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Development of a nanoemulsion loaded with naringenin

ABSTRACT. Alzheimer's disease (AD) is a progressive neurodegenerative disorder that leads to deterioration of a patient's memory, cognition and communication abilities. Numerous studies have indicated that oxidative stress is also a major reason behind the pathophysiology of AD. Oxidative stress can cause neuronal damage and modulate intracellular signaling, ultimately leading to neuronal death by apoptosis or necrosis. Hence, antioxidants have been studied for their effectiveness in reducing these deleterious effects. Naringenin, a polyphenolic compound obtained from grapefruit and sour oranges helps lessen oxidative stress and has been found to be effective for the treatment of AD. In the present study, an o/w nanoemulsion (NE) loaded with naringenin was prepared using labrasol as oil, igepal as surfactant and glycerol as co-surfactant, and characterized (particle size, polydispersity and zeta potential) by *in vitro* methods. The NE was clear (100% optical transmittance) with spheres of mean diameter 74.8 nm, monodisperse (polydispersity index PDI = 0.229) and a zeta potential of –29.6 mV. *In vitro* release into phosphate buffer saline (pH 6.8), artificial cerebrospinal fluid and simulated nasal fluid was studied up to 24 h. The encapsulation of naringenin in a NE sustained its antioxidative potential and stability compared to an aqueous solution. It was concluded that the NE could be used as an effective carrier of naringenin for the management of AD.

Keywords: Alzheimer's disease, *in vitro* release, oxidative stress

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