**VITAMIN D3 LOADED NANOEMULSION FOR SUSTAINABLE NUTRIENT DELIVERY**

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**Abstract**

Vitamin D is a liposoluble vitamin and very sensitive to oxidation, UV light and heat. Nanoemulsions are firm liquid dispersions and droplet size ranging from 50 to 500 nm. Currently, these are great interest in food and pharmaceutical industries because of its efficient delivery system for lipophilic compounds. The aim of the study is to formulate Nanoemulsions (NEs) as sustainable nutrition delivery system for vitamin D**3**. Nanoemulsions were prepared by wash-out method by using magnetic stirrer. Nanoemulsions were formulated and fabricated using Fish oil, Tween 20 (surfactant) and Vitamin D**3** wherein the aqueous phase was added continuously to the blend of oil (fish oil), surfactant (tween 20) and functional component (vitamin D3). Various surfactant and oil concentrations were employed and conditions were optimized to ensure stability. Since vitamin D is very sensitive to light, heat and oxygen, an ice bath was used while stirring magnetically. After the formulation of nanoemulsions, the liquid dispersed nanoemulsions were subjected stability test in room temperature and in refrigerator (-4$ ℃$). Fourier transform infrared (FTIR) spectroscopy was used to screen functional groups present in nanoemulsions. This study concluded that the delivery of lipophilic compounds like vitamin D**3** which was loaded in nanoemulsions will help for sustainable nutrient delivery.

**Keywords:** Nanoemulsions, vitamin D**3**, fish oil, sustainable, nutritient delivery