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Importance of Epigallocatechin-3-gallate with Tremendous Pharmacological Benefits in Functional Food Development

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Abstract: One of the most tea catechin in epigallocatechin gallate. It is the principle plentiful tea polyphenol, accompained by other polyphenols such as epigallocatechin, epicatechin-3-gallate, epicatechin, and catechin. The principle notable pharmacological characteristics of Epigallocatechin gallate are HIV infection, antineoplastic, hypertension, and related issues, type II diabetes mellitus, its application as nephroprotective, hepatoprotective, cardioprotective, and its utilizations in Parkinson, Osteoporosis, and Alzheimer. It has been also considered as the most important natural product in cancer treatment due to its safety, natural origin, and affordable. It has also ability to reduce lipid and protein damage caused by hepatotoxin. It carries also an important role in food industry. It is found in green tea, black tea, strawberries, cranberries, kiwis, cherries, apples, peaches, hazelnuts, pistachios, and pecans.

Keywords: natural products; medicinal plant; green tea; epigallocatechin; epigallocatechin gallate.

1. Introduction

Medicinal plant sciences have been studied as the main origin of curative treatment [1-10], and the natural ingredients and chemical ingredients of herbs and plants are used to prevent many diseases and promote health [16-21]. Epigallocatechi gallate (EGCG), which is a kind of catechin, is the ester of gallic acid and epigallocatechin [21-34]. Epigallocatechin-3-gallate is the main ample tea polyphenol, together with other polyphenols, such as catechin, epicatechin, epigallocatechin, and epicatechin-3-gallate. Epigallocatechin gallate, also considered as epigallocatechin-3-gallate, is a polyphenolic flavonoid obtained from tea (*Camellia sinensis*) posses many pharmaceutical benefits like antioxidant, antimicrobial, and anticancer activities. The goal of this manuscript is study of the most notable pharmaceutical merits of Epigallocatechin.

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2. EGCG and Pharmacological Benefits

EGCG may cause the generation of reactive oxygen species, its process is according to the creation of EGCG quinone, EGCG dimer quinone and other components and the development of autoxidized products may have roles in the suppression of fibrillation; furthermore, EGCG are discovered to form covalent adducts with cysteinylthiol residues in proteins via autoxidation to consecutively stimulate protein function, which can be used to cure human gastric cancer; the balance and autoxidation of EGCG are related to metal ion, pH, temperature, oxygen amounts and antioxidant amounts [35]. EGCG effects alzheimer disease through oxidative stress, neuroinflammation, and neurogenesis alteration; inhibited the production of Aβ and decreased inflammation, cell apoptosis, and oxidative stress; it can also reduce the Aβ amounts by increasing andogenous APP proteolysis and reduce nuclear translocation of c-Abl, as well as leading to an elevation in the

main autopahy adaptor proteins NDP52 and P62; EGCG regulates the iron export ferroporting in substantia nigra, decrease oxidative stress and indicate a neurorescue impacts against 1-methyl-4-phenyl-1,2,3,5-tetrahydropyridine (MPTP)-induced neutochemical and functional shortages [36]. EGCG has shown anti-tumor activity by introduction of 6-methoxycabonyl to EGCG is effective against getitinib-resistant HCC827-Gef cells which can increase its anti-tumor properties [37,38]. EGCG can blocks the synthesis of collagen, proliferation and activation of hepatic stellate cells, and it can decrease MMP-2 activity and contains the antibrosis impacts via down-regulation of the expression of MMP-2 mRNA [39,40]. It can boost the enzyme inhibitory activity and the DPPH radical scavenging activity and against α-glucosidase, and α-amylase which shows its antibacterial impacts; its utilization may show important functions in cell behavior and important for regenerative endodontic treatment [41]. It has fungicidal activities against *Trichophyton mentagrophytes*, *Cryptococcs neoformans*, *T. rubrum*, and *C. albicans*, and EGCG synergistically boost the antifungal potency of azola drugs which can be useful in the development and preventing of drug resistance, in decreasing the drug dosage and reducing the negative impacts[42,43]. EGCG has antimicrobial impacts against bacteria leading to food-borne diseases, the most discovered bacterium are *Helicobacter pylori*, *Escherichia coli*, *Bacillus stearothermophilus*, *Helicobacter pylori*, *Clostridium thermoaceticum*, *Bacillus cereus*, and *Salmonella typhi* [44-50].

3. Conclusions

The tea catechin is epigallocatechin gallate, which is predominantly identified in tea (white, green, black, and oolong), fruits (strawberries, kiwis, cranberries, blackberries, cherries, apples, peaches, pears, and avocados), and nuts (pistachios, and hazelnuts, and pecans). Catechins may be grouped into a larger group of plant components such as polyphenols. Epigallocatechin, epicatechin 3-gallate, and epicatechin, and also show similar advantages. The main notable pharmaceutical characteristics of EGCG are in treatment of HIV infection, antineoplastic, hypertension, and related complications, type II diabetes mellitus, and also it has hepatoprotective, cardioprotective, and nephroprotective activities, and significant utilization in Parkinson, and Osteoporosis, and Alzheimer. Its value in cancer treatment is due to natural origin, low cost, and safety, but the major disadvantage is its minimum effectiveness with some restraints in researches related to EGCG.

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