

[Home](#) > [Materials Innovations and Solutions in Science and Technology](#) > Chapter

Formulation of Emulsion Containing Chloramphenicol and Cinnamon Essential Oil for Topical Use

| Chapter | First Online: 19 March 2023

| pp 55–71 | [Cite this chapter](#)

Materials Innovations and Solutions in Science and Technology

[Siti Hajar Musa](#) , [Nurhanis Fasiah Muhamad](#), [Fatin Fathia Mohd Ali](#) & [Nur'Aisyah Rifhan Mohammad Shuhaimi](#)

 Part of the book series: [Advanced Structured Materials](#) ((STRUCTMAT, volume 173))

 198 Accesses

Abstract

Methicillin-resistance staphylococcus aureus (MRSA) is a fatal pathogen that causes infections in various parts of the body due to high resistance toward wide antibiotics alternatives. The return of chloramphenicol is believed to overcome antibiotic-resistance issues of MRSA. In this study, chloramphenicol was cooperated with cinnamon essential oil in which the combination has been reported to be synergistically effective against MRSA. The emulsion carrier was formulated using both a high-shear homogenizer and an overhead stirrer homogenizer. Three emulsions were prepared at different compositions of cinnamon essential oil, water and surfactant based on the constructed ternary phase diagram. Samples with different formulation (F_1 , F_2 and F_3) were subjected to several tests including the stability, rheological, colony and invitro release analysis. F_1 , F_2 and F_3 possessed good stability against phase separation for 1 month storage at temperature 4 and 25 °C. All the formulations were having pH values within the range of 3–5 as well as showing no

mold and microbial growth after been incubated on nutrient agar plates at controlled conditions. From the rheological aspect, non-Newtonian and pseudoplastic flow behavior well-suited an emulsion for the topical used. A Franz diffusion cell was used in the permeation study where F_1 resulted in up to 60.83% of chloramphenicol permeation through the cellulose acetate membrane. This corresponded to controlled release mechanism and best-fitted to zero-order kinetic behavior ($R^2 = 0.9937$). Preliminary studies have proven that the formulated emulsion has a promising potential as topical medicament and could open up new possibilities for the production of pharmaceutical products. The increase in demand of topical skin treatment is predicted in this country together with other neighboring countries. The closely sharing genetic pool and environmental climate result in skyrocketing skin problems. Thus, the formulation could generate a great potential for a better future.

 This is a preview of subscription content, [log in via an institution](#)  to check access.

Access this chapter

[Log in via an institution](#) →

Chapter

EUR 29.95

Price includes VAT (Malaysia)

eBook

EUR 128.39

- Available as PDF
- Read on any device
- Instant download
- Own it forever

[Buy Chapter](#) →

Softcover Book

EUR 159.99

Hardcover Book

EUR 159.99

Tax calculation will be finalised at checkout

Purchases are for personal use only

[Institutional subscriptions](#) →

Similar content being viewed by others