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Development of nanoemulsions with vegetal oils enhanced by melaleuca oil

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PURPOSE OF THE ABSTRACT

Nanoemulsions are transparent or translucent systems, characterized by the very small droplet size, that enhances stability and the delivery of active ingredients through the skin, due to the size of the droplets and the large surface area of the system [1]. To improve the absorption and stability of the nanoemulsion, many technics can be used to control the droplet size and distribution, such as concentration of surfactants and oils, preparation temperature and stirring speed [2]. Another factor that can interfere in particle size and nanoemulsion spontaneous formation is the physicochemical characteristics of the oils and surfactants, and this can be used to improve the nanoemulsion formation and decrease its droplet size [3]. The aim of this study was to verify the influence of the addiction of Tea Tree oil in droplet size and distribution, using two stable and previous known nanoemulsions. Tea Tree oil is an essencial oil, obtained by the leaves and terminal branches of Melaleuca alternifolia. Originated from Australia, this oil is been used in dermatology, among other, by its antioxidant, antibacterial and antifungal activities [4]. The original nanoemulsions were prepared using Babaçu oil (Orbignya Oleifera seed oil)[5] and Rice oil (Oryza Sativa Bran Oil) with addiction of 1, 2 and 3% Tea Tree oil. These preparations were submitted to 7 freeze-defrost cycles (14 days) [6] and the droplet size distribution was monitored for early signs of instability.

Material and method

1. Preparation of nanoemulsion: the EPI (Emulsion Phase Inversion) method was used. The oily and water phases were heated separately, until 75±2°C, and mixed under constant stirring until 25±2°C.
2. Freeze-defrost cycle: nanoemulsions were stored at 10°C for 24 hours and then 35°C for the next 24 hours, completing a cycle. Samples were submitted to 7 cycles.
3. Droplet size and distribution: The droplet size distribution was measured by using a dynamic light scattering instrument (Zetasizer Nano ZS, Malvern Instruments, Malvern, UK), after 24 hours, 7 and 14 days of the cycle.

FIGURES

FIGURE 1

FIGURE 2

KEYWORDS

BIBLIOGRAPHY

[1] T. Tadros, P. Izquierdo, J. Esquena, and C. Solans, Adv. Colloid Interface Sci. 2013,108?109, 303?318.
[2] A. H. Saberi, Y. Fang, and D. J. McClements, J. Colloid Interface Sci.. 2013, 391, 95?102.
[3] K. Bouchemal, S. Briançon, E. Perrier, and H. Fessi. Int. J. Pharm.. 2004, 280, 241?251.
[4] N. Pazyar, R. Yaghoobi, N. Bagherani, and A. Kazerouni. Int. J. Dermatol. 2013, 52, 784?790.
[5] V. C. Gumiero, doctoral thesis. USP. 2011.
[6] ANVISA, Brasília: Editora Anvisa, 2005.