

Role of some Morin-nanoconjugates in ameliorating inflammatory disease

Abstract:

Nanotechnology flourishes in the medicinal field for the treatment of chronic human diseases due to their several advantages. Recently, nanomedicine is applied in different ways such as chemotherapeutic agents, biological agents, immunotherapeutic agents etc. in the treatment of various diseases. Nanoparticles remain in the blood circulation for prolonged time. So high dose of drug is not required which reduces the adverse side effects of the drug. Nanoparticles can easily penetrate through cell membrane and reach to its preferred location which increases its efficiency.

Nanoparticles exhibit unique structural, chemical, mechanical, magnetic, electrical, and biological properties. In recent time, nanoparticles are used as carrier by encapsulating or attaching the drug molecules. By doing some surface modification the drugs can also be delivered to target tissues more accurately in a controlled way. Nowadays, nanoparticles are widely used in medical biology and disease prevention and remediation because of all these interesting features.

The combinatorial delivery of nano-encapsulated bioactive natural compounds along with the synthetic drugs or other natural components owes to have growing interest in recent times. Nano-carriers can enhance the half-life of drug, increase permeability and retention. So, this method of delivery of natural bioactive compounds is very impactful for the treatment of various inflammatory diseases. Currently, natural components have been thoroughly examined in curing diseases because of their characteristic features. In comparison to conventional drugs, polymer based nanoparticles encapsulated with bioactive natural components are more beneficial due to their stability, biocompatibility and biodegradability.

Natural compounds are widely available in plants, vegetables and fruits. Its medicinal importance has been extensively studied and established. Alkaloids, flavonoids, polyphenols, tannins, terpenes, saponins are the major bioactive molecules among others. Morin, a widely available natural flavonoids which are considered to have biological activities like anticancer, antioxidant, anti-inflammatory, anti-diabetic, anti-arthritis properties. But, the low absorption,

low permeability, poor solubility reduce its bioavailability and efficacy. Also due to its high systemic clearance morin require repeated applications and/or high doses. This further lessens its therapeutic use. Formulations of various biocompatible and biodegradable biopolymers based nanoparticles encapsulated with morin are able to solve the above mentioned limitations, maximize their delivery efficiency and increase the desirable benefits.

In the thesis work, we formulated the different polymeric nanocomposite of morin to address those limitation , enhance the therapeutic efficacy and evaluating its protective effect on inflammatory diseases. Therapeutic efficacy of the nanoparticles are high because of unique features like the high surface area to volume ratio, and controllable biologic properties like enhanced solubility, improve pharmacokinetic profile and targeted delivery.

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