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Review on the Health Benefits of Green Tea

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Abstract: ***Objective: The aim of this review study is to update information about pharmacokinetically, phytochemical and pharmacological studies of green tea. To evaluate the pharmacological activities of green tea. Methods: Literature on green tea was collected and reviewed. Results: Green tea are having broad types of characteristics such as antibacterial activity, antifungal activity, Antioxidant activity, Anti-viral effects, Anti hypertensive effect, Effect on skin, anticancer activity. The medicinal utilities have been described especially for leaves. The present review incorporates the description of green tea, its phytochemical constituents and various pharmacological activities of isolated compounds as well as bioactivity of extract studies carried out by various numbers of laboratories. Conclusion: as per available literature and its readily availability, green tea can be used to cure the symptoms of variety of diseases.***

Keywords: green tea, Camellia Sinensis, Anti-cancerous.

1. Introduction

Tea is one of the mostly widely used beverages worldwide, Tea is available in three forms 20% is Green tea, and it is used in Asian countries, 2% is oolong tea, which is produced in Southern China and 78% is black tea, which is usually used in the Western countries.(1) Green tea is mostly used drink in the World. It is obtained from plant Camellia Sinensis.(2)The health profits of polyphenols found in green tea. Green tea are prevent cancer, including lung, colon, esophagus, mouth, stomach, small intestine, kidney, pancreas, and mammary glands. Most of the epidemiological studies and clinical trials show that green tea may reduce the risk of many chronic diseases.(3)It is organized from unfermented leaves, it contains the maximum concentration of powerful antioxidants called polyphenols.(4)

Plant Description of green tea:
Taste: Bitter taste
Odor: tart green floral tea
Size: 3-7mm in length
Shape: leaf blade thinly leathery, elliptic or obovate-elliptic, 5-12 cm long, 1.8-4.5 cm wide,
Flower: yellow-white flowers and flowers are axillary, solitary, or up to three in a cluste. (5)

Cultivation:
The green tea growing area encompasses southwestern China, northern Laos, northern Vietnam, Myanmar, Cambodia, and northeastern India. in India, mainly it is found in Darjeeling, Assam region to produce tea.**(6)** Cultivation of tea is feasible in areas that receive over 120-150 cm of rain annually, and have temperatures of 12-30°C. At least 5 hours of direct or eleven hours of indirect daylight daily are square measure needed for tea cultivation. Soils should be well-drained, sandy, totally ventilated, deep and nutrient with a healthy layer of humus and low hydrogen ion concentration. Drought, water work, excessive heat, and frost area unit harmful for the expansion of tea plants and will end in a lower quality product in terms of chemistry, taste, aroma, and bioactivity. Tea plants area unit usually raised in controlled nursery conditions or different protected conditions for their first 2-4 years. **(7)**

Chemical constituents of green tea
This chemical composition is complicated consisting of proteins whose enzymes represent a very important fraction; amino acids like as teanine or 5-N-ethylglutamine, aminoalkanoic acid, tryptophan, glycine, serine, amino acid, tyrosine, valine, leucine, threonine, arginine, lysine; carbohydrates like polyose, pectins, glucose, fructose, sucrose; lipids as linoleic and a-linolenic acids; sterols as stigmasterol; vitamins (B, C, E); organic compound bases like caffeine and elixophyllin pigments as chlorophyll and carotenoids; volatile compounds like aldehydes, alcohols, esters, lactones, hydrocarbons, etc.; minerals and trace parts like Ca, Mg, Cr, Mn, Fe, Cu, Zn, Mo, Se, Na, P, Co, Sr, Ni, K, F, and A.(8)

Chemical constituents	Activity
methanol extract	Anti fungal activity
Polyphenols	Anti-inflammatory activity, anti-carcinogenic properties, Antiviral activity
Catechins	Antiviral activity
epigallocatechin gallate	Antimicrobial activity
vitamin C and vitamin E	antioxidant activity
Tannin	Anti spasmodic activity
sodium selenite	Anticataract activity

(9)

Biological Activities of green tea

Sr. no.	Green tea activities	Effects	References
1	Antioxidant activity	Green tea are increase in plasma antioxidant capacity in humans. Green tea increase blood antioxidant potential leads to a decrease oxidative damage in macromolecules such as DNA and lipids.	(10)
2	Effect on skin	Green tea protect against some types of radiation, it prevents skin disease, photoaging and potential cancer problems due to prolonged exposure.	(11)
3	Anti-viral effects	The effect of green tea observed in all influenza virus sub-types tested, including A/H1N1, A/H3N2 and B virus.	(12)
4	Anti cancer activity	Green tea inhibit an enzyme required for cancer cell growth, but also kills cancer cells	(13)
5	Anti hypertensive effect	green tea prevents high blood pressure. it improved blood pressure.	(14)
6	Body weight control/ obesity	Green tea exhibits a fatty acid synthase inhibitor activity. Green tea leaves reduces their body weights and plasma triglyceride, cholesterol and LDL-cholesterol	(3)
7	Diabetes	Green tea can decrease blood glucose levels.	(13)
8	Oral Health Benefits	green tea polyphenols are stop growth, acid production, metabolism, and glucosyltransferase enzyme activity of S. mutans and dental plaque bacteria.	(15)
9	Bone density	Green tea may decrease the absorption of iron and calcium to some extent and decrease the absorption rate of zinc. Green tea increased the absorption of manganese and copper.	(16)

Chemical components of black tea and green tea

Sr, no.	Compounds	Green tea	References
1.	Catechins	30-42 %	(17)
2.	Simple polyphenols	2%	(18)
3.	Flavonoids	6-16%	(1)
4.	Theanine	20-40 mg	(16)
5.	Aminoacids	4%	(19)
6.	Peptides/proteins	15%	(12)
7.	Lipids/Organic acids	7%	(11)
8.	Carbohydrates	5-7%	(3)
9.	Caffeine	3.5%	(12)
10.	Methylxanthines	<1	(18)

Antioxidant Activity

Green tea is dietary source of antioxidant nutrients: green tea is wealthy in polyphenols. Green leaves also contains carotenoids, tocopherols, ascorbic acid, minerals such as Cr, Mn, Se or Zn, and certain phytochemical compounds.(11) EGCG stop the TPA-induced oxidative DNA base modification in Hel cells, stop the Cu2+ Mediate chemical reaction of lipoprotein, decrease tert-butyl hydroperoxide-induced lipoid peroxidation and stop the assembly of reactive gas species derived from NADPH-cytochrome P450-mediated reaction of the grilled meat substance, 2-amino-3methylimidazo quinoline.(12)

Green tea improves body substance and cell-mediated immunities, reduced the chance of sure cancers and vessel diseases. Most of the cancer chemopreventive properties of tea leaf ar mediate by EGCG.(10)

Anti cancer activity

Anti-cancerous property various cell signaling pathways have been shown to be affected by EGCG: prohibition of nuclear factor kappa-light-chain-enhancer of activated B cells (NF-κB), insulin-like growth factor-1 receptor (IGF1R) activation, cyclooxygenase-2 expression, mitogen-activated protein kinases (MAPK) pathways, epidermal growth factor receptor (EGFR) mediated pathways, proteasome activity, vascular endothelial growth factor (VEGF), and matrix metalloproteinase-2 (MMP-2) and MMP-9.(10)EGCG or EGCg (epigallocatechin gallate) in a green Tea Polyphenols, they are not only inhibits an enzyme required for cancer cell growth, but also kills cancer cells without affecting on healthy cells.(13)green tea stop carcinogenesis of the skin, lung, oral cavity, esophagus, stomach, liver, kidney, prostate and other organs.(11)

Diabetes

Green tea use is linked with reduced fasting glucose levels and A1C levels, as well as decreased fasting insulin levels, which are a measurement of diabetes health. virtually, one animal study found that EGCG was as effective as the diabetic drug Avandia in moderately diabetic mice, propound green tea, or a high-quality green tea extract, could be the prevention of diabetes. (13) green tea improves insulin sensitivity in human and reduces hypertriacylgly-cerolaemia in mice. Green tea is Increased gluconeogenesis is a main source of increased hepatic glucose production and the ability of insulin to regulate transcription of the rate-controlling gluconeogenic enzymes, phosphoenolpyruvate carboxykinase and glucose-6-phosphatase, may contribute to this problem.(14)

Oral Health Benefits

Green tea catechin consumption it improved oral health. Green tea use helps oral healths are due to its anti-inflammatory properties, and antimicrobial activity aligned with mouth flora such as Streptococcus mutans. The antimicrobial activity is improvement observed as to bad breath, oral health are a decrease in periodontist and dental caries. (15)

Anti-viral effects

EGCG and ECG were found to be strong resistor of influenza virus reproduction in cell culture. This effect was observed in all influenza virus sub-types tested, inclusive A/H3N2, A/H1N1 and B virus. Quantitative analysis exposed that, at high concentration, EGCG and ECG also depress viral RNA synthesis in cells, whereas EGC failed to show a related effect. equally, EGCG and ECG stop the neuraminidase activity much effectively than the EGC. Neuraminidase is an antigenic glycoprotein enzyme establish on the surface of the influenza virus. Neuraminidase has functions that help in the efficiency of virus release from cells. (12)

Effect on skin

The in vitro and in vivo animal and human report suggest that green tea polyphenols are photoprotective in nature, and can be applied as pharmacological agents for the preclusion of solar UVB light-induced skin disordesr including melanoma, photoaging, and nonmelanoma skin cancers after more clinical trials in humans.(3)

Bone density

Green teas decrease the absorption of calcium and iron. It is reduced the absorption rate. Green tea promoted the absorption of manganese and copper.(16)

Effect on obesity

Obesity is a most main factor in a number of diseases, including hypertension, non–insulin dependent diabetes, coronary heart diseases, pulmonary dysfunction, osteoarthritis, and certain types of cancer. Tea catechins, specifically EGCG, appear to have anti obesity and anti-diabetic effects. The effects of green tea on obesity and diabetes have received increasing concentration. Green tea is a natural remedy that can increase energy expenditure and fat oxidation and thereby encourage weight loss. (3)

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