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STUDY OF CENTELLA ASIATICA AS A POTENTIAL SOURCE OF ACTIVE METABOLITES

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ABSTRACT

The current study is aimed to describe the analogs of naturally occurring compounds found in methanolic extracts of Centella Asiatica.Traditional .Knowledge suggests that it is the most spiritual of all the herbs and its importance is well documented by scholars since ancient times. Hence it is interesting to carry out its phytochemical analysis so as to find out the exact mechanism behind its medicinal values which revealed the presence of phytochemicals like alkaloids, Steroids, Tannins, Diterpenes, phytosterols possessing anti-bacterial, anti-fungal, properties

Keywords*: phytochemicals, anti-bacterial, anti-fungal, ICP-AES*

I. INTRODUCTION

Centella Asiatica has a long history in the folk medicines of India, Indonesia, china, Srilanka and Madagascar. It is still widely used in these countries as a part of main ingredients of various medicines. It has been used for generations in India to promote relaxation, improve memory, for skin inflammation, to improve blood circulation, to treat bloating, wound healing, for congestion and depression. In folk medicine of Srilanka. It is used for mental and neurological problems, In Africa for leprosy, hypertension and Cancer; in Bangladesh it finds application to treat asthma, itching, Leucorrhoea, Malaria, tumor and wounds while in Madagascar for Leprosy and tuberculosis.

A study conducted in 1992 by K. Nalini at Kasturba Medical College Showed an impressive improvement in memory in rats which were treated with extracts orally daily for 14 days before the experiment .Literature survey of medicinal history of “Centella Asiatica” in various countries reveals that it has been used by tribes from ancient time for various disorders.

In India, It is regarded as the most spiritual of all herbs. Growing in some areas of the Himalayas, It is used by yogis to increase meditation power. It is said to develop the crown chakra, the energy centre at the top of the head and balance right and left hemispheres of the brain. It is regarded as one of the most rejuvenating herbs in ayurvedic medicine. Srilankan noticed that Elephants, renowned for their longevity, munched on the leaves of plants. Thus the leaves became known as a promoter of long life. It is said to fortify immune system, both

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cleansing and feeding and to strengthen adrenal. It has been used as a blood tonic and for skin health. The importance of Centella Asiatica has been realized and well documented by scholars since ancient period. Apart from the innumerable social benefits, much emphasis has been accorded to the plant of its medicinal value. In an extensive search of literature, there are various published report on the medicinal activities of Centella Asiatica mostly carried on rats, rabbits etc.

In India, the knowledge of medicinal plants is very old and medicinal properties of plants are described in Rig-Veda and Atherveda (3500-1500B.C.) from which Ayurveda is developed which is the term for traditional medicine in India. The scientific investigations of Indian medicinal plants, especially in Ayurveda started in early part of twentieth century with the extreme investigation of Dr.R.N.Chopra who is known as "Father of Indian Pharmacology". With the advancement of progressive development in the field of pharmaceutical science, the remarkable progress had been made including the diagnosis and the treatment of diseases. The recent drug discovery technique is based on structure, activity relationship, computer modeling, and screening throughout the spectroscopy methods[1].The present study is related to the scientific investigation of Centella Asiatica and little bit approach to confirm the ancient concepts of Centella Asiatica which makes it highest ranked historical medicinal herb in Ayurveda and its heroic symptomatic accounts not only in India but also in countries like Thailand, Japan, Nepal, Australia, and China .

II. MATERIALS AND EXPERIMENTAL METHODS

The plant material was selected from "Go green" nursery, Borpada, Bombay-Goa Highway. Fresh plant materials were washed under running tap water and then with distilled water, leaves, stems and roots were separated out by scissor, air dried then homogenized to fine powder and stored in air tight bottles. Now this fine powder was treated as sample of leaves. 25gm portions of powdered plant materials were separately dispersed in 100ml of methanol. The solution was left to stand at room temp for 24hrs and was filtered with Whatsmann filter paper No.1.The filtrate was used for tests of phytochemicals.

1) Test for Phytochemicals:

"*Phytochemicals are naturally occurring biologically active chemical compounds in plants responsible for attributing them medicinal values or protective and disease preventive properties".*

S/N	Phytochemicals	Test(Methanolic extract)	Result
1	Alkaloids	5ml Leaf extract+ 1ml Mayer's reagent (Pot. Mercuric iodide), formation of yellow colored ppt.	Present
2	Steroids	5ml Leaf extract+ 3-4 drops of conc.H_2SO_4- formation of golden yellow colour.	Present

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3	Diterpenese.	5 ml (Leaf extract+ water) + 10 drops of copper acetate solution– formation of green colour.	Present
4	Tannins	5ml of extract + 5-6 drops of 1% lead acetate solution-formation of yellowish colour.	Present
5	Phytosterols	1 ml extract + 1ml conc. H_2SO_4-formation of reddish brown colour in extract layer.	Present
6	Anthocyanins	2ml extracts + 2ml HCl+NH_3, appearance of pink colour turning into blue violet.	Present

2) Test for elements

Qualitative Analysis of trace elements in methanol extract of Centella Asiatica by ICP-AES.:-

Inductively Coupled Plasma Atomic Emission Spectroscopy was carried out for the detection of following elements in Metahanolic leaves extract of CentellaAsiatica at SAIF, IIT, and Bombay. Around 5ml of methanol extract was sent to SAIF, IIT, and Bombay.

S/N	Elements	Methanolic extract of Leaves sample
1	Mg	Present
2	Ca	Present
3	S	Present
4	Fe	Present
5	Cr	Present
6	Mn	Present
7	Si	Present
8	B	Present
9	Zn	Present
10	Na	Present
11	K	Present
12	P	Present

III. RESULT AND DISCUSSION

The present study is the preliminary step carried by authors for detailing of Centella Asiatica. It is the collection and identification of secondary metabolites in Centella Asiatica which may responsible for its medicinal values.

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The phytochemical analysis revealed the presence of phytochemicals like alkaloids, Steroids, Diterpenes, Tannins, Triterpenes, Anthocyanins, and Phytosterols etc. The study reveals the presence of these phytochemicals which may find physiological action on human beings. As per the literature survey, Alkaloids are the substances well known for their biological activities at the beginning of World Civilization and were used in traditional herbal medicine for curing diseases and in weapons as toxins .They have shown the broad range of pharmacological and biological activities including acetylcholinesterate inhibitors, anti-tumor, anti-bacterial, anti-fungal, anti-viral, anti-malarial activities(Bastida et al.2006, Jin 2009)[2].Now a day's Galamanthine a type of Amaryliaceae alkaloids is being marketed as hydro bromide salt for the palliative treatment of mild to moderate Alzheimer's' disease[2].Saponins are also known to exert various range of pharmacological activities like , it may work as anti- inflammatory , vasoprotective, hypoglycemic, ant-fungal, ant-parasitic, immune modulator, expectorant and much more.(Sporg et al 2004, Sahu et al 2008)[3].They are known to react with membrane sterols, disrupt membrane function and also arrest the growth of cells (Price et al 1987)[4].They also exhibit anti-exudative properties[5].Presence of Anthocyanin was incorporated in human diets many centuries ago. The demonstrable benefits include protection against liver injuries, significant reduction of blood pressure, improvement of eyesight, strong anti- inflammatory and anti-microbial activities, suppression of proliferation of human cancer cells[6].

The study also shows the presence of triterpenes which are large class of compounds including steroids and sterols. This class is present abundantly in plants and having C30 carbon skeleton and most naturally occurring triterpenoids. They are large class of naturally occurring hydrocarbons secondary metabolites built up from five carbon isoprene units linked together most commonly head to tail arrangement but can be constructed in other configuration with variable degrees of unsaturation oxidation , functional groups and ring closure giving rise to rich diversity of structural classes with novel skeleton and this modified hydrocarbons are called terpenoids[7].Over 20000 triterpenoids occur in nature and more than 100 distinct skeletons have been described(Liby et al. 2007,Xuet al.2004).

Generally all tribal people and people in regular area throughout the world use the leaves of Centella Asiatica for various medicinal properties as given above. The qualitative elemental analysis carried out by ICP-AES results also supports the medicinal value of CentellaAsiatica like presence of "Magnesium" which is essential to all living cells. Adult human body contains 25gms of Magnesium. Over 60% of all Mg in body is found in skeleton, about 27 % in muscles and is involved in more than 300 essential metabolic reactions. The European Food safety Authority which provides scientific advice for dietary intake of Mg in contributing electrolyte balance, reduction in tiredness and fatigue, normal nerve function, normal development of bones, teeth and normal psychological functions. "Potassium" is also an essential dietary mineral and electrolyte which conducts electricity in body along with Na, Cl, Mg and Ca. According to The European Food safety Authority, It contributes normal muscular and neurological functions, also maintenance of normal blood pressure. Calcium is building block of bones and teeth. Its ionic form is essential in muscles contraction, impulse conduction in nerves and blood clotting. Phosphorus joins calcium to contribute to bone structure present in nucleic acids and ATP. Study also reveals the presence of Boron and first clinically tested boron based drug is velcade. This is

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used to treat multiple myeloma-the cancer of plasma cells. Zinc can improves immune function healing, helps in blood clotting, good eyesight, keeps skin healthy and enzyme activity. Fe is also found in Haemoglobin which is oxygen carrier in RBCs.

IV. CONCLUSION

The present study can provide an option to carry out quantitative analysis and practically applicable biological activities of CentellaAsiatica as the herb is full of secondary metabolites. The qualitative elemental analysis of Centella Asiatica by ACP-AES results also supports the medicinal value and can be an alternative to the existing synthetic drugs or can be a good source of nutritional elements.

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