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The Scinerio of BARLERIA PRIONITIS Used as Herbal Medicine for Treatment of Many Diseases

Dr. Indrani Bhattacharya[1], Pathan Fizanahmed Bismillakhan[2], Shreya Vora[3]

[1]Assistant Professor, Parul Institute of Applied Sciences, Parul University, Vadodara, Gujarat.
[2]Student, Parul Institute of Applied Sciences, Parul University, Vadodara, Gujarat.
[3]Assistant Professor, Parul Institute of Applied Sciences, Parul University, Vadodara, Gujarat .

ABSTRACT:- Barleria prionitis is a species of plant in the family Acanthaceae. It is also known as Porcupine flower, Vajradanti is an erect, bushy, prickly undershrub exteding up to 0.6-1.5 m high and found throughout hotter parts of the country and also cultivated as a hedge plant. Barleria Prionitis is also used for different medicinal purposes in ayurveda. The diverse parts of Barleria prionitis it is are widely used to heal diseases by different ethnic communities. The whole plant or its parts like leaf, root, stem, bark and flower has been widely utilized for the cure of , whooping cough, catarrhal affections, swellings, inflammations, glandular swellings, toothache, urinary infection, fever, gastrointestinal infections, diuretic and also in the treatment of dental infections. Extracts and isolated phytochemicals from this plant have been found to posses wide range of pharmacological include antimicrobial, anthelmintic, antidiarrhoeal, antifertility, antioxidant, anti-inflammatory, antidiabetic, anti-arthritic, cytoprotective, hepatoprotective, diuretic, enzyme inhibitory and anti-nociceptive activities without any toxic effects. This review summarizes the current knowledge of the Barleria prionitis with a complete insight, mostly focusing on their traditional, ethanobotanical properties, pharmacognostic, phytochemical and pharmacological activity. The solvent extract appeared antimicrobial activity against all the clinically isolated microorganisms.

Keywords:- Barleria prionitis, solvent extract, phytochemical compounds, ethano medicine, pharmacological activity.

INTRODUCTION:-

Majority of population in developing world is competing to rise living standard and improvement of health care delivery required to increasing poverty and population. According to appropriate estimate, 75-80% of rising world is dependent on regular plants obtained remedies as pharmaceuticals are very high priced. From this actuality, it can be recovered that by data assembling and investigation, valuable plus economical medicaments can be divided from different flora to satisfy requirements of evolving world. Hence requirements of precise plants cannot be forgeted.

Medicinal plants are used worldwide in management of healthcare problems since ancient time and estimated 60-80% of the world's population still depending on the traditional medicines (Dey et al.,2009; Ansari and Inamdar,2010; Shafaei et al.,2011; Menghani et al.,2011; Ramachandran et al.,2011; Chandrashekhar and Kumar,2011).

Presently, the global demand of herbal medicines is increasing rapidly because of their higher safety margin and low cost (Muayimi et al., 2008). Medicinal plants are trusted to be a probable source for the searching of new drug candidates (Mohajer et al.,2006; Dev et al.,2010; Roy and Banerjee,2010; Kyode and Kayode,2011).Numbers of active compound classes like alkaloids, terpenes, flavonoids, glycosides, lignans, phenolics, saponins etc has been used in the present system of medicines for their wide therapeutic pursuits.(Saadabi et al.,2006; Mukherjee et al.,2009; Sohail et al.,2011; Agrawal et al., 2011; Gantait et al., 2011).

Barleria prionitis is grown as an ornamental and medicinal plant in Asia. It is an erect, pricky, bushy, undershrub reaching up to 0.6-1.5 m high and found throughout hotter parts of the country and also cultivated as a fence plant. It is used for different medicinal purposes in ayurvedic medicine. Barleria prionitis is frequently the host to larvae of the Phalanta phalantha and Junonia lemonias butterflies. Barleria prionitis leaves are known to contain 6-Hydroxyflavone, one of the chemical compounds that is a noncompetitive inhibitor of the protein cytochrome P450 2C9. Barleria prionitis also known as the porcupine flower, which belongs to the family Acanthaceae and genus Barleria. It is well known for its medicinal values due to the existence of valuable Alkaloids, Phenols, Terpenoids, Tannins, Quinones, Cardiac glycosides, Saponins, Carbohydrates, flavonoids and Proteins. Diverse medicinal properties have been assigned to natural herbs.

Distribution:-

It is often found in tropical Asia include India, Malesia, Pakistan, Philippines, Sri Lanka and in tropical Africa and Yemen. This plant is dispersed throughout the hotter parts of India and commonly grown in gardens as a hedge plant(Khare, 2007; Shendage and Yadav, 2010). It is commonly found in the states of India include Andaman and Nicobar Islands, Assam, Bihar, Chhattisgarh, Andhra Pradesh, Delhi, Diu and Daman, Goa, Gujarat, Karnataka, Kerala, Laccadive and Maldiv Islands, Madhya Pradesh, Maharashtra, Orissa, Pudhucherry, Tamil Nadu, Rajasthan, Uttar Pradesh , Uttarakhand and West Bengal (Shendage and Yadav,et al., 2010).

PHARMACOLOGICAL ACTIVITY

Antibacterial activity: It has been announced that different solvent (ether, ethanol and chloroform) extracts of B. prionitis leaves and callus be seen antibacterial activity against numbers of gram positive bacterial isolates while no or slight inhibitions were noticed against the aqueous extracts. Among these extracts, the ether extract be seen powerful antibacterial activity (Shukla et al.,2011).few antibacterial phytochemicals include balarenone, pipataline and 13, 14-seco-stigmasta-5, 14-diene-3-a-ol have been isolated from the ethanolic extract of B. prionitis and these compounds be seen strong antibacterial activity against Bacillus cereus and Pseudomonas aeruginosa (Kosmulalage et al.,2007) .It was reported that the different solvent extracts of barks, leaves and stems showed indication antibacterial activity against oral pathogens Streptococcus mutans, Staphylococcus aureus, Pseudomonas aeruginosa and Bacillus cereus causing dental caries(Aneja et al.,2010). Among the extracts, the methanolic bark extract showed more potent inhibitory activity against all the oral pathogenic bacteria (Aneja et al.,2010). The antimicrobial activity of B. prionitis may be due to the existence of acetylbarlerin, barlerin, shanzhiside methyl ester, verbascoside, balarenone, pipataline, 13, 14-seco-stigmasta-5, 14-diene-3-a-ol and 6-O-acetyl shanzhiside methyl ester (Kosmulalage et al., 2007;Aneja et al.,2010)

Antifungal activity: The methanol, ethanol and acetone extracts of B. prionitis bark be seen antifungal activity against oral pathogenic fungus Saccharomyces cerevisiae and two strains of Candida albicans. Among the extracts, methanolic extract was more potent against all the fungal isolates(Aneja et al.,2010). Amoo et al.(2011)announced that the petroleum ether, dichloromethane and ethanol extract of stem and root be seen fungistatic and fungicidal activities against C. albicans.

Antiviral activity: Chen et al.(1998) isolated two iridoid glycosides viz. 6-O-trans-p-coumaroyl-8-O-acetylshanzhiside methyl ester and its cis isomer from B. prionitis. In vitro study be seen that these two glycosides have potent antiviral activity against Respiratory Syncytial Virus (RSV) with EC_{50} and IC_{50} values of 2.46 and 42.2 $\mu g\ mL^{-1}$, respectively (Chen et al., 1998).

Anthelmintic activity: The whole plant extract of B. prionitis was reported have anthelmintic activity (Chavan et al., 2010a). In vitro study showed that aqueous and ethanolic extracts were significantly paralyzed the Pheretima posthuma worms at lower doses (50, 75 and 100 mg mL^{-1}) and caused death over 100 mg mL^{-1} dose concentration in compare to standard drug albendazole (Chavan et al.,2010b).

Antifertility activity: The antifertility activity of B. prionitis roots was reported by Gupta et al.,(2000). Oral direction of methanolic root extract (100 mg/rat/day) reduced the spermatogenesis in male albino rats (Gupta et al.,2000; Verma et a.,2005). It was observed that the root extract decreased the production of round spermatids, sperm motility, spermatogonia, preleptotene spermatocytes population and mature leydig cells. Biochemical inspection revealed that the root extract was also reduced the total protein, glycogen, sialic acid contents of the testes, testicular glycogen contents, epididymides, ventral prostate and seminal vesicle(Gupta et al.,2000; Verma et al.,2005).The antifertility effect of root extract may be due to the existence of iridoid glycosides barlerin and acetyl barlerin via affecting the functions of testicular somatic cells(Gupta et al.,2000).

Antioxidant activity: The whole plant extract of B. prionitis was announced to show potent antioxidant activity (Chetan et al.,2011). In vitro study showed that the ethanol and aqueous extracts of whole plant posses notable antioxidant activity against 1, 1-diphenyl-2-picrylhydrazyl (DPPH), 2, 2'-azino-bis (3-ethylbenzothiazoline-6-sulphonic acid (ABTS), nitric oxide and hydroxyl radical scavenging assay and Fe^{3+} reduction assay (Chetan et al.,2011). In compare to antioxidant potency, the ethanol extract was more potent than aqueous extract and its antioxidant vigour showed sharp co-relation with the phenolic content of the extract (Chetan et al., 2011). Amoo et al.,(2011) reported that the methanolic extract of roots, leaves and stems showed significant antioxidant property. It was observed that the leaves showed higher degree antioxidant potential and high phenolic content in comparison to flower and stem (Jaiswal et al., 2010a). Some glycosides have been isolated from the aerial

parts of B. prionitis namely barlerinoside, shanzhiside methyl ester, 6-O-trans-p-coumaroyl-8-O-acetylshanzhiside methyl ester, barlerin, acetylbarlerin, 7-methoxydiderroside and lupulinoside showed antioxidant activity. Among the isolated glycosides, only barlerinoside showed higher possiblel of antioxidant property with an IC_{50} value of 0.41 mg mL^{-1} (Ata et al.,2009).

Antidiabetic activity: Dheer and Bhatnagar (2010) disclosed that the alcoholic extract of B. prionitis leaves showed antidiabetic activity. Oral administration of alcoholic extract at dose concentration 200 mg kg^{-1} body weight significantly decreased the blood glucose, glycosylated hemoglobin level and increased serum insulin and liver glycogen level in diabetic rats. The extract also seize the diabetes mediated weight loss (Dheer and Bhatnagar,2010).

MATERIALS AND METHODS

Sample collection

Plants belonging to acanthaceae family like Neelagirianthasis Sp, Adathoda beddomie, Justeceae gendurusa, Neelagirianthasis hemitomie, Barleria prionitis, Adathoda zylanica and Hemigraphis corolata were collected from FRLHT, Yelhanka, Bangalore in sterile bags and transported to the laboratory for further study on Phytochemical analysis and antimicrobial activity against some bacteria.

Solvent extraction

Leaves were air dried completely under shade. After entire air drying leaves were ground to fine powder and stored at room temperature.1gm of each sample powder was added to 25ml of solvent and kept for 48hrs with slight shaking. After 48hrs, extract were filtered by using whattmann no1 filter paper to get filtrate as extracts and were stored until more distant use.

PHYTOCHEMICAL ANALYSIS

QUALITATIVE ASSAY

Following standard protocols were used for qualitative analysis of samples to check for presence of Alkaloids, Carbohydrates, cardiac glycosides, Flavonoids, Phenols, Saponins, Tannins, Terpenoids, Quinones and proteins.

Test for Quinones

To check the presence of quinones 1ml of extract added to concentrated Hydrochloric Acid. The Formation of yellow precipitate or Coloration indicates the existence of Quinones in the Extract. Otherwise indicates non existence of Quinones in the given extract.

Test for Cardiac Glycosides

1 ml of each extract was added to 0.5ml of glacial acetic acid and 3 drops of 1% aqueous ferric chloride solution. The Formation of brown ring at the interface indicates the presence of cardiac glycosides in sample.

Test for Terpenoids

1ml of extract of each solvent was taken with 0.5 ml of chloroform followed by a few drops of concentrated sulphuric acid. Formation of reddish brown precipitate indicates the presence of terpenoids in the extract.

Test for Phenols

To 2 ml of each extract, 2ml of 5% aqueous ferric chloride were added. Formation of blue colour indicates the presence of Phenols in the extract.

QANTITATIVE ASSAY

Depending on above qualitative results the quantitative assay is carried out for Alkaloids, Tannins, phenols, Terpenoids, Cardiac glycosides,Quinones,Proteins and Carbohydrates.

Total Tannins Content Determination

The tannins were determined by slightly modified Folin and Ciocalteu method. Briefly, 0.5 ml of sample extract is added with 3.75 ml of distilled water and adds 0.25 ml of Folin Phenol reagent, 0.5 ml of 35%sodium carbonate solution. The absorbance was measured at 725 nm. Tannic acid dilutions (0 to 0.5mg/ml) were used as standard solutions. The results of tannins are expressed in terms of tannic acid in mg/ml of extract.

Total phenol content Determination

The phenols were determined by slightly modified Folin and Ciocalteu method. Shortly, to the 200µl of the sample extract +800 µl of F. c reagent mixture add 2ml of 7.5% sodium carbonate then dilute the total content to 7 volumes with distilled water finally keep the tubes for 2hrs incubation in dark. The absorbance was measured at 765 nm. Gallic acid dilutions (0 to 0.5mg/ml) were used as standard solutions. The results of phenols are designated in terms of gallic acid in mg/ml of extract.

ANTIMICROBIAL ASSAY

An antimicrobial or antibiotic agent is a substance/chemical that kills microorganisms or inhibits their growth. Antimicrobial medicines can be grouped according to the microorganisms they act primarily be against. For example, antibacterial agents are used against bacteria and anti-fungal are used against fungi. They can also be classed according to their function. Antimicrobials that kill microbes are called microbiocidal; those that merely inhibit their growth are called micro biostatic. The antimicrobial assay was performed by agar disc diffusion method (Bauer et al., 1966). The molten Mueller Hinton Agar was prepared and poured into the sterile Petri plates.

Target microorganisms

Antimicrobial activity is performed against three different organisms namely E.coli, Staphylococcus aureus and Pseudomonas species which were isolated from clinical samples collected from pathology labs.

Agar well diffusion method

The antimicrobial activity of the Phytochemical Extracts was determined by using the Agar Well Diffusion technique. Nutrient agar plates were each seeded with 0.5 ml of an overnight culture of each bacterial strain. The 24 hrs broth culture (0.1ml) of each bacterium was inoculated onto Mullher Hinton agar plates by spread plate technique and well made by sterile cork borer and 80 µl (0.05 ml) solution of concentrated. Plants extracts was added in to each well. (Mukesh Chandra Sharma and Smita Sharma, 2010, Borah et al., 2013).

CONCLUSION

Barleria Prionitis have antimicrobial, anticancer, Antinociceptive-activity, cytotoxicity-activity,anti-arthritis activity and most of the plant in this family can be used for the different diseases. Thus plants are ethnobeneficial for all the purposes and that is why research industries and all people are focusing on this family for extraction of good phytochemcial components and we can analyze phytochemical components and we can valuable novel drug from it which can be cost effective in comparison to chemical formulated drug.

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