

Recent Updates on the Pharmacological Potential of Plant-based Rutin

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Backgrounds: Flavonoids have been found to be beneficial in the treatment of several diseases owing to their intense biological activity, bioavailability, and safety aspects. Rutin, an important polyphenolic flavonoid, is consumed on a daily basis in the diet. Rutin, also known as vitamin P and quercetin-3-O- rutinoside, is a nontoxic and non-oxidizable molecule. It is present in vegetables, food items, and beverages.

Objectives: The present review is aimed at providing a comprehensive overview of the medicinal attributes, metabolism, biological and pharmacological activities, and mechanisms of action of rutin. Limitations and future prospects on rutin related research are also described.

Methods: Various search engines and databases were used for literature search with keyword combinations including rutin, antioxidant, pharmacological efficacy, bioavailability, clinical studies, and molecular targets.

Results: A wide range of *in vitro* and *in vivo* studies on rutin suggested its potential biological and pharmacological effects, including antioxidant, anti-inflammatory, antidiabetic, anti-hyperlipidemic, renoprotective, hepatoprotective, cardioprotective, and anticancer activities. Rutin exhibited the drug action by modulating various signaling pathways, including PI3K/AKT pathway, β -catenin signaling, JAK-STAT signaling, and apoptotic pathways.

Conclusion: The available data suggest the potential therapeutic utility of rutin against a diverse number of disorders, mainly derived from its antioxidant activity and the modulation of signaling pathways. Further, it helps in minimizing the side effects of the therapy for the treatment of several chronic diseases. Thus promising activities of rutin make it a potent drug candidate.

Keywords: Rutin, metabolism, antioxidant, antidiabetic, anticancer, cardioprotective, signaling.