on vasicine showed bronchodilatory activity comparable to theophylline, both in vitro and in vivo. Both the alkaloids in combination showed pronounced bronchodilatory activity. Vasicine also exhibits strong respiratory stimulant activity. There has also been a report of thrombopoetic⁴ (platelet increasing) activity with vasicine. Uterine stimulant activity and moderate hypotensive activity of the alkaloidshave been observed. Vasicine is metabolized to vasicinone and analysis of plant leaf extract showed that it contained 0.85 percent vasicine and 0.027 percent vasicinone. Sitosterol, β -glucoside-galactose and deoxyvasicine have been isolated from the roots of the plant. 2'-4- dihydroxychalcone- 4-glucoside has also been recognized in the flowers. A new triterpenoid, 3 -hydroxy-D-friedoolean-5-

ene, along with the known compounds, epitaraxerol and peganidine have been isolated from the aerial parts of *Adhatoda vasica*. The leaves also contain a very small amount of an essential oil and a crystalline acid. An analysis published in India in 1956 showed the seeds as containing 25.8 percent of deep yellow oil composed of glycerides of arachidic 3.1 percent, be- henic 11.2 percent, lignoceric 10.7 percent, cerotic 5 percent, oleic 49.9 percent and linoleic acids 12.3 percent and β -sitosterol (2:6 percent). Elemental analysis using atomic absorption spectrophotometry revealed the presence of major elements in *Adhatoda vasica*.

Adhatoda vasica mainly consists of alkaloids containing pyrroquinazoline ring derivatives like vasicine, vasicol, vasicinone along with other miner constituents. Vasicine is a major bioactive alkaloid of vasica which contain pyrroquinazoline ring



**Fig.-1: Structure of Major Chemical Constituents of *Adhatoda vasica* Nees**

RESULTS AND DISCUSSION

Adhatoda vasica has also been reported that 70 percent of the pregnant women use the leaves of plant to induce abortion. Further, the extracts have been found to be quite effective against tuberculosis. Various parts of the plant have been used in Indian traditional medicine for the treatment of asthma, joint pain, lumber pain, sprains, cold, cough, eczema, malaria, rheumatism, swelling and venereal diseases.

It has been revealed from the literature that the quinazoline based alkaloids have been the major constituents present in the different parts of *Adhatoda vasica*, which have been mainly responsible for their wide range of pharmacological potential. *Adhatoda vasica* has been an important medicinal herb well known for its applications in different old medicinal system like as Ayurveda, Siddha and Unani etc. *Adhatoda vasica* also showed many pharmacological activities Viz. hepatoprotective, antiulcer, abortifacient, antiviral, anti-inflammatory, thrombolytic, antibacterial, antifungal, radiomodulation, hypoglycaemic, antitubercular, antioxidant and antitussive. Owing to its wide range of biological activities it may act as an important source for the discovery of new and potent drug molecules.

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