Inclusion of thermal water in dermocosmetic formulations and respective characterization and efficacy evaluation

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Keywords: Thermal water, Dermocosmetic formulations, Skin barrier, Stability, Efficacy.

Introduction

Alterations in cultural or economic or even mentality of the population, which cause the consumer to increasingly approve the use of cosmetic products containing ingredients of natural origin. Having such a will and of course associated with the advancement of science and technology, led researchers to use these new substances and active techniques to respond to consumer perspectives. Nowadays, many natural mineral waters have been used in cosmetic products due to their dermatological properties, representing an added value, referring to the end of the myth that the thermal water only takes effect when it is used alone in baths and sections of hydromassages. Particularly, the beneficial properties of the Cró thermal water, from Beira Interior of Portugal, for dermatological treatment can be conveyed in dermocosmetic formulations as a tool for maintenance, correction and improvement of skin properties.

The objective of this study was the development, characterization and efficacy evaluation of 3 dermocosmetic formulations with Cró thermal water as a specific ingredient to be used.

Methods and results

A hydrophilic carbopol gel, prepared using a neutralisation method with triethanolamine, a soap, using the saponification method with sodium hydroxide in reaction with stearic acid, and an O/W cream with zinc oxide and dexpanthenol, using a method of dispersing the oil phase in a major aqueous phase, were developed. The gel, the soap and the cream contained more than 90%, 5% and more than 60 % of thermal water, respectively. After the creation of the formulations, different tests were carried out that allowed the verification of the stability (organoleptic characteristics, viscosity, pH determination, rheologic studies and texture analysis) after 1 (T1), 15 (T15) and 30 (T30) days of storage, and to evaluate their efficacy through non-invasive biometric techniques (cutaneous pH, degree of hydration, sebum content, transepidermal water loss (TEWL) and skin relief). The main results achieved are shown in Table 1.

Table 1. Stability and efficacy results of the 3 formulations containing Cró thermal water

Formulation	Stability tests and results	Efficacy tests and results
Gel	Viscosity Firmness (~200 g) Adhesiveness (~ -1500 g.s) Spreadability (~3.0N) pH (5.6-5.9)	Skin pH (5.7 after 60 min) Hydration (↑ 50% in 30 min) TEWL (↓ 20% in 30 min) Skin relief
Soap	pH (8.5-8.6) Hardness (~2850 g.s)	pH (7.15 after 60 min) Sebum content – ↓ of about 87%
Cream*	Firmness (~275 g) Adhesiveness (~ -2000 g.s) Spreadability (~2.5N)	In vivo evaluation – Healing effect after 15 days

* evaluation only at T1

Conclusions

The dermocosmetic formulations based on thermal water showed good physico-chemical stability which demonstrates that the vehiculation of Cró thermal water did not compromise this characteristic. In fact, it was verified an improvement of rheological and textural parameters over time and a significant improvement in the skin biometric parameters was also achieved. This research project demonstrated the potential and promising benefits in the use of thermal water in dermocosmetic formulations that could be used in cosmetology and dermatology fields.