Synthesis of Phenolic Fatty Acid Esters for Potential use as Ultra-violet (UV) Chemical Filters and as Skin Therapeutics

Ewonkem B. Monique[a]*, Deussom M. Pascaline[a], Mwande-Maguene Gabin[b], Tiakouang N. Eunice[a], Akone Sergi[a,c], Toze F. A. Alfred[a], Wansi J. Duplex[a]

[a] *Department of Chemistry, Faculty of Sciences, University of Douala, P.O Box 2701, Douala, Cameroon*•

[b] *Department of Chemistry, University of Sciences and Technics of Masuku, P.O. Box 901, Franceville, Gabon*•

[c] *Helmholtz-Institute for Pharmaceutical Research Saarland, University Campus E8 1, 66123 Saarbrücken, Germany*•

*To whom correspondence should be addressed: myewon@gmail.com

Introduction

- **Phenolic Fatty Acid Esters (PFAEs) belong to a new class of aromatic compounds possessing at least one benzene ring with a hydroxyl group and one fatty acid unit. They are capable of protecting and treating skin exposed to harmful effects of solar UV radiations that cause skin cancers, dermatitis, sunburns or aging.**
- **PFAEs are made from both natural occurring phenolic compounds that confer UV absorption properties to the molecules and non-toxic renewable raw materials like vegetable oils that increase the hydrophobicity, emollient and greasiness properties.**
- **In the present study, we designed and synthesized phenolic fatty acid esters from esterification of fatty acids and salicylic acid, curcumin or eugenol. We evaluated the UV absorption of PFAEs, photostability and *in vitro* sun protection factor of salicylate or eugenoate fatty acid esters.**

Goal

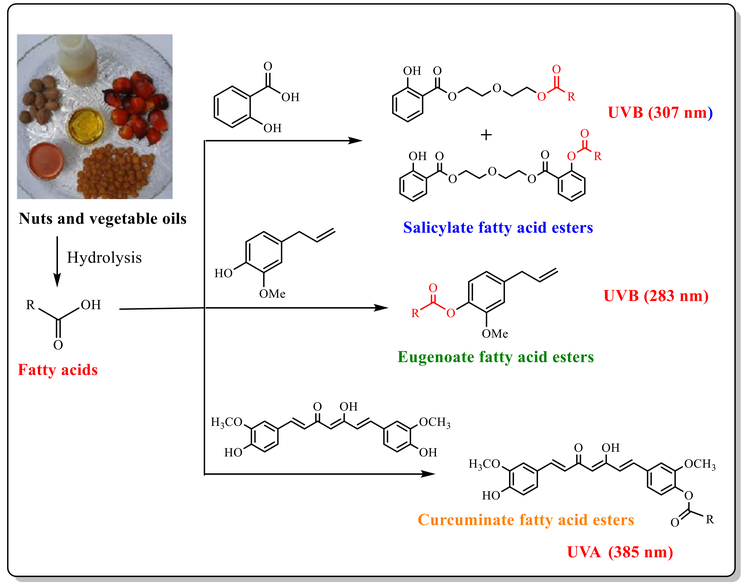
Develop a range of cosmetic and dermatologic ointments, based on synthetic PFAEs, capable of both protecting skin against UV sun radiations and treating skin diseases.

Conclusion & Perspectives

- **Natural occurring phenolic products and renewable resources like vegetable oils allow to synthesize phenolic fatty acid esters that are able to absorb UVB (280 – 320 nm) and UVA (320-400 nm). These PFAEs are photostable upon prolonged sunlight and photoprotective.**
- **The future challenge is to biologically test the synthesized PFAEs and use them as active ingredients in the manufacture of solar creams and therapeutic skin ointments.**

Results and discussion

Synthesis of phenolic fatty acid esters



Photostability studies

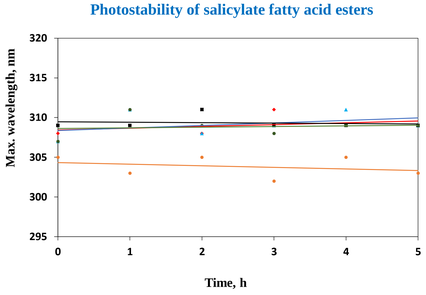


Photo protective properties

In vitro SPF according to Mansur et al. mathematic equation (**1**)

$$SPF_{in\ vitro} = CF \times \sum_{290}^{320} EE(\lambda) \times I(\lambda) \times abs(\lambda)$$

PFAEs	*In vitro* SPF values
Salicylate fatty acid esters	From 12 to 25
Eugenoate fatty acid esters	From 6 to 10

1. Mansur, J. S.; Breder, M. N. R.; Mansur, M. C. A.; Azulay R. D. An. Bras. Dermatol. 1986, 61, 121-124