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Incorporation of Bioantiseptics in Topical Antiseptic Crams Developed from Distilled Fatty Acids

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ABSTRACT

The goal of this study is to develop the formulation of Topical Antiseptic Creams (TACs), respectively with camphor and propolis as bioantiseptics. These TACs were formulated from Distilled Fatty Acids (DFAs), Soybean Oil (SO) and Palm Oil (PO). They were subjected to ISO Oleochemical Analyzes (OA) and supported by Spectral Methods (SMs), confirmed the concept of their formulations. Their Antimicrobial Activity (AA) reacted positively against Microbial Strains (MSs), suggesting that camphor TAC benefits from better AA, in favor of an alternative for improving the quality our healthcare.

Keywords: Antimicrobial Activity, Bioantiseptic Cream, Camphor, Distilled Fatty Acids, Propolis,

1. Introduction

Bides to their food use Fatty Substance (FS) fined particular interest in the technical field, such as Natural Substance (SN). This latter is antibacterial and antioxidant, with surfactant, biodegradable and unsaponifiable properties, favoring them for cosmetic formulations, until now very little exploited [1-2]. Although, there is a renewed interest in this SN, as reported in previous studies [1-3]. Hence, the interest of this study, where bioantiseptics (propolis and camphor) are included in the TACs developed from DFAs of SO and PO derived from co-products of a grease refinery. These DFAs were subjected to ISO OA, and supported by SMs. The AA evaluation of these TACs against MSs reacted positively and revealed to be very active on Gram $^{+}$ bacteria and not very active on Gram^{-} bacteria. Suggesting that only camphor TAC exhibits a better AA, thus selected as an alternative, opposing the controversial use of parabens [4]. These lucrative and multi-use green chemistry products, derived from co-products of grease refining, and should be valorized. Such valorization reduces the financial burden of fully renewable local surfactants. At the same time, the incorporation of these biotanseptics into these co-products contributes to herbal medicine, as well as biotechnological progress, playing a crucial role in improving our healthcare.

2. Experimental

The study was carried out during the winter period, in ideal conditions to perfect disinfection and sterilization conditions, similar to those of hospital practice. The study is carried out at the biochemistry laboratory, of the Faculty of Sciences, UMBB-Algeria. The experimental requirements for the synthesis of our TACs consist of DFAs as the main raw material, bioantiseptics (Propolis and Camphor), auxiliary products and MSs, detailed:

Distilled Fatty Acids (DFAs): were subjected to ISO OA, which is the Volatile Matter Content (VMC), Insoluble Impurities (IIm), Refractive Index (RI), Density at 20° C (D), Acid Index (AI), Iodine Index (IoI), Peroxide Index (PI) and Saponification Index (SI), corroborate by Gas Chromatography (GC) and Fourier Transform Infrared (FT/IR). Were supplied from the grease refinery (CEVITAL), Bejaia - Algeria

Bioantiseptics: for comparison purposes, two bioantiseptics, camphor and propolis, were chosen as antiseptic treatment. Of Algerian origin.

Auxiliary products: consisting of fatty alcohols (C6 - C20), glycerin, Eumulgine SM O20, Dehymuls F, boric acid, distilled water, acid citric. Every product was provided by the central pharmacy appointed SAIDAL, located in Algiers-Algeria. The AA of our TACs were evaluated against highly pathogenic SMs.

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Microbial Strains (MSs): Basically, three MSs were used for testing our TACs including Staphylococcus Aureus ATCC 43300 and Pseudomonas Aeruginosa ATCC 27853 as bacteria and one Candida albicans ATCC 2091 as yeast. These MSs are provided by the institute Pasteur, Alger, Algeria.

The TACs: were formuled, with a percentage (%) by mass of all the constituents relative to 100 g of preparation, was produced with a mixture of DFAs (10.0), Fatty Alcohol (10.0) (C6- C20), Glycerol (0.5) , Distilled Water (67.0) Citric Acid (0.5) and bioantiseptics (0.3) linked to camphor and propolis and evaluated following the AA with respect to the referenced literature [5-6].

3. Results and Discussion

According to the ISO OA results of DFAs, clearly note their fluidity making them an excellent lubricant. This specificity is corroborated by GC and infrared FT/IR: The chromatogram notes a striking absence of light FA (C <12) and odd carbon fatty chains. These latter's are preferential elements of the bacteria, from which, they derive their food substrate, conferring microbial virginity of our DFAs. Furthermore, a set of C_{18} was detected, known for their emulsifying and biodegradable properties. Offer them industrial applications, where they are used as lubricants, encouraging their interest where surfactants are in high demand. The spectrogram (FT-IR), suggest for the essential, the Absorption bands at 3007.94 cm -1 3008.98 cm -1 are attributed to vibrations -CH2 characteristic of FAs, and the band in the vicinity of 720 cm-1 corresponds to the vibration (CH2) n with n≥4 noted their fluidity [7]. Macroscopically, the homogeneity of the TACs was verified with the naked eye, testifying to their absolute homogeneity. The pH of TACs is close to that of the skin, therefore harmless. AA was carried out on potentially targets, because each is made up of cellular structures and a particular metabolism. AA was found to be very active on Gram+, but not very active on Gram, suggesting appropriate selectivity for camphor TAC in favor of better activity than that of propolis.

4. Conclusion

This study clearly concerns green chemistry, according to the incorporation of bioantiseptics into TACs developed by DFAs defined as co-product of a grease refinery. The results of these DFAs comply with ISO standards, guaranteeing the TACs formulation. Their AA results reacted positively on MSs all harmful to humans, directly or indirectly. Suggesting that camphorTAC has better AA than propolis TAC. This study extends use of DFAs where biosurfactants are in demand, and the addition of biotanseptics to these DFAs contributes to herbal medicine, as an alternative medicine.

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References

[1] Suffredini IB., Paciencia ML., Nepomuceno DC., Younes, RN., Varella AD., Antibacterial and cytotoxic activity of Brazilian plant extracts--Clusiaceae Mem Inst Oswaldo Cruz, 101(2006) 287.
[2] Lourenço FR., Pinto TDJA., Antibiotic microbial assay using kinetic-reading micro plate system, Brazilian Journal of Pharmaceutical Sciences 47 (2011) 584.
[3] Vynograd N., Vynograd I., Sosnowski Z A., comparative multi-centre study of the efficacy of propolis, acyclovir and placebo in the treatment of genital herpes (HSV), Phytomedicine 7(2000)1-6.
[4] Benkimoun P., Parabens present in 400 drugs. Le Monde FR (2011).
[5] Sonogo R., Formulation of a dermal ointment based on Mitracarpus Scalbert extracts (ZUCC), Med.Trad. Afr 14 (2006) 159.
[6] Gilbert L., Physico-chemical and sensory characterization of cosmetic ingredients, a methodological approach Polymers, Doctoral thesis, University of Havre, 2012.
[7] Didouche Y F., Valorization of industrial waste, ecological economic impact, Doctoral thesis, UMBB-Algeria (2012) 24.

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