

# The Analytic Aspect of Phyto-Chemicals of *Capparis decidua* Medicinal Plant of Khetri Region, Rajasthan

DR. MUKESH KUMAR SHARMA 'BHATT'

**Abstract - The area under study i.e. Khetri Region is located in South-eastern part of Jhunjhunu district, Rajasthan state with its geographical extension in between 27° 40' 24" to 28° 17' 12" N latitude and 75° 39' 59" to 76° 12' 59" E longitude. 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.**

## I RESEARCH AREA

All these rivers fall under the pattern of the total area under internal drainage system of the district. 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.

## II. 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 20<sup>th</sup> 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 lebbek* (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 its 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 multipurpose 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.

## III 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.

#### IV 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.

#### V 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.

#### VI INTRODUCTION AND MORPHOLOGY

The plant species belongs to the family-Capparaceae and it is a much branched straggling, glabrous shrub. It is leafless, except in young shoots only and these fall down at very early stage, other-wise most of the year it remains leafless. The twigs are smooth, green with nearly straight paired spines which serve as organ of defence and also reduced the rate of transpiration. Generally, it is observed in the form of shrub of 1 to 2.5 m. height but some times it attained the form and shape of a medium sized tree when protected properly. It is the tree which have efficiency also to grow on very deep soils on the gravel plains and may attain the full growth in the areas of good rainfall and moisture holding soils. In arid zone Khetri Region above 80 percent of the total plants are observed as in the form-shrub but below 20 percent are found as in the stage of tree in different Habitats where it reached to height from 3 to 10 m. or above.

Plant belongs to the class of 'leafless and spiny as well as thorny' under the xerophytic categorisation for the flora of desert, and also from leaf-classes point of view. Due to more shrubby by nature it falls under the group of 'nanophanerophyte' but sometimes it comes under the group of 'micro-phanerophytes' when it attained the size as well as shape of a tree flowering and fruiting - both take place in the period of March to June months. The rhythm of flowering and fruiting of the species is biannual, i.e. first flowering period remains from April to May followed by first fruiting period from May to June where as second flowering period runs from September to October which is followed by the second fruiting period from October to November. The unripe raw fruit's are green but the ripe matured fruit's are known as berry and locally called 'dhallu' usually brick red or pinkish red in colour, by shape and it's average size lies in between .7 to 1.5 cm. in diameter (Plate).



Plate : Capparis decidua Tree

The observations over the study sites scattered throughout the arid and semi-arid area of Khetri Region in different Habitats which show the nature of it's distribution. This is one of the most common plant as found throughout the area under study. Thus, by nature of it's plant growth as well as for survival the shrub species is characterised by 'polyclimax' tendency of succession. Due to it's strong drought resistant character it's development coincides in most of the Habitats with the prevailing desertic conditions. The plant species generally (about 80 percent) is observed at the stage of shrub (below 3 m) but at some places it reaches to the height as well as in the form of a tree (above 3 m). It is also observed that *Capparis decidua* as a tree found on very deep soils on the alluvial plains and may attains a full growth on the areas of good rainfall and moisture holding soils.

Altitudinally, the plant is found between 150 to 500 m MSL in Khetri Region. It's occurrence is divided mainly into three physiographic formations :

1. Gravel and compact soil sandy plains which cover about 76 percent of the distribution.
2. Small isolated undulating hilly patches surrounded by the above mentioned physiographic formation which occupy approximately 17 percent area.
3. Seasonal depressions, gullies, rivulets, and natural water tanks which cover approximately 7 percent area of the total.

The area under study has about 80 percent plants in the form of shrubs whereas 20 percent in the form of trees. The shrub shows common occurrence at Rasulpur (sandy plains Habitat). It shows frequent occurrence in sand dunes Habitat of Khetri Region. In stony and rocky Habitat it shows rare to frequent occurrence but it is observed again common at Dadafatehpura it again shows rare to frequent pattern phytogeographic distribution. The trees community shows no occurrence on the top of sand dunes as well as hilly areas of the area under study.



Plate : Capparis decidua Fruits

## VII PHYTO-CHEMICAL (MEDICINAL) USES

It is a Phyto-chemical shrub species and therefore out of five it covers four categories of applications or rather to say uses, which are; fuel, medicinal, edible, and commercial. But we are here concerned with medicinal uses or Phyto-chemical aspect of this plant species.

At the name of medicinal uses for the cure of diseases, the caper buds as well as the fruit's are considered useful in scurvy. It is an evergreen shrub, low trailing or prostrate in habit with close heavy foliage flowers are white in colour. The flower buds are pickled and sold as capers. The bark and root of this plant is slightly bitter and tart.

It's wood is tough but light, bitter in taste hence not eaten even by the white ants. So it's tender shoots give relief from toothache and protect from pyorea disease. It's one of the most useful character is that unripe but dried raw green fruit's from the plant are consumed against increasing fats and flesh in body, thus it is treated as anti-doses to control and avoid the unwanted increasing flesh and weight of human body. Hence, it is said to the protective against rheumatism. The bruised leaves are used as a poultice in gout. The bark and root of this plant is slightly bitter and tart. It is aperitive, diuretic, resolvent and tonic. It facilitates digestion, and stimulates appetite. It is used in medicine as a refrigerant and an tisorbutic.

For treatment of rheumatism, paralysis, toothache, and affection of liver and spleen and tubercular glands. It is used capers are used for flavouring pickles sauce, salads and other cooked food.

## VIII PHYTO-CHEMICAL ANALYSIS OF APPLIED PART AND PORTION

The flowers contain a glycoside and rutin. Flower buds rutilic acid, pectic acid, a volatile emetic constituent and saponin. The seeds yield 30 – 35 percent pale yellow oil. The root bark contains rutilic acid and a volatile substance.

All parts of the plant are used in traditional medicine for a variety of purposes in the regions where it grows. The fruits of the plant are astringent and useful in cardiac troubles and biliousness. The blanched fruits have a significant hypocholesteraemic effect on the serum and liver cholesterol. The root bark is alexiteric, anthelmintic and useful in cough, asthma and inflammations. Its aqueous extract possesses purgative activity. This genus is also known to be a rich source of flavonoids, alkaloids, glucosinolates.

Fruits of *Capparis moonii* contain L-stachydrine, rutin and  $\beta$ -sitosterol. The aqueous extract of the rind of the immature fruits contains a chestnut-red pigment, hajiacyan, which is used as an anti-trachoma drug. The fruits are also used in weakness and cough.

*Capparis spinosa* contains  $\alpha$ - and  $\beta$ -amyrin, taraxasterol, erythrodiol, betulin and  $\beta$ -sitosterol. The presence of amino acids and phenolic acids has also been reported in this specie. The plant is credited with antipyretic and antiseptic property, and is useful in skin-diseases. The juice of inner bark of the root is used in scabies and eczema.

The ripe fruits of *Capparis micracantha* have a sweet aromatic flavour and are edible.

## IX RESULTS AND DISCUSSION

A survey of literature reveals that very little work has been done on chemical constituents of *Capparis decidua* fruit. Therefore, the present study was aimed at isolating and identifying various chemical components present in the fruit of this plant.

Compound A (14-hydroxytetradec-12-enylbutanoate, 1) was crystallized from petroleum ether. The TLC plate on spraying with 10%  $H_2SO_4$  followed by heating to 110°C exhibited yellow spot. The IR spectrum of the compound showed peaks at 3318  $cm^{-1}$  and 1746  $cm^{-1}$  indicating the presence of -OH group and ester linkage. . On

the basis of mass spectral data following structure is assigned to the compound 14-hydroxytetradec-12-enylbutanoate. It is a hitherto unknown compound.

## REFERENCES

- [1] Anonymous (1991) Nature and Extent of Biodiversity in Arid and Semi arid Region of India.-CAZRI Jodhpur.
- [2] Bachketi, N.D. (1984) Social Forestry in India, Problems and prospects, Published by Birla Institute of Scientific Research, New Delhi.
- [3] Bhandari M.M. (1990) Flora of the Indian Desert (Revised) MPS Report Jodhpur.
- [4] Cain, S.A. and Castro, G.M.de O.(1959) Manual of vegetation Analysis. Arper and Row, U.S.A.
- [5] Charan, A. K. (1992) Plant Geography, Rawat Publication, Jaipur
- [6] Clements, F.E. (1916) Plants succession - An analysis of the development of vegetation. Washington, D.C.
- [7] Eyre, S.R. (1963) Vegetation and soils : A world Picture, Ed ward Arhold.
- [8] Hills, E.S. (1966) (ed.), Arid Lands, UNESCO and Methuen.
- [9] Hooker, J.D. (1906) A Sketch of the flora of British India, London.
- [10] Krebs, C.J. (1978) Ecology - The Experimental Analysis of distribution and abundance. Harper and Raw.
- [11] Levin, D.A. (1979) The nature of plant species, Sci 204. 381-4.
- [12] Linneaus S.C. (1753) Species Plantarum.
- [13] Sharma, M.K. (2007) Medical Plant Geography, Rachana Publications, Jaipur.
- [14] Polunin, (1967) Introducing of Plant Geography and some related Science. London.
- [15] Rathore, N.S. (1992) Application of Remote Sensing in Forest Cover Mapping of North Aravalli's Mountains Ranges. XIV-Indian Geography Congress, Jaipur, Abstract Publication, pp. - 31.
- [16] Raunkiaer, C. (1934) The Life-forms of the plant and statistical plant geography. Clarendon Press. Oxford.
- [17] Robinson, H. (1978) Biogeography. MacDonald and Evan,London.
- [18] Viemeyer, N.D. (1986) Lesser-known Plant of Potential use in Agricultural and Forestry Sci., 232, 1379-84.
- [19] Wegner, P.L. (1965) Vegetation and Soils. Mc Graw Hill, New York.