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ON

ROLE OF PHYTOCHEMICALS AND ADVANCED MATERIALS IN CANCER PREVENTION AND RESEARCH

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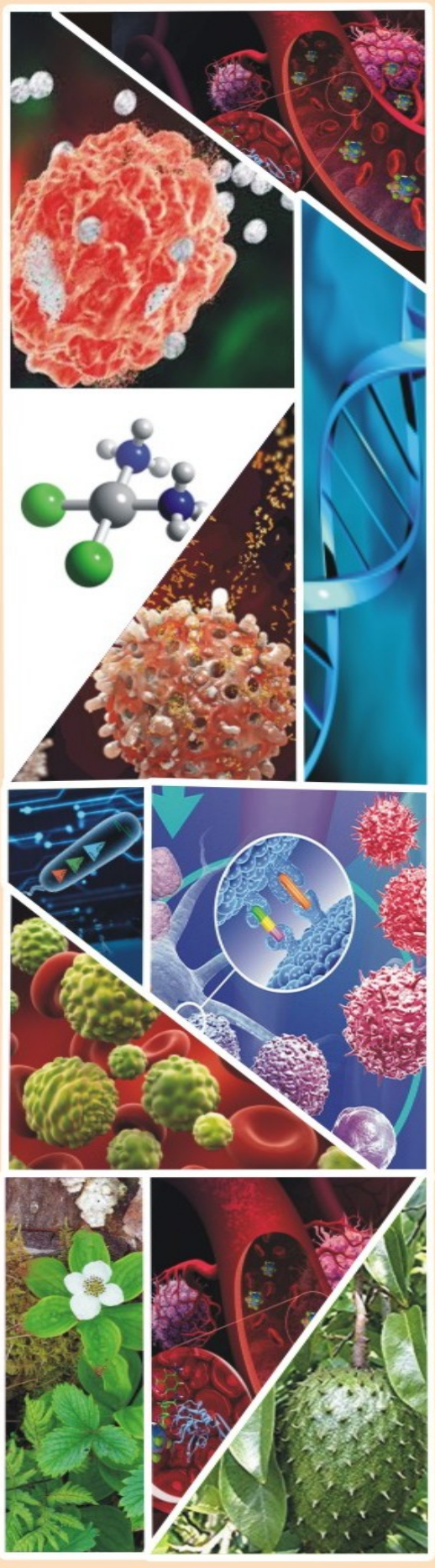

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CONTENT

A SHORT REVIEW ON PHYTOPHARMACOLOGICAL STUDIES ON LOTUS FLOWER AND HIBISCUS FLOWER

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Abstract

Flowers of *Nelumbo nucifera* Gaertn, *Hibiscus rosa-sinensis* L., are very popular for their aesthetic and spiritual appeal. Indigenous treatment systems found these flowers very useful in curing various ailments. Their phytochemical profiles are very impressive and several promising bioactive compounds were isolated and characterized. Synergism in some flower extracts produces antioxidant and anti inflammatory activities both in vitro and in vivo. Flower metabolome is a valuable resource to search for novel bioactive compounds.

Introduction

Lord Buddha while on a long journey fell ill and Jain physicians cured his illness with a drop of nectar served on the lotus petal. Jains being strict adherents to the ahimsa begun exploring flowers as novel and pious way of curing diseases and thus originated 'Pushpa Ayurveda' or flower therapy. It describes various practices such as 'darsanam', 'sparsha vidhanam', 'alepanam', 'nasya vidhanam' etc detailing the essential protocols associated with this particular branch of of ayurveda. Ayurveda and siddha systems documents unique medicinal properties of some flowers as distinct from other parts of the plant [1].There mentioned about rasayana medicines made with 18000 kinds of flowers [2]. 'Kaiyadevanighantu' is an ayurvedic text mainly devoted to the therapeutic implication of flowers of many medicinal plants [3]. Such a vast and ancient wisdom of health care should put into effective use in tackling the contemporary challenges of medical science and this is the reason behind the extensive research going on the phytochemical and pharmacological properties of different flowers. Demand for novel drugs is ever increasing and researchers turn more and more to nature as a source of valuable molecules. Here the authors focus on 10 flowers which are popular remedies for a host of diseases and in which significant phytochemical and pharmacological studies are carried out or are going on. Also a humble effort is made to converge discussions from such studies to a balanced and futuristically valuable perspective, encompassing this particular research area.

Lotus flower (Nelumbo nucifera Gaertn of family Nelumbonaceae)

Lotus flower or 'Thamara' occupy a unique place in indian psyche because of its aesthetic, spiritual and therapeutic values. Ayurveda describes lotus flowers as sweet cooling, astringent and diuretic. There are special references to the medicinal uses of different parts of the flower with detailed descriptions on the methods of use [4]. In ayurveda and other indigenous practices flower formulations are used to treat diarrhoea, diseases of the liver, cough, menorrhagia and bleeding piles[3,4]. 'Aravindasavam' is a ayurvedic paediatric tonic with lotus flower as its main ingredient[5]. Flower contains flavonoids, arbutin, alkaloids, steroids, phenols and tannins [6,7]. Pharmacological and toxicological studies show that flower has antidiabetic,

hypoglycemic and hypolipidemic properties [8-11]. A possible mechanism involved in the hypoglycemic property is that it stimulates insulin secretion from beta cells of islets of Langerhans [12], but arriving at such a conclusion requires further studies. Several flavonoids and Isorhamnetin glycosides having antioxidant property were isolated from the stamens [13,14]. They augmented antioxidant defence systems in experimental animals by decreasing lipid hydroperoxides, increasing superoxide dismutase and glutathione levels.This might also help in understanding lotus flower's multifaceted roles as cardioprotective tonic [15], potential acetylcholinesterase inhibitor to treat alzheimer's disease (Hint:ayurvedic remedy for insomnia and restlessness) [16], and an antitumour agent [17]. This flower is also rich in secondary metabolites having antibacterial and other antimicrobial properties [18,19,20]. Moreover several studies confirmed its antiplatelet and haemostatic potential [21]. Shim et.al shown that kaemferol from stamens exert antiallergic effect by downregulating FcepsilonRI expression and degranulation [22]. Recent research shown that flower stalk extracts has antiulcer activities [5]. Most of the above studies also prove that white lotus flowers are medicinally more valuable than the pink ones.

Hibiscus flower (Hibiscus rosa-sinensis L. of family Malvaceae)

Hibiscus flower is extensively mentioned in Ayurveda and siddha systems and continue to be a prominent herbal remedy of indigenous practices across the world to treat hair fall, piles, hemorrhage, menorrhagia, leucorrhoea, dysuria, hypertension, cough, diseases of pittam, and as emmenagogue, abortifacient and contraceptive[1, 3,23,24]. Many of these claims are substantiated by research. Local wisdom in northern parts of Karnataka advocates consuming 5 to 6 fresh petals to cure diabetes [25] and flower has proven hypoglycemic effect [26]. Upadhyay et.al.demonstrated hair retarding effect of flower extract against the traditional use of flower as hair promoting tonic [27]. Phytochemical analysis of the flower yielded indole alkaloids, reducing sugars,saponins,tannins and terpenoids and aqueous extracts shows the presence of cardiac glycosides, saponins [28], flavonoids such as quercetin and cyaniding [29]. Many of this secondary metabolites are responsibles for different properties such as haemoprotective [30] or antibacterial activities [31,32,33]. Siddiqui et.al isolated four new compounds from the hydroalcoholic extracts and compared the hypotensive activity of extract and individual compounds. He found that extract exhibited higher activity than the isolated compounds and suggested synergism among components [34]. One of the important property studied was flowers' unique antifertility property, acting through antiestrogenic activity and thereby preventing implantation [35]. There are also reports on its antispermatogenesis activity [36,37,38]. Flower has hypolipidemic effect as suggested by numerous studies [39,40,41]. In an interesting experiment monosodium glutamate (MSG) induced obesity in rats was effectively treated with powder of flower dissolved in normal saline [42] thereby proving its antiobesity and anti-atherogenic potential. Researchers also demonstrated the antianxiety activity [43] and immunostimulatory effect of flower extracts acting via cell mediated and humoral antibody activation of T and B cells [44].

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