International Journal of Geology, Agriculture and Environmental Sciences
Volume – 8 Issue – 1 January - December 2020
Website: www.woarjournals.org/IJGAES *ISSN: 2348-0254*

The Analytic Aspect of Phyto-Chemicals of *Asparagus racemosus* Medicinal Plant of Khetri Region, Rajasthan

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Abstract: ***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° 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.***

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.

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 lebbeek* (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-Liliaceae. It is a perennial foliage plant, it is an extensively scandent, much branched under shrub with spines. It's roots are tuberous and many in numbers. In nature, mostly it is observed as herb but at favourable Habitat conditions - the plant may be observed as "under-shrub" stage from vegetational group point of view. From leaf-class classification point of view, the plant belongs to the "nanophylls" leaf-class. From xerophytic categorization point of view- the plant falls under the category of "spiny and thorny". It bears white flowers, it's fruit's are as globose berry and show red colour when ripe. The plants have their propagation by seeds. The flowers are very fragrant. The parienth lobes are white but change to copper tinge at length. Anthers are red (Plates).

Plate : Asparagus racemosus Plant

The plant in nature mostly occurs on stony and rocky Habitat i.e. in hilly patches of Khetri Region, which is it's favourable Habitat. The plant bears climatic limitation of rainfall condition inbetween 30 cm. to 100 cm. average annual rainfall amount but from temperatures variation it experiences 10^{o}C mean monthly maximum, respectively. The plant generally favours shades Habitat, in other words to say in open places it is not observed but it shows it's occurrence in the shades of some shrubs on stony and rocky Habitat like- *Euphorbias*, *Rhus coriara* etc. Thus, it prefers somewhat comparatively more moist vegetation cover, in other words to say it avoids direct bright sun-shine insdation. The plant use to disappear from the surface when the relative humidity falls below 30 percent in atmosphere. The plant also prefer sandy-loam soil Habitat and it requires sunny position in initial stage fruit's growth; after full development it requires shade conditions.

The plant shows rare distribution in the Habitats specially - stony and rocky areas, and riverine and aquatic areas. It is very interesting that in Khetri Region the plant shows through frequent phytogeographic pattern of spatial distribution in two Habitats, specially sand dunes areas, and sandy plains areas. It has rare or no occurrence with in human settlements of the area under study.

PHYTO-CHEMICAL (MEDICINAL) USES

The dried roots about 700 gm. are burnt and fumes are inhaled under a blanket for curing in normal fever. In brief, the plant is reported as tonic, swellings, loss in strength and vigour.

Asparagus racemosus is a very common and popular herbal drug prevailing from centuries back and prescribed by the vedh's as a traditional medicine. It is used with several combination but primarily for the treatment of sexual impotency and general debility. It is very nutritive and good health tonic with cooling and soothing effects on body. They also use it for the promotion of urination. Some of them also indicated about it's possible role in the treatment of epilepsy.

PHYTO-CHEMICAL ANALYSIS OF APPLIED PARTS AND PORTION

Dried fleshy roots are the applied parts and portion of the particular perennial herb species. Spindle shaped structures, 5

to 15 cm., thick, cream yellow externally but white internally with longitudinal wrinkles, without any smell. From phyto-chemicals point of view- the biologically active chemicals reported are the saponins- shatavarin I,II,III and IV; the steroids and sitosterol; rich amount of engymes amylase and lipase, some glycosoides and sapogenins are also traced out from this plant. Inamdar and Mahabale in 1980 presented phyto-chemicals comparative study between Shatawar and *Asparagus species*.

Plate : Asparagus racemosus Root

Asparagus racemosus (Shatvari) is known to possess a wide range of phytochemical constituents which are mentioned below. Some of the structures have been drawn in (Figure).

1. Steroidal saponins, known as shatvarins. Shatvarin I to VI are present. Shatvarin-I is the major glycoside with 3-glucose and rhamnose moieties attached to sarsapogenin;

2. Oligospirostanoside referred to as Immunoside;

3. Polycyclic alkaloid-Aspargamine A, a cage type pyrrolizidine alkaloid;

4. Cyclic hydrocarbon-racemosol, dihydrophenantherene;

5. Carbohydrates-Polysacharides, mucilage;

6. Sterols-Roots also contain sitosterol, 4, 6-dihydryxy-2-O (-2-hydroxy isobutyl) benzaldehyde and undecanyl cetanoate;

7. Miscellaneous-Essential fatty acids-Gamma linoleinic acids, vitamin A, diosgenin, quercetin 3-glucourbnides. Some chemical structures are given in Figure 1.

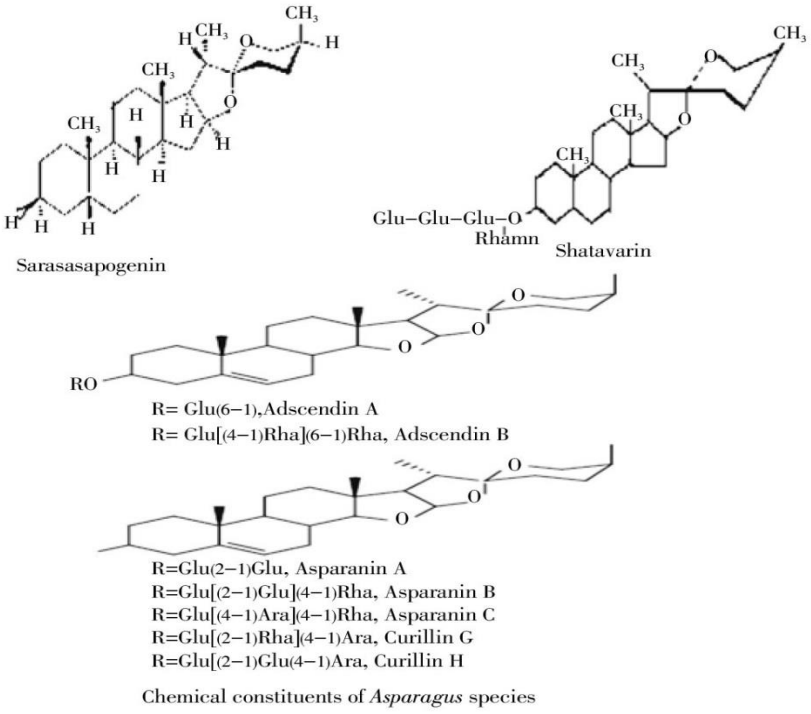

Fig. 1. Photochemical Constituents Structures.

RESULTS AND DISCUSSION

Numerous studies have been conducted on *Asparagus racemosus*, it has developed as a drug by pharmaceutical industries. In Ayurveda, it is knoen as female tonic and also it is a rejuvenating herb. *Asparagus racemosus* is beneficial in female infertility, as it increases libido, cures inflammation of sexual organs and even moistens dry tissues of the sexual organs, enhances folliculogenesis and ovulation, prepares womb for conception, prevents miscarriages, acts as post partum tonic by increasing lactation, normalizing uterus and changing hormones. It is also used in leucorrhoea and menorrhagia.

In Ayurveda, *Asparagus racemosus* is known as the herbal-queen because it has a strong rejuvenating, nurturing and stabilizing effect on excessive air, gas, dryness and agitation in body and mind.

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