

Food products in two cosmetic formulations: determination of the stability and toxicity

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Introduction

The cosmetic market is extending to millions of consumers worldwide and its industry is worth tens of billions of US\$.



The competitive environment and the demands made by the consumers pushed the manufacturers to develop new types of cosmetic products and to use new ingredients, such as bee products, to produce formulations with higher quality and efficacy.

Honey



Sweet and viscous fluid produced by *Apis Mellifera* L., from the nectar of flowers. Is antimicrobial, anti-inflammatory, antimutagenic, antitumoral and antioxidant. It is used as a vehicle in creams and lotions or to bind the ingredients in pastes.



Propolis

Resinous substance harvested from several plants by *Apis mellifera* L. It has higher antioxidant and antimicrobial activity in relation to honey. Is antibacterial, antifungal, antiviral, anti-inflammatory and antioxidant. Used in deodorants and purifying agents of the skin and as a preservative.

Objectives

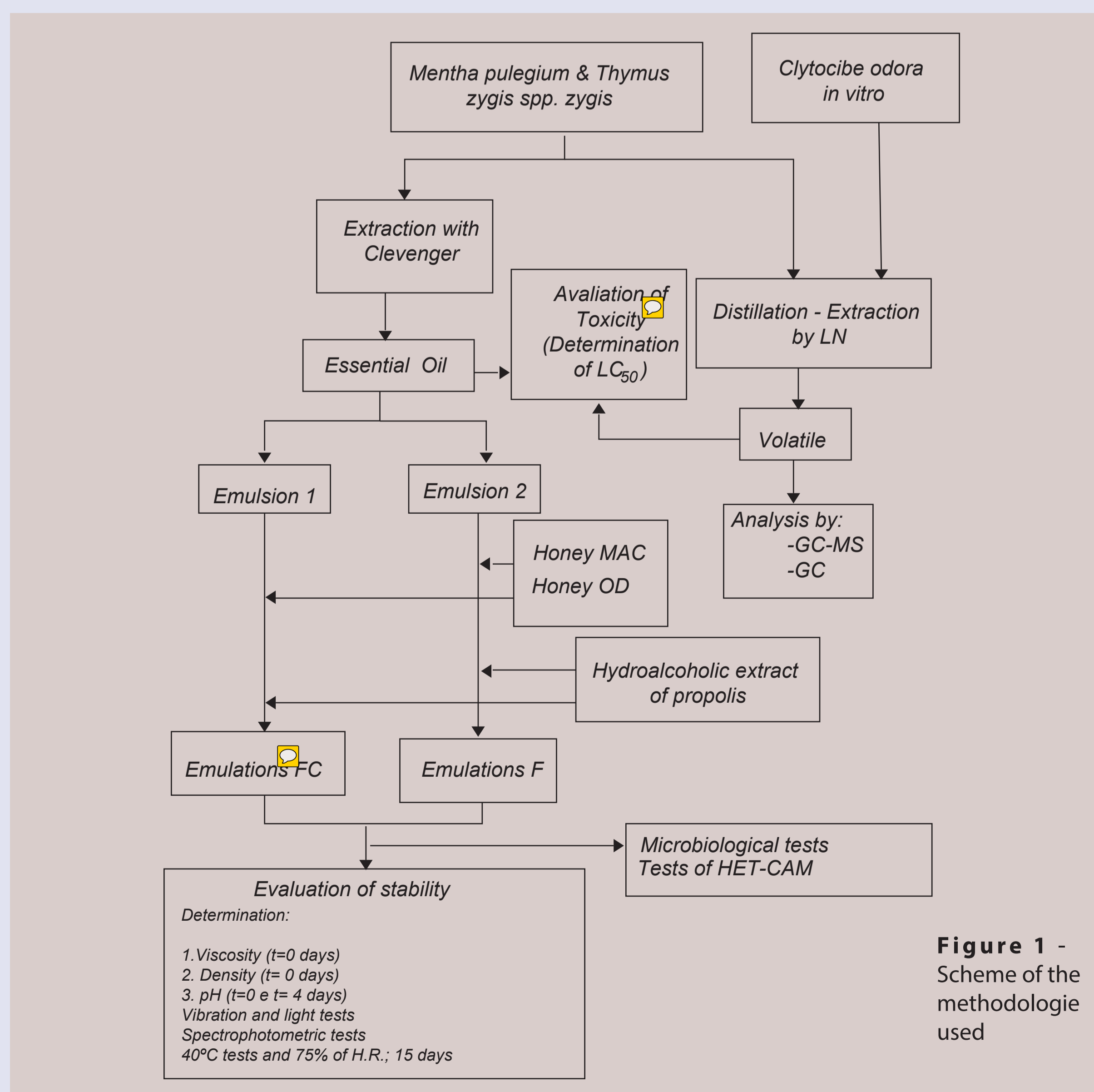
The aims of this study were:

To develop two cosmetic formulations for topical application that combine bee products and essential oils from two medicinal plants.

To extract and analyse the essential oils of an edible wild mushrooms *Clitocybe odora* (Bull.) P. Kumm, grown *in vitro*, to understand its potential as a source of bioactive compounds usable in cosmetics.

Materials and methods

Several preparations were prepared to which was added one of the essential oils and bee product using as the emulsion base two different emulsions, the emulsion 1 and the emulsion 2 from which were obtained the FC emulsions and the F emulsions respectively. (Figure 1)



Results and discussion

Incorporation of honey / propolis extract:
No influence in:

pH
Relative density
Behavior in the vibration test.

Influence in:

The UV-Vis spectrums
Test at 40°C and 75% of HR (change of colour and odor) - Due to the propolis extract

The cosmetic formulations evidenced a thixotropic flow behaviour, which is frequently observed in various cosmetic formulations^[2], Figure 2 and 3.

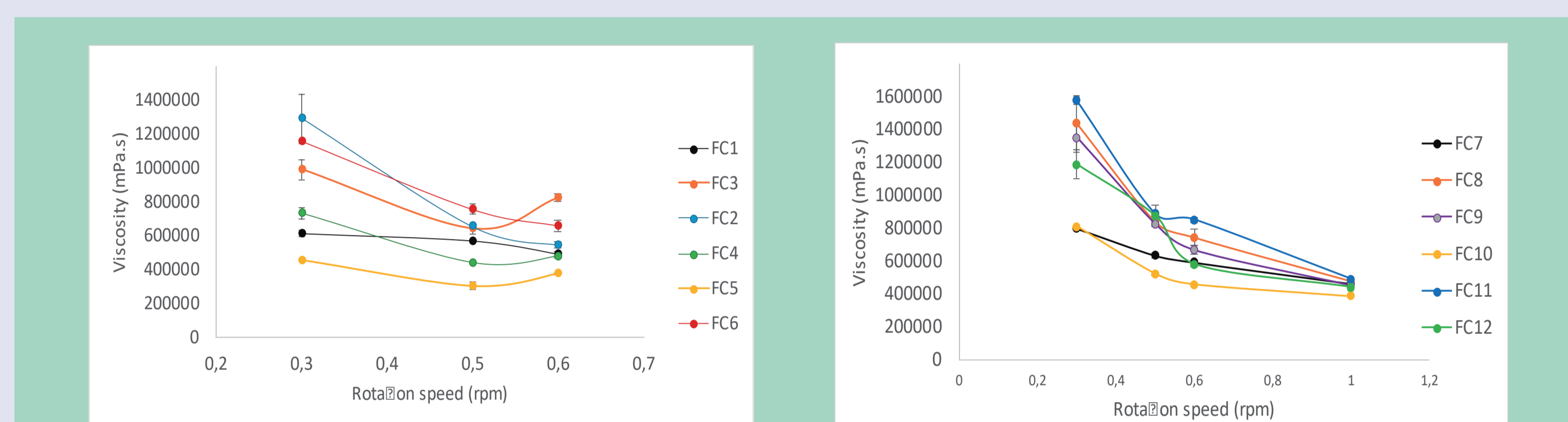


Figure 2 - Emulsion 1 with the incorporation of *Thymus zygis* subsp. *zygis*, essential oil.

Figure 3 - Emulsion 1 with the incorporation of *Mentha pulegium* L. essential oil.

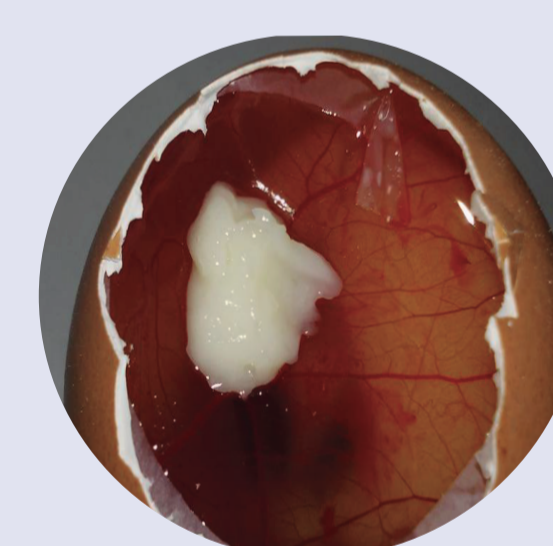
The preservation system used, the essential oils of *Mentha pulegium* and of *Thymus zygis* subsp. *zygis*, was effective, not having been observed the occurrence of contamination of the cosmetic formulations.

All the emulsions demonstrated to be bacteriostatic and fungistatic against the microorganisms *Candida albicans*, *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Escherichia coli*. Was also verified that the emulsions were bactericide in relation to the bacteria *Bacillus subtilis*.

	Essential oil of <i>Mentha Pulegium</i> L.	Essential oil of <i>Thymus zygis</i> subsp. <i>zygis</i>	<i>Clitocybe odora</i> volatils
LC ₅₀ (mg/mL)	>0.1	>0.1	>0.1

Important feature in cosmetic formulations

Potential biological activities



The results obtained using the HET-CAM test demonstrated that all the formulations are no irritating for the eyes. (Figure 3)

Figure 3 - HET-CAM test of the emulsion F with *Mentha pulegium* essential oil and propolis extract

Spathulenol, Figure 4, was identified as the most abundant compound in the volatile fraction of the *Clitocybe odora* (Bull.) wild mushroom, grown *in vitro*. This compound has been reported as possessing moderate cytotoxic activity^[4].

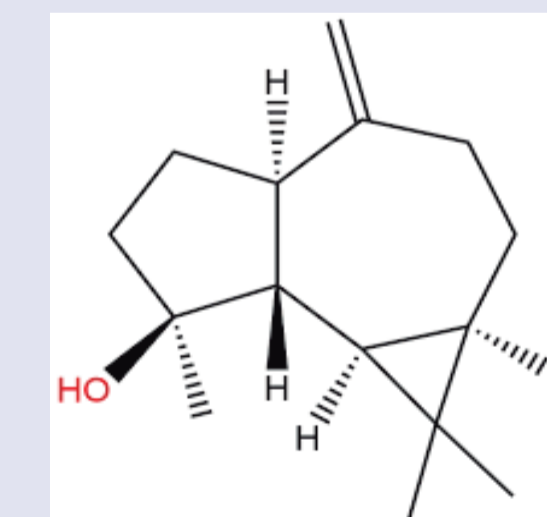


Figure 4 - Spathulenol

Conclusions

The viscosity is affected by the use of the honey and the hydroalcoholic extract of propolis. This extract is also the responsible for the change in the colour and the odor of the formulations.

The formulations are considered non-irritating to the eyes and microbiologically safe. The use of bee product does not affect the antimicrobial characteristics of the formulations.

The results obtained throughout this study show that the incorporation of the bee products studied (*Lavandula* spp. honey and propolis hydroalcoholic extract) and the two essential oils of *Mentha pulegium* L. and *Thymus zygis* subsp. *zygis* are an alternative that should be considered when formulating cosmetic products.

The spathulenol presents a high potential to be used in a cosmetic formulation and considering that it is the main compound in the volatiles of the *Clitocybe odora* (Bull.) wild mushroom grown *in vitro*, potentiates the use of this extract as an alternative source for this compound.

References

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