Cannabis-Infused Edible Products: Water-Soluble Cannabinoid Formulations

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Abstract
The cannabis industry has seen tremendous growth in the last year with the legalization of recreational cannabis in Canada. While most of this growth has come from cannabis flower, the fastest growing subset of the market is hemp-derived cannabidiol (CBD) products. CBD is one of the major cannabinoid constituents of cannabis/hemp, with a chemical structure similar to that of tetrahydrocannabinol (THC) but with no psychotropic activity. CBD has been reported to have positive effects such as anti-inflammation, prolongation of sleep, anticonvulsant, anxiolytic, and relief of neuropathic pain [3]. With Canada set to legalize cannabis-infused edible products next month, a diversity of commercial food products made from cannabis and hemp extracts are being developed including cannabinoid-infused beverages [1, 2]. The two main cannabinoids of interest (CBD, THC) are highly lipophilic, therefore the emulsification and/or encapsulation of cannabis/hemp oil is a key step in manufacturing water-based cannabinoid products. Strategies for encapsulation are classified as surfactant-based (micelles, microemulsions, liposomes, dilutable non-lamellar phases), emulsion-based (emulsions, nanoemulsions, multiple emulsions, solid-lipid nanoparticles), biopolymer-based (hydrogels, filled gels), as well as combinations of all or some of the prior strategies [2,5]. The role of carrier oils in water-soluble CBD and THC formulations is one of the focuses of their utilizations [4]. Oral bioavailability of cannabinoids is known to be very low in humans, therefore it presents another challenge as consumers generally prefer faster onset of action by CBD or THC. In a recent study, researchers developed a novel nanoemulsion preparation of CBD (CBD-NE) to improve the poor solubility and absorption of CBD. Oral administration of CBD oil and CBD-NE were examined in rats and their pharmacokinetic profiles of CBD and the effect of bile secretion on CBD absorption were evaluated. The results indicated the novel nanoemulsion formulation successfully improved the absorption of CBD, and thus could be useful to achieve a more stable and quicker onset of action by cannabinoids [3].

References