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Freeze dried *Salvia officinalis* methanolic extract incorporated into nanostructured lipid carriers for Alzheimer's disease treatment

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Alzheimer's disease (AD) is a chronic and progressive neurodegenerative disease that accounts for 70% of all patients with dementia with approximately 36 million cases in the world. Having in mind that AD pathophysiology involves more than one aspect and that single target drugs are not always efficient in the desired extent, promoting multi-targeted drug therapy would be a better pathway to achieve efficient treatment. Considering that natural products are multi-target as they are rich reservoir for drug discovery because of their diversity and complexity of structures, it has been suggested, on the basis of traditional medicine, its *in vitro* cholinergic binding properties, antioxidative effect, modulation of mood and cognitive performance in humans that *Salvia officinalis* might potentially provide a novel natural treatment for AD. In order to improve its penetration into the brain and circumvent problems associated with blood brain barrier, incorporation of *Salvia officinalis* extracts into nanostructured lipid carriers (NLC) might be a rational approach into the development of novel dosage form for efficient AD treatment. Three different formulations of NLC loaded with freeze dried methanolic extract of *Salvia officinalis* (FMSE) were prepared using solvent evaporation method. Lipid phase consisted of 0.1g (*NLC*-FMSE1), 0.15g (*NLC*-FMSE2) and 0.2g (*NLC*-FMSE3) phospolipon 90H (kindly donated by Phospholipid, Germany) and 0.065g oleic acid (Sigma-Aldrich, Germany), 4.3g ethanol (Alkaloid, Macedonia) and 0.025g FMSE. Water phase was composed of 0.18g Tween 80 (Merck, Germany), 0.045g poloxamer 407 (BASF, Germany) and 8.8g distilled water. All prepared formulations were characterized with particle size in range of 132±0.97 to 154±0.2 nm, unimodal particle size distribution from 0.918±0.1 to 1.181±0.02 Span, encapsulation efficiency of 52.74±1.2 to 77.71±1.8 % and prolonged drug release (18 to 22% for 24h). Obtained results were in favor of their potential for efficient treatment of Alzheimer's disease.