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Anti-aging nanoformulation with extract of *Myrtus communis L.*

Abstract

Myrtle (*Myrtus communis* L.) is an evergreen shrub belonging to the family of Mirtaceae that grows spontaneously throughout the Mediterranean area. This plant is widely used because its medicinal properties such as anti-inflammatory and immune-stimulatory properties [1].

In this study, supercritical fluid extraction (SFE) extracts were obtained at 23 MPa, 45◦C and a CO_2 flow of 0.3 kg h^{-1}using ethanol as co-solvent with a flow rate of 0.09 kg h^{-1}[2]. Their *in vitro* antioxidant capacity was determined using DPPH method. Then, the extract was encapsulated into nanocarriers. The last aim was to improve the skin permeation of the loaded extract to prevent or treat skin problems.

Methods:

PLGA nanoparticles (NPs) were prepared by emulsification/solvent diffusion method and their mean particle size/polydispersity index (PI) were measured by dynamic light scattering. Encapsulation efficiency was also determined [3].

Results:

Concerning antioxidant activity of the extract, this study showed that the extract had 93% of activity.

Results of nanoparticle characterization are displayed in Table 1. Particles were very small and monodisperse. The particle size is crucial for skin permeation through the hair follicles. This fact is reported in several papers. As example, Otberg et al. [4] applied caffeine in a mixed solution of ethanol:polylene glycol to volunteers before and after blocking all hair follicles with a varnish solution. In this study, caffeine was observed in blood 20 min after application on the hair follicle-blocked skin, but 5 min after topical application to normal skin. A possible reason for the more rapid appearance of drug in blood is the rapid absorption of the substance penetrating through hair follicles to blood capillaries. We expect that our polymeric nanoparticles will permeate hair follicles.

Table 1: Characterization of the loaded NPs

	Size (nm)	PI	Zeta Potential (mV)
Mean	219.67	0.11	*-20.32*
SD	9.86	0.05	1.27

Our future studies will include permeation studies using in vitro models simulating the skin permeation.

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