Karanjin: a potential furanoflavonoid for neuroprotection

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Abstract

Phytochemicals are widely known for the pharmacological effects in treating various human conditions and in recent years, new compounds are being discovered with substantial health benefits. Karanjin is a furanoflavonoid mainly isolated from *Millettia pinnata* L., emerging in the field of pharmacology and exerting potential therapeutic values in pre-clinical studies. The review aims to highlight the potential of karanjin as a neuroprotective agent with the significance of modulating the underlying molecular

mechanistic pathways. Common neurodegenerative diseases reported globally include Alzheimer's disease, Parkinson's disease, Huntington's disease, and amyotrophic lateral sclerosis. The main problem in the treatment of neurodegenerative diseases is the effect of the prescribed drugs for the underlying conditions is only momentary whereby a permanent solution is unavailable. Bioactive compounds under the class of flavonoids have largely been acknowledged for neuroprotection in pre-clinical studies and partial clinical trials through various mechanism of action such as modulation of NF-kB pathway, inhibition of oxidative stress, modulation of PI3K/Akt, and more. Molecular docking results of karanjin have proven the potential against Alzheimer's and Parkinson's disease through modulation of molecular targets adenosine A2A receptor, α-synuclein, catechol-*O*-methyltransferase, monoamine oxidase B, angiotensin converting enzyme, β-site APP cleaving enzyme, glycogen synthase kinase-3, TNF-α converting enzyme, and acetylcholinesterase involved in the disease progression, compared to commercial standard drugs. The review emphasizes the optimization method for the isolation of karanjin and the various impending mechanistic effects of karanjin in modulating neurodegenerative diseases.