جامعة عبد المالك السعدي
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Université Abdelmalek Essaadi

Pole for Doctoral Studies
Center for Doctoral Studies Sciences, Technologies, and Medical Sciences

ANNOUNCEMENT OF DOCTORAL THESIS DEFENSE

Ms. MDARHRI Yousra

Will present here research work with the aim of earning a Doctorate

Doctoral program: Sciences and Technologies Engineering
Discipline: Chemistry
Specialty: Chemical Engineering, Materials and Environment

On 11/10/2025 at 10H00 at Conference Hall F, Faculty of Sciences and Techniques of Tangier, UAE
Under the Theme

Design and Characterization of a Nanoemulsion Stabilized by a Food-Grade Biopolymer for Pharmacological Applications

Front of the jury composed of :

First Name & Last Name	Establishment	Designation
Pr. BEN ALLAL Laïla	FST of Tangier, UAE	President
Pr. MAURADY Amal	FST of Tangier, UAE	Reviewer
Pr. BOUKHRIS Said	FS of Kenitra, UIT	Reviewer
Pr. DERMAJ Ahmed	FS of Kenitra, UIT	Reviewer
Pr. LENDA Fatimazohra	FST of Tangier, UAE	Examiner
Pr. BOUASSAB Abderrahman	FST of Tangier, UAE	Examiner
Pr. TOUHAMI Fakhita	ENSA of Tangier, UAE	Co-Adviser
Pr. CHABBI Mohamed	FST of Tangier, UAE	Supervisor

Host Research Structure: Laboratory of Physical Chemistry of Materials, Natural Substances and Environment

Abstract

The growing demand for sustainability and the valorization of industrial by-products has driven the development of high-value, eco-friendly materials. In this context, our study focuses on the valorization of natural resources and the development of innovative delivery systems through several synergistic approaches.

This multidisciplinary work aims to integrate organic waste management and the exploitation of natural bioresources through the recovery of chitin from seafood industry waste and its conversion into chitosan, the extraction and characterization of argan oil obtained from Moroccan argan tree kernels (Argania spinosa L. Skeels), and the valorization of cannabidiol (CBD), a promising therapeutic compound derived from cannabis (Cannabis Sativa). Chitin was isolated from shrimp shells and deacetylated to produce chitosan. Both biopolymers were characterized using physicochemical and structural techniques, confirming their suitability for biomedical applications.

In parallel, argan oil was extracted and analyzed for its content of bioactive compounds, highlighting its high therapeutic potential. Based on these results, oil-in-water nanoemulsions of argan oil were formulated using a low-energy emulsification method. The incorporation of chitosan as a surface-active agent enabled the evaluation of its stabilizing effect on the colloidal stability and physicochemical properties of the formulations. Subsequently, CBD was encapsulated within these chitosan-enriched nanoemulsions. The resulting systems were subjected to a series of analyses to assess their physicochemical behavior and biofunctional potential, particularly in view of pharmaceutical applications. The findings demonstrated that chitosan significantly improved the stability and dispersion of argan oil within the nanoemulsion system, while also enabling effective encapsulation of CBD. These results open promising avenues for the formulation of delivery systems based on natural biopolymers. This research contributes to the development of sustainable biological carriers by combining marine waste valorization, the use of vegetable oils, and the encapsulation of bioactive molecules in biopolymeric matrices. It aligns with the goals of green chemistry, modern pharmacology, and environmental biotechnology, offering innovative and eco-friendly solutions.

Keywords: Nanoemulsions, Bioactive Molecules, Encapsulation, Biopolymers, Pharmacology.