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A Potential Review on Pharmacological Activity of Some Medicinal Plants of Western Ghat

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ABSTRACT: Western Ghat is a global biodiversity hotspot. The position of Western Ghat makes it biologically rich and biogeographically unique. More than 229 plant species found at Western Ghat. Plant used as a source of medicine from ancient times. Number of plants recognized in the Ayurvedic system of medicine exhibit biological activity. Several active constituents of the plant have been extracted and isolated for potent pharmacological activity action. The present work is based on a review of some medicinal plants of Western Ghat which shows potent pharmacological activity. The relevant database for this was collected from science direct, PUBMED, google scholar. Some of these plants are Capsicum annuum L. Var. Grossum Sendt and Brassica oleracea L. Var. italica Plenk.

Keywords: Capsicum annuum L. Var. Grossum Sendt, Brassica oleracea L. Var. italica Plenk, Herbal drug, pharmacology.

I. INTRODUCTION:

Capsicum annuum L. Var. Grossum Sendt is pepper belonging to the genus Capsicum. Genus capsicum contains more than 200 varieties. Capsicum is official in the British Pharmaceutical Codex and was official in the US National Formulary XI [1]. Capsicum annuum L. is an annually cultivated perennial verdant plant. Taproot, stalk is 4-5 hedral, 20-125 cm tall and grassy. Before the development of the first flower, it shows monopodial branching, single-stalked with a branching allocate bole or bushy. Leaves are light to dark green, ovate to lanceolate with smooth-edged, on long leafstalks, solitary or collected in a badge. At the stalk branches flowers are formed, bi-sexual with white, 5 hedral corolla; facultative self-pollination. Fruits occurring in a variety of shapes like tomato, bell, polyspermous and variety of colour. At the biological ripeness colour of the fruit is dark violet, dark red, orange, yellow or cream (Figure 1). Drooping or pointed of fruits occurs towards stem. Seeds are found at the base of fruit, light yellow, flat or slightly curved. Cultivation of Capsicum annum was started before 6 thousand of years ago. It occurs in Central and South America as a wild plant. At starting of the seventeen century it was introduced to Russia and cultivated as far north as a degree of northern latitude. It required heat, moisture and fertile soil. Capsicum annuum is one of most widespread vegetable due to its financial worth, colour, odour, taste and its nutritious properties of fruits [2]

(a)

(b)

Figure 1- (a) Capsicum annuum L. Var. Grossum Sendt plant. (b) Brassica oleracea L. var. italic Plenck

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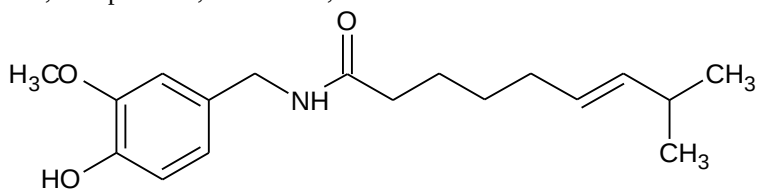
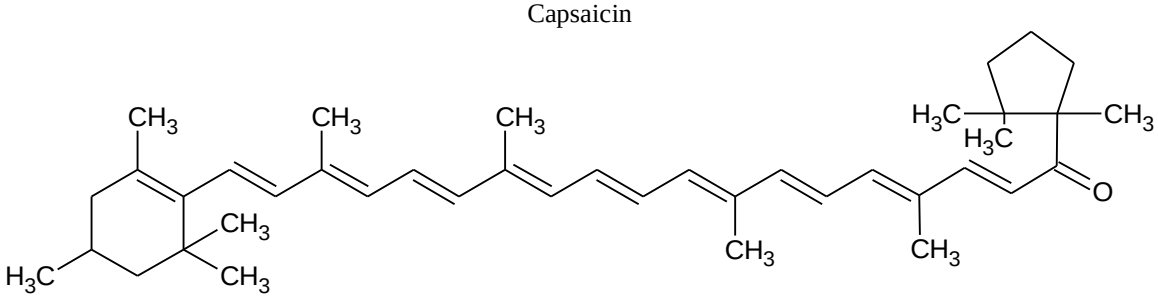
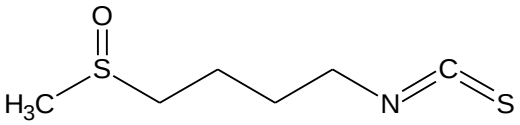
The main predictable property of capsicum is pungency. Capsaicin found in peppers responsible for characteristic pungent taste [3]. Pepper is a rich source of phenol and flavonoid. It contains capsaicinoids, capsinoids, icariside, capsoside, glycolipid, carotenoids, apo-carotenoids, anthocyanins, phenols, aldehydes, acids, ketones, alcohols, ethers, nitrogen compounds, aromatic hydrocarbons, alkanes, esters, and lactones.



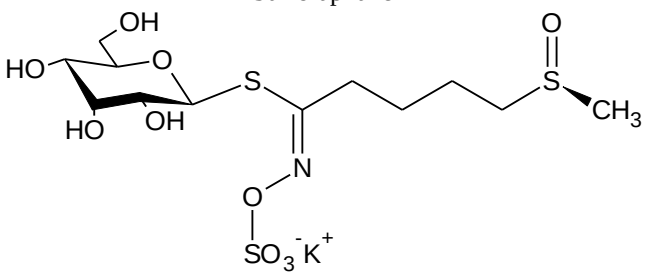
Capsaicin



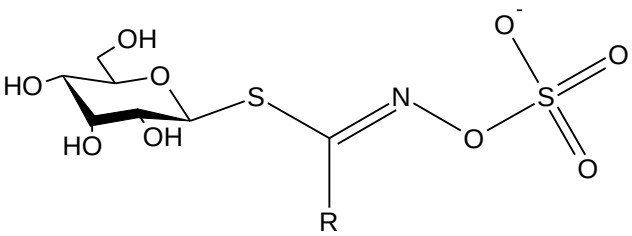
Capsanthin



Sulforaphane



Glucoraphanin



Glucosinolate

Figure 2- Some active chemical constituents of Capsicum annuum L. Var. Grossum Sendt and Brassica oleracea L. var. italic Plenck

Matured chilli is a rich source of fat, ash, protein and ascorbic acid; green fruit contains a higher quantity of calcium, sodium, potassium, magnesium, phosphate, iron, copper and zinc[4]. Traditionally it is used as a colourant, in toothache, muscles pain, diabetes, GIT disorders [5, 6]. Due to its volatile content it shows colour and flavouring properties.

Butanol extract of Capsicum annuum fruit shows revealed antimicrobial activity. Ethanol extracts 100mg/mL showed antimicrobial activity against Bacillus, E.Coli, Micrococcus,

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Pseudomonas and Citrobacter[7]. Capsicum annuum bell pepper also showed inhibitory effect against Pseudomonas aeruginosa and Salmonella typhimurium[8]; antibacterial activity against pathogenic strains occurred from the urinary tract [9]. Peptides from pepper seed delayed growth of yeasts and shows potent fungicidal activity [10]. Crude extract of pepper shows antiviral activity against herpes simplex with minimal cytotoxicity [11]. Fruit powder of pepper in higher dose shows insecticidal activity [12]. Dust of C. annuum seed is poisonous to Callosobruchus maculates and Sitophilus zeamais. In vitro study of leaves extract shows the death of the cercaria of Schistosoma mansoni within 15 min. The ethanol extract of C. annuum has been shown to have a larvicidal activity against Anopheles stephensi and Culex quinquefasciatus [13]. Secondary metabolite of C. annuum shows prominent antioxidant properties[14]. Secondary metabolite of C. annuum shows prominent antioxidant properties [14]. C. annuum exhibits hypercholesterolemic [15, 16], anti-inflammatory [17].

Table 1: Classification of Capsicum annuum L. Var. Grossum Sendt and Brassica oleracea L. Var. italica Plenk

	Capsicum annuum L. Var. Grossum Sendt	**Brassica oleracea L. Var. italica Plenk**
Kingdom	Plantae	Plantae
Subkingdom	Viridiplantae	Trachebionta
Super division	Embryophyta	Spermatophyta
Division	Tracheophyta	Magnoliophyta
Class	Magnoliopsida	Magnoliopsida
Order	Solanales	Capparales
Family	Solanaceae	Brassicaceae
Genus	Capsicum	Mustard
Species	Capsicum L.	Brassica oleracea
Variety	Capsicum annuum L. Var. Grossum	Brassica oleracea L. var. italic Plenck

Brassica oleracea L. Var. italica Plenk is annual green caption grown in all over the world (figure 1). Broccoli is universally studied by its competence to decrease the peril of raising many types of cancers [18]. Broccoli grows 60-90 cm tall, vertical and branching with rubbery leaves. It shows a dense green cluster of flower buds. If it is unharvested, these buds bear yellow-colored flowers with four petals and produce silique fruits. It grows insensible to cool climates and propagated by seed. It is harvest after 60-150 days based on weather and variety [19]. Broccoli contains extensive quantities of active constituents like Vitamin C, phenolic compound, glucosinolate and, β-carotene. Three days old seedlings are 10- 100 times more glucosinolate than the matured plant [20 Brassica oleracea L. var. Italica has acrid taste established particular attention for the production of sprouts and microgreens [21]. The broccoli's seedling is an excellent source of health-promoting phytoconstituents such as nitrogen-sulfur derivatives, polyphenols, and flavonoid. It contains glucosinolates and isothiocyanates. Also, it contains polyphenols like sinapic and chlorogenic acid derivatives. It also contains minerals like manganese, potassium and selenium. It is a rich source of Vitamin A, C, K and B6. Literature data show that the consumption of microgreens and sprouts of broccoli in the daily diet reduces the risk of chronic diseases [22-25]. The pectin extracted from broccoli stalks has a lower molecular weight, methyl –esterification value is 56% and neutral sugar galactose, giving out some characters with the modified citrus pectin. Modified pectin shows in-vivo and in-vitro immunomodulatory potential [26]. Studies on purple head broccoli explored different chemical compound at different growing stages. It showed antioxidant, antiproliferative against prostate cancer cells [27]. The presence of phenolic compounds and organic acids show a rich dietary source. It contains hydroxycinnamic acids, citric, malic and oxalic acids. It exhibits antimicrobial activity [28]. The floret powder of broccoli shows the highest protein content; leaves flours contain high crude fibres. Lipid content was the same in powder of leaves and stalk powder. Antinutritional factors in broccoli floret and leaf powder have tannin, phytates and oxalates [29].

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Isolated glucosinolate from broccoli seed shows inhibition of mutagenesis with Salmonella typhimurium [30]. Broccoli contains nutritional antioxidants that is ascorbic acid, alpha tocoperol and non-nutritional antioxidants such as carotenoids and phenol. Broccoli sprouts and microgreens show in vitro and in vivo inhibition of lipoxygenase and xanthine oxidase enzymes. It activates peroxidase, catalase, superoxide dismutase, glutathione peroxidase [31-33]. Its sprouts possess anti-inflammatory activity. Hence broccoli sprouts and microgreens have prevention and treatment of ulcerative colitis and Crohn's disease. The anti-inflammatory mechanism of broccoli sprouts is associated with nuclear factor-kappa B (NF-κB) and nuclear factor erythroid 2-related factor 2 (Nrf2) signalling pathways [34]. Broccoli used in supplementary treatment for type-2 diabetes and anticipation of its long term complications. Broccoli sprout powder contains a rich source of sulforaphane which decreases serum insulin and minimizes complications of diabetes. Sulforaphane induced some peroxisome proliferators activated receptors which contribute to glucose homeostasis in hyperglycemia and oxidative conditions [35-37]. Broccoli flower extract is a crucciferae cluster of vegetables that has multiple antioxidants. It acts as an MMP-1(matrix metalloproteinase-1) agent at the mRNA and protein level of skin photoaging in vitro. Broccoli flower extract has an inhibitory effect on skin photoaging induced by UVB in vitro by increasing type I procollagen expression at the protein level in human skin fibroblast culture [38].

II. CONCLUSION:

During the last decade, the preference of the market turned towards the production of functional food which can offer nutrients specific to human health-promoting functionality and the reduction of chemical preservatives for food conservation. Capsicum annuum L. Var. Grossum is fascinating for their food and organoleptic values also as natural sources of carotenoids and polyphenols. Capsicum, broccoli sprouts and microgreens are most consumed vegetable now a day. They are recognition as efficient foods or nutraceutical foods by the rising curiosity of consumers for diets that maintain health and long life. Isolated compounds from all of them incorporated into food and pharmaceutical products.

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