ETHANOBOTANICAL RELEVANCY OF HIBISCUS SABDARIFFA IN PRESENT CONTEXT

Hosita Gupta
Assistant Professor Botany
Botany Department
Indira Gandhi Government Postgraduate College Bangarmau, Unnao, India.

Abstract: Hibiscus sabdariffa commonly known as red sorrel or Roselle belongs to family Malvaceae. The plant considered to be originated in West Africa or India. It is a medicinal plant famous worldwide with about 300 species distributed in tropical and sub-tropical regions of the world. It has ethno botanical importance, an infusion from the calyces being used as a diuretic and to treat gastro-intestinal disorders, liver diseases, fever, hypercholesterolemia and hypertension. In India traditionally used as antiseptic,astringent,cholagogue,demulcent,digestive,diuretic,emollient,purgative,refrigerant,sedative,stomachic and tonic. Phytoconstituents responsible for its medicinal value includes polyphenolic acids, flavonoids, anthocyanins, tannins & protocatechuic acid. Hibiscus sabdariffa is consumed as a beverage in the United States, Mexico, Nigeria & other West African countries, Egypt, Iran, India, Thailand and Taiwan. The Bedouins in the north Badia region of Jordan use the leaves as well as the flowers and they drink the infusions when treating high blood pressure and cold when treating low blood pressure. An over dose of the hibiscus sabdariffa has as adverse effect on the liver. Thus Hibiscus sabdariffa ,an ornamental plant possess pharmacognastic values relevant in present context also.

INDEX TERMS: Roselle,ethanobotanical, cholagogue ,protocatechuic acid,flavonoids.

LITERATURE REVIEW

An annual herbaceous shrub cultivated for its flowers ,although leaves and seeds have also been used in traditipnal medicine.The calyces are used as a refrigerant in the form of tea,to make jams and jellies.Famous by different names :roselle,sorrel,guinea sorrel,sour-sour,queensland jelly plant,jelly okra,lemon bush,florida cranberry,karkade ,zobo,lal patwa.The plant contain proteins ,fats ,carbohydrates ,flavonoids(HIBICETINE & SADERETINE) ,acids ,minerals (phosphorus,magnesium ,calcium) and vitamins. It has antihypertensive,hepatoprotective ,antihyperlipidemic,anticancer and antioxidant properties .Seed oil is rich in unsaturated fatty acids ,steroids and tocopherols . Also contain Nitrogen,fatty oil,cellulose,pentosans and starch. Hibiscus sabdariffa fruit extracts investigated for antinociceptive and CNS depressant activity. Plant infusion modulates oxidative stress in patients with marfan syndrome. Plant extract inhibits the development of atherosclerosis in cholesterol fed rabbits .Thus the extract can lower the levels of tryglycerides,lipoproteins,cholesterol.Results showed that Hibiscus sabdariffa decreased the systolic and diastolic blood pressure.This review paper dealt with Hibiscus sabdariffa's ethanobotanical importance as well as its relevancy in the present context and also hope for further research to be made.The paper discussed under sub-sections ;1)Ethanobotany,2)Phytochemistry,3)Pharmacology,4)Toxicity . Finally the text is concluded by the fact that Hibiscus sabdariffa possess several medicinal values due its Phytoconstituents . The researches were made on the basis of ethanobotanical study.

INTRODUCTION

Hibiscus sabdariffa belonging to Family MALVACEAE commonly known as Roselle ,an important ornamental and medicinal plant native to west Africa and India . The plant is an annual, erect, herbaceous sub-shrub with a deep root system. Leaves alternate, 7.5 - 12.5 cm long, green with reddish veins and long /short petioles. Leaves of young seedlings and upper leaves of older plants are simple, lower leaves are deeply 3 to 5 or 7 –lobed and the margins are toothed. Flowers borne singly in the leaf axil are upto 12.5 cm wide, yellow or buff with a rose or maroon eye and turn pink as they wither at the end of the day. The typically red calyx ,5 large sepals with epicalyx of 8-12 slim pointed bracteoles. Fruit velvety capsule 1.25-2 cm long, which is green when immature ,5-valved each with 3-4 seeds. Seeds are kidney shaped light brown, 3-5 mm long and covered with minute, stout ,stellate hairs. Flowers bisexual ,entomophilous.A no. of compounds like cyanidin,quercetin,hentriacontane ,cyanidin diglucoside ,calcium oxalate ,tannins ,thiamine ,riboflavin ,niacin and ascorbic acid have been reported. Hibiscus sabdariffa contain ergosterol ,the most important mycosterol.

RESEARCH METHODOLOGY

Firstly existing available research in the related field is searched out & related literature gathered. After collection & analysis of data, the main text of the report is logically sequenced and broken into readily identifiable sections including results of the findings at the end.

I. ETHANOBOTANY

Hibiscus sabdariffa is consumed as a beverage in the united states, Mexico ,Nigeria ,west African countries ,Egypt ,Iran ,India ,Thailand and Taiwan. Use of hibiscus sabdariffa for the treatment of various cardiovascular risk factors including hypertension in Egypt , Jordan, Trinidad and Tobago, against hypotension in Jordan and Iraq,hyperlipidemia in Jordan ,Greece ,Brazil, Trinidad and Tobago and for obesity in Iraq, Greece and Brazil. The calyces are used for making decoction. The Bedouins in the north Badia region of Jordan use the leaves as well as flowers and they drink the hot infusions in hypertension and cold in hypotension.In Trinidad and Tobago only the leaves are used to treat high blood pressure and flowers and seeds to treat hypercholestremia.In Kurdistan autonomous region of Iraq aqueous infusion of flowers (1 teaspoon in half litre
Water) for hypotension and 2tsp for treatment of obesity.In folk medicine mild laxative effect, ability to increase urination ,relief during hot weather and treatment of cracks in the feet ,bilious, sores and wounds. In Sudan used for sore throat and wounds.Antimicrobial,emollient,antipyretic,diuretic ,antihelmentic,sedative properties and as a soothing cough remedy in African folkmedicine.In India leaves are poultice on abscesses.It also showed possessing role as hypo-lipidemic ,anti-hypertensive,anti-diabetic activity ,anti-helminthic and anti –microbial activity.

II.PHYTOCHEMISTRY

Leaf contain protein,fat,carbohydrate,fiber,ash,calcium,phosphorus,iron,thiamine,beta carotene ,riboflavin ,niacin and ascorbic acid. Its antioxidant and anti-tumoral properties are due to the presence of following phenolic compounds polyphenolic compounds ,flavonoids ,anthocyanins such as delphinidin-3-o-glucoside,delphinidin -3-o-sambubioside,cyanidin-3-o-sambubioside and protocatechuic acid .

Citric acid, malic acid and tartaric acid occur in Free State in plants like hibiscus sabdariffa. Polyphenol rich (74%) extract containing protocatechuic acid (24.2%) ,catechin (2.7%) ,gallocatechins (2.4%),caffeic acid (19.9%) & gallocatechins gallates (30.05%).Aqueous extract of hibiscus sabdariffa contain anthocyanins (2.5%),polyphenolic acid (1.7%) and flavonoids (1.4%).

III.PHARMACOLOGY

1. ANTIHYPERTENSIVE

In order to compare the antihypertensive effectiveness and tolerability of a standardized extract from hibiscus sabdariffa with captopril showed that hibiscus sabdariffa decreased the systolic blood pressure from 139.05 to 123.77 mm Hg and diastolic pressure from 90.81 to 79.52 mm Hg .Antihypertensive activity mediated through the endothelium derived nitric oxide with GMA relaxant pathway and inhibition of calcium influx into vascular smooth muscle cells.

2. ANTICANCER

Anthocyanins inhibit LDL oxidation and LDL mediated macrophage apoptosis, serving as a chemo preventive agent .Protocatechuic acid as a cancer chemo preventive agent against tumour promotion. The menthol extract from calyces showed significant selective activity against leukaemia line with concentration dependent cytotoxic and cytocidal effects.

3. ANTILITHIATIC

Ethylene glycol used to induce lithiasis. Microcrystals were deposited in the sections of kidneys of rats treated with ethylene glycol. Urine excreted by animals fed on the plant extract showed is more dilute, reinforces its diuretic property. Magnesium level increased reducing the intensity of crystallization. Also low serum creatinine level and improved creatinine clearance was seen in plant extract fed rats.

4. ANTIHYPERLIPIDEMIC

Seed oil is rich in unsaturated fatty acids like linoleic acid, steroids and tocopherols and also contain nitrogen, fatty oil, cellulose ,pentosans and starch. The antioxidant and free radical scavenging effects chloroform soluble fraction and ethyl acetate soluble fraction obtained from flowers exhibits hydrogen peroxide induced radical scavenging activity and also inhibited the SOD anion and lipid peroxides reduction in ferrous sulphate –induced oxidative stress by hibiscus sabdariffa treated and ascorbic acid treated group. Administration of hibiscus sabdariffa extract to fructose and cholesterol fed rats showed reduction of LDL to HDL ratio & normal serum GOT, GPT, alkaline and acid phosphatase Activity.

5. HEPATOPROTECTIVE

Protocatechuic acids have protective effects against cytotoxicity and gentoxicity of hepatocytes induced by t-BHP.

6. OXIDATIVE STRESS MODULATION

Infusion of hibiscus sabdariffa modulates oxidative stress in patients with Marfan syndrome which is associated with progressive

aortic dilation, endothelial dysfunction that contributes to the early acute dissection of the vessel and can end up in rupture of aorta & sudden death. Hibiscus sabdariffa calyces increase cellular antioxidant capacity of both enzymatic and non-enzymatic systems and decrease oxidative stress. Hibiscus sabdariffa calyces increase cellular antioxidant capacity essential for homeostasis & decrease oxidative stress.

7. ANTINOCICEPTIVE

Hibiscus sabdariffa fruit extract investigated for antinociceptive andCNS depressant activity.Phytoconstituents such as flavonoids & neuroactive steroids were found to be ligands for the GABA receptors in the CNS which led to the assumption that they act as benzodiazepine like molecules.GABA plays as a major inhibitory neurotransmitter. Different anxiolytic, muscle relaxant sedative-hypnotic drugs actions were acting through GABA.

8. CARDIOPROTECTIVE

The antioxidant effects of the anthocyanins cause inhibition of LDL-C oxidation which impedes atherosclerosis, an important cardiovascular risk factor.

IV.TOXICITY

Doses of 300 mg/kg/day of hibiscus sabdariffa over a three month period cause an adverse effect on liver enzymes, suggesting that at very high doses the extract could be hepatotoxic. Uric levels were reported to be elevated in rodents given extremely high doses of hibiscus sabdariffa extract, a potential adverse effect that could exacerbate or contribute to the development of gout.

V.CONCLUSION

Hibiscus sabdariffa belonging to Family MALVACEAE commonly known as Roselle ,an important ornamental and medicinal plant native to west Africa and India .Hibiscus sabdariffa being effectively used against hypertension, pyrexia ,liver disorders ,hyperlipidemia ,obesity, laxative ,diuretic, skin infections ,sore throat,etc.in different parts of the world as a folk medicine. The phytochemical screening revealed the presence of proteins, carbohydrates,glycosides,flavonoids,tannins and saponins. Hibiscus sabdariffa containing sex flavonoids like SABDARETIN,GOSSYPIN acts as a hypotensive agent. Higher phenolic and flavonoids content responsible for anticancer activity against cultured human cancer lines ,including melanoma,breast,leukemia,ovary,prostate,colon,kidney,glaucoma,neuro cells. Phenol rich extract exhibited a greater ability to decrease total cholesterol and LDL-C cholesterol and increase HDL-C cholesterol. HIBISCUS ACID have role in lowering blood pressure and cholesterol. Infusion of hibiscus sabdariffa L. modulates oxidative stress in patients with marfan syndrome. Extract inhibits the development of atherosclerosis in cholesterol fed rabbits .Also investigated for antinociceptive and CNS depressant activity. The effective uses of hibiscus sabdariffa in kidney malfunctioning in general and especially stone formation. Recent study do reveal its crucial role in treating different medical problems like cardiovascular disorders,cancer,hypertension,obesity management, oxidative stress modulation, kidney stone formation, liver trouble. There is need for further research on the species due to its immense pharmacological value.

REFERENCES

1.Kalyan S Betanabhatla ,AJM Christina,B Syama Sundar,S Selvakumar ,K Sundara Saravanan,Antilithiatic activity of Hibiscus sabdariffa Linn. On ethylene glycol –induced lithiasis in rats, Natural Product Radiance, Vol.8(1),2009,pp. 43-47.

2.Formagio ASN, Ramos DD Vieira MC Ramalho SR,Silva M.M.,Zarate NAH Foglio MA and Carvalho JE,Phenolic compounds of Hibiscus sabdariffa and influence of organic residues on its antioxidant and anti-tumoral properties, Brazilian Journal Biology ,2015,Vol.75 no.1 ,p.69-76.

3.Bindu T.K., "Phytochemical investigation of a few plants '' Thesis,department of chemistry , university of Calicut ,1998.

4.Shodhganga ,Review of literature ,chapter 2,page 43-44.

5.Chang –che-chen,Jong-DongHsu,San-Fa Wang,Huei-Ching Chiang,Mon-Yuan Yong,Erl-Shyh Kau,Yung-Chyan Ho, and Chau-Jong Wang,Hibiscus sabdariffa extract inhibits the development of Atherosclerosis in cholesterol fed rabbits ,J.Agriculture Food Chemistry ,2003 ,51 (18) ,pp 5472-5477.

6.A Herrera –Arellano ,J Tortoriello ,Effectiveness and tolerability of a standardized extract from Hibiscus sabdariffa in patients with mild to moderate hypertension : a controlled and clinical trial,Phytomedicine ,vol.11,issue 5,20 july 2004,pages 375-382.

7.Allison L. Hopkins ,Marnie G.Lamn,Cheryl Ritenbaugh ,Hibiscus sabdariffa L. in the treatment of hypertension and hyperlipidemia a comprehensive review of animal and human studies.,Fitoterapia HHS.

8.Pragya Singh,Mahejibin khan,Hailu Hailemariam,Nutritional and Health importance of Hibiscus sabdariffa ; A Review and indication for research needs,Journal of nutritional health and food engineering ,vol.6 ,issue 5 ,2017.

9.N. Mahadevan ,Shivali and Pradeep Kamboj ,Hibiscus sabdariffa Linn.-An Overview, Natural product radiance ,vol. (8)(1),jan-feb 2009,pp.77-83.

10.Hajera Khatun etal.,Review of literature ,2011.

11.Maria Elena Soto,Alejandra Zuniga –Munoz,Veronica Guarner Lans,Erendira Janet Duran- Hernandez , and Israel Perez-

Torres,Infusion of Hibiscus sabdariffa L. modulates Oxidative stress in patients with Marfan Syndrome,Hindawi Publishing Corporation mediators of Inflammation,vol.2016.
12.Okereke CN,Iroka FC,Chukwuma MO,Phytochemical analysis and medicinal uses of Hibiscus sabdariffa, International Journal of Herbal Medicine.
13.A mini review Hibiscus sabdariffa ,Indian Journal of Hill Farming ,27 (1).
14.http://shodhganga.inflibnet.ac.in .