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A novel method of extracting highly bio available gallate catechins from fresh tea leaves: An anti-malarial drug

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A new method, which is patented, is developed to reinforce the bio availability of fresh tea leaves to extract gallate catechins, an anti-malarial drug. The tactic involves use of a patented hydrodynamic system which converts the fresh tea leaves into a nano emulsion. This active catechins rich Nano emulsion is filtered and clear emulsion is collected. This clear emulsion is subjected to liquid-liquid extraction and therefore the catechins are isolated through a solvent phase. Then the solvent phase is dried during a molecular distillation unit and subsequently during a vacuum tray drier to urge a green colored powder. The HPLC analysis revealed that this extract has all the eight catechins in higher levels and its bioavailability is increased to 10-fold as compared to the commercially available tea extracts.

The present paper comprehensively reviews the mechanisms resulting in low absorption, poor permeability and fewer stability of tea catechins and also describes the potential for improving the bioavailability of tea catechins through new techniques like nanoparticle-based delivery systems, structurally modified molecule of catechins, co-administration with other drugs or bioactive. Furthermore, the challenges and future research directions also are discussed. To gather the related references, computerized systematic literature searches were conducted in web of Science and Google Scholar databases to retrieve the pertinent studies and reviews. The papers published within the English language were exclusively evaluated. No other limitations were applied. The particular catchphrases used were tea catechins or tea polyphenols or with the terms retaining, bioavailability, assimilation, or nanoparticles, prodrugs, per acetylate, and synergistic also in light of the fact that the terms improvement and overhaul. First, into a discussion on the bioavailability of catechins, and then, to supply more thorough insights into the way and mechanism to enhance.

The aim of this study is to guage the capacity of β-cyclodextrin (β-CD) to recover phenolic compounds from tea leaves. The ethanol/water mixture presented the very best for the total phenolic content from the extract taken, followed by those obtained using β-CD solution and water. The extracts showed that the HPLC analysis by the addition of β-CD to the extracting agent had a significant effect on the extraction of epigallocatechin gallate (EGCG) and epicatechin gallate (ECG). The extraction yield of EGCG and ECG using 15 g/L β-CD were above that obtained using water and 50% ethanol. The indicated molecules result in the molecular docking of EGCG and ECG was tend more to interact with β-CD than epigallocatechin, epicatechin, and gallocatechin. The impact of β-CD concentration, temperature, and time on EGCG and ECG extraction from tea leaves was investigated and therefore the maximum amount of EGCG (118.7 mg/g) and ECG (54.6 mg/g) were achieved when extracted with 25 g/L aqueous β-CD solution at 60 °C for 60 min. this study indicates that aqueous β-CD are often used as an alternate to organic solvents to recover EGCG and ECG from tea leaves. application pt Tea catechins have recently received much attention thanks to their health benefits and functionality and are widely utilized in pharmaceuticals, nutraceuticals, and cosmetics. The extraction of catechins is that the 1st step for his or her further use. Generally, organic solvents are wont to recover phenolic compounds from plants. However, use of organic solvents may end in environmental pollution and cause health problems in persons. This study has proved that β-CD has the potential to exchange organic solvents to extract EGCG and ECG from tea leaves.

Nanostructure-based drug delivery system is one among the fastest-emerging areas in improving the bioavailability of medicine. Many studies showed promising EGCG-loaded nano-carriers with sustained release and improved bioavailability even at much lower doses than conventional preparations. Encapsulation materials including lipids, proteins, carbohydrate are often used as carriers and exert improving effects on the bioavailability of diet catechins including EGCG, via enhancing its solubility, preventing its degradation within the intestinal environment, elevating the permeation in intestine , leading to an increased concentration within the bloodstream.

The stability of EGCG was improved when sure to bovine albumin (BSA). Both EGCG ovalbumin−dextran conjugate nanoparticle and chitosan coated BSA–EGCG nanoparticle showed significantly higher apparent permeability coefficient compared to free EGCG in solution, leading to an improvement of the EGCG absorption. The radioprotection effect of chitosan coated BSA–polyphenols nanoparticles by oral administration in mice was significantly above that of free polyphenols. A catechin-loaded Nano emulsion-based nano gel showed sustained release profile, leading to enhanced photo protection potential to skin thanks to its improved permeability also as bioavailability through transdermal route, compared to the traditional gel, during which gelatin showed higher bio accessibility and antioxidant activity than chitosan. Milk proteins, containing caseins and whey proteins, were considered as ideal carriers for delivering catechins. Sodium caseinate adsorbed at the oil water interface, can load high ratios of EGCG. Casein micelles are often used as protective carriers for EGCG in foods. it had been demonstrated that nano encapsulation of EGCG in casein micelles didn't diminish anti proliferative activity of the catechins on carcinoma cells, compared with free morpheme EGCG.

Accordingly, casein micelle is taken into account to be a perfect platform for catechin delivery while the binding of caseins with EGCG wouldn't affect the bio accessibility of EGCG. Other proteins like corn zein protein, soy protein and rice bran protein isolate were confirmed to enhance the steadiness, bio accessibility and permeability of catechins, and will be used as satisfactory carriers for tea catachins. Incorporation of EGCG in zein fiber-forming solution through hydrogen bonding, hydrophobic interactions, and physical encapsulation enhanced the stabilization of EGCG. it had been found that a mix of tea catechins and vitamin C significantly increased tea catechins' recovery during a simulated in vitro digestion system. Absorption of EGC and EGCG was significantly enhanced in formulations containing vitamin C and carbohydrate derives. Also, accumulation of EGC, EGCG and ECG by Caco-2 cells was significantly increased in formulations containing vitamin C and sucrose. As many other bio active compounds other than

ascorbic acid will show more synergistic interactions with tea catechins. A major challenge for cancer chemotherapy and radiotherapy is time-dependence multi-drug resistance (MDR), as well as treatment interruptions caused owing to various side effects. To overcome this shortcoming, developing novel combination therapies for chemotherapy and bioactive dietary compounds will be a trend in future. As the catechins combination with other drugs which shows more synergistic effects will be a promising approach.