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Formulation development and evaluation of naturally found antioxidant

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Antioxidants are substances which counteract free radicals and prevent the damage caused by them. Coenzyme Q10 (CoQ_{10}) or ubiquinone is naturally found regenerable, bioenergetic, powerful, endogenous cellular antioxidant. It is a fat-soluble, pseudo-vitamin, composed of a long side chain containing ten isoprenoid units, hence the name CoQ_{10}. It is a yellow-orange colored crystalline compound that can be synthesized *de novo*. It is available in the membranes of the Golgi, where it is present at an even higher concentration than in the mitochondria, as well as in plasma membranes. It acts as an electron and proton carrier in the mitochondrial respiratory chain activity as well as in Golgi and plasma membranes for NAD(P)H-oxidoreductase-dependent reactions such as in nitric oxide synthesis. It plays a crucial role in the production of adenosine triphosphate (ATP). It protects phospholipids and mitochondrial membrane proteins from peroxidation and protects DNA against the oxidative damage that accompanies lipid peroxidation. It has been demonstrated that CoQ_{10} acts as a radical scavenger whose effects on improvement of cognitive functions has been shown. CoQ_{10} functions as an antioxidant help to regenerate other antioxidants; influencing the stability, permeability and fludity of membranes; and stimulating cell growth and inhibiting cell death. CoQ_{10} is also indispensible for the maintenance of the bioenergetics of skeletal and heart muscle. It is present in the body in both the reduced (ubiquinol) and oxidised (ubiquinone) forms. Its reduced form, ubiquinol is also an antioxidant. When cell membranes are oxidized, ubiquinol is the first antioxidant consumed. Moreover, the formation of oxidized lipids and the consumption of α-tocopherol are suppressed while ubiquinol is present.

A deficiency in either its bioavailability or its biosynthesis disrupts normal cellular functions and can lead to one of several disease states. Dietary contributions of CoQ_{10} are very small, but supplementation is effective in increasing plasma CoQ_{10} levels. CoQ_{10} has been reported to have a wide range of therapeutic effects, effective in numerous disorders and deficiency states and that supplementation has a favorable outcome. It is widely used as an anti-aging substance, as a drug for chronic heart failure, as a nutritional supplement, and in cosmetics.

CoQ_{10} is practically insoluble even in the presence of 5% sodium lauryl sulfate in water and poorly absorbed from the gastrointestinal tract. The slow absorption of CoQ_{10} from the gastrointestinal tract is attributed to its high molecular weight and poor water solubility. Various solubilization strategies therefore, have been developed so as to increase its solubility. In this study, self emulsifying preconcentrate of CoQ_{10} have been developed with the aim to increase its aqueous solubility. Optimization and assessment relied on solubility studies, emulsification efficiency, phase diagrams, dilution robustness, cloud point, particle size, and *in vitro* dissolution. Release studies demonstrated a significant increase in CoQ_{10} release from the developed system compared to plain drug suspension.

Biography

Anuj G. Agrawal has completed his M.Pharm at the age of 23 years from University of Mumbai under the guidance of Prof. (Dr) R. R. Somani with outstanding academic record. Currently, he is a research scholar and has published 8 papers in various national & international journals and few more papers are in communication. A book chapter in his name is published in INTECH publisher. He has delivered oral and poster presentations at different national & international meetings which include the presentation at CSIR-National Physical Laboratory, New Delhi, University of Mumbai, Controlled Release Society-Indian Chapter, etc. He had received a travel grant from Gov. of India to attend the conference at Moscow, Russia.

Inhibitory effects of methanolic extract of *Salvia fruticosa* Mill. on pro-inflammatory cytokines production in RAW 264.7 *in vitro* cellular model and in Balb/c mice *in vivo* animal model

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The aim of this study is to elucidate the anti-inflammatory effects of methanolic extract (MeOH) of *Salvia fruticosa* Mill. (*S. fruticosa*) on the production of pro-inflammatory cytokines in lipopolysaccharide (LPS)-stimulated RAW 264.7 cells and in Balb/c mice. Tumor necrosis factor –α (TNF-α), interleukin-6 (IL-6), and interleukin 1β (IL-1β) production in RAW 264.7 cells and in Balb/c mice were evaluated. The extract of *S. fruticosa* exhibited potent inhibitory effects on pro-inflammatory cytokines production in both cellular and animal models stimulated by LPS. Our data suggest that the methanolic extract of *S. fruticosa* could be developed as a potential anti-inflammatory candidate for the treatment of inflammatory diseases mediated by overproduction of pro-inflammatory cytokines such as rheumatoid arthritis.