Contribution ID: **205** Type: **Poster**

(-)-Epigallocatechin Gallate: Anticancer potential, Therapeutic challenges and Translational Promises

Green tea, derived from *Camellia sinensis,* is a widely consumed beverage acclaimed for its health benefits, primarily attributed to its abundant polyphenol content, particularly catechins. The predominant bioactive catechin in green tea, (-)-Epigallocatechin-3-gallate (EGCG), is recognized for its antioxidant, anticancer, antidiabetic, and neuroprotective properties. However, (-)-EGCG faces challenges such as poor lipid solubility, low bioavailability (0.2–2%), and instability within the body due to its hydroxyl-rich structure (Almatroodi et al., 2020). However, its efficacy is constrained by factors such as insufficient intestinal absorption, rapid metabolism, and limited tissue accumulation. Recent studies have explored strategies to enhance the bioavailability of (-)-EGCG, including nanoparticle delivery systems, structural modifications, and synergistic combinations with other compounds. This review explores the biochemical characteristics of (-)-EGCG, its health benefits, and the latest advancements aimed at overcoming its pharmacokinetic limitations to improve its therapeutic application.

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Track Classification: Biological Sciences