

Development and determination of the stability of cosmetic formulation with incorporation of natural products

Poster N°:XXX

Amira Bouranen⁽²⁾, Habib Mosbah⁽²⁾, Vitor M.R. Martins⁽¹⁾,
Maria João Sousa⁽¹⁾

⁽¹⁾Mountain Research Centre (CIMO), ESA, Polytechnic Institute of Bragança, Campus de Santa Apolónia, 1172, 5300-253 Bragança, Portugal

⁽²⁾Laboratory for Research on Genetics Biodiversity and Bioresources Valuation of (LR11ES41), ISBM, University of Monastir, Monastir 5000, Tunisia
joaos@ipb.pt

Introduction :

Nowadays, natural products are gaining increased popularity as cosmetic ingredients due to their active properties and the different roles they can play in a single cosmetic formula, acting as moisturizers, fragrances, surfactants and preservatives.

Objectives :

The aim of this study is to formulate and subsequently evaluate the stability and toxicity of an anti-aging gel based on natural products namely, bee pollen, and essential oils from two varieties of thymus, Portuguese specie *Thymus zygis zygis* and Tunisian specie *Thymus capitatus* applied as natural preservative.



Figure 1: Bee pollen



Figure 2: *Thymus capitatus*



Figure 3: *Thymus zygis ssp zygis*

Methods :

A- Extraction of essential oils :



The essential oils obtained via steam distillation method by CLEVENGER APARATUS.

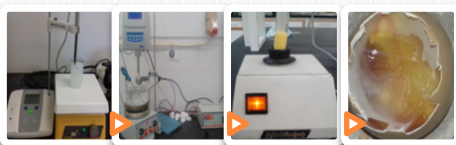
- Yield of *T. caspittatus*: 0,93% (w/v)
- Yield of *T. zygis*: 1,2%(w/v)

B- Preparation of formulation :

➤ For preparing the gel formulation, we tested different concentrations of methylcellulose and bee pollen in order to choose the adequate concentrations to work with.

C- evaluation of stability :

➤ Several physicochemical methods are used to evaluate the stability of gel formulation such test, density, Analyzes at different temperatures (freeze-thaw cycles), temperature stress tests, evaluation of the organoleptic characteristics (odour, colour and general aspect), UV spectrophotometric analysis, centrifuge test, texture, spreading resistance, through light test, and others tests such as :



pH Viscosity Vibration Inflammatory

The acute toxicity of the compound incorporated in the base formulation is determined through the evaluation of brine shrimp (*Artemia salina*) mobility.

The microbiological stability of the formulations will also be evaluated through agar diffusion assays using cultures of *Escherichia coli*, *Staphylococcus aureus*, *Candida albicans*, and *Pseudomonas ssp.*

Results :

Different percentage of methylcellulose:



Gel 1%	Gel 2%	Gel 3%	Gel 5%
Too liquid 2 phases	Less viscous	Good viscosity	Too much viscous

➤ Different amount of pollen:

0.5g pollen	1 g pollen	1.5 g pollen
Liquid gel	Stable viscosity	Liquefaction of gel after 3 days

The tests in the development of the formulations shows that the best combinations was the 1% of pollen in 3% of Methylcellulose as gelling agent

➔ The formulations prepared presented a pH value that seems adequate for topic application, and presented a non-newtonian flow behaviour, which is frequently observed in cosmetic products, besides evidencing no phase separation after centrifuge and vibration tests.

The tests of acute toxicity was performed but the results are preliminary, so they are not presented here. Therefore, the tests performed so far suggest that the cosmetic formulations prepared through the incorporation of the bee pollen and essential oils did not seem to influence negatively the stability of the cosmetic formulations.

Conclusion :

The obtained results demonstrate that these natural products can have a very high potentialities to be used in the development of new cosmetic products replacing the synthetic compounds which may have adverse and allergic effects for human health.