Preparation of herbal ointments by the method of crushing the flowers

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Abstract

The present work aims to elaborate the ointments prepared by the method of grinding the flowers of plant calendula arvensis and dandelion. The subject has been reinforced by characterizations namely physical analysis by measuring pH, conductivity and water resistance test, chemical analysis by infrared spectroscopy and morphological analysis (visually and microscopically). From the results, we noticed that in the macroscopic characterization, a semi-solid consistency and homogeneity for the two ointments prepared by the method of grinding the flowers of two plants: calendula arvensis and Dandelion. Microscopically, the both ointments (CAO and DO) have a better physical stability; the latter is characterized by a homogeneous appearance, which was obtained. The yellow flowers ointment DO shows a better chemical stability than the CAO orange flower by the presence of increase of intensity in all the characteristic bands, which confirmed by FTIR analysis, finally, both ointments are water resistant, which was confirmed by the test of water resistance .

Keywords: *herbal ointment, crushing flowers, beeswax, olive oil, physico-chemical analysis.*

I. Introduction

In English scientific ethnobotanical literature, most of the field studies conducted in Southern Europe and in the entire Mediterranean basin have been based on the traditional uses of medicinal plants within a single cultural context [1]. The need for an effective, safe and economical alternative therapeutic system that can prevent development of resistant microorganisms, and opportunistic infections has become critical. The increases in adverse effects in conventional medicines have navigated researchers towards safe herbal medicinal products. Phytotherapy refers to the alternative system of medicine, which uses plant products, herbs and shrubs for the management of diseases [2]. The components in plants that are having anti-inflammatory [3], analgesic, astringent, antioxidant, antibacterial and anti-fungal properties are called phytochemicals [4].
This plant contains several bioactive compounds, including terpenoids and terpenes (mainly bisabolol, faradiol, chamazulene, arnidiol and esters), carotenoids (mainly with rubixanthin and lycopene structures), flavonoids, (mainly quercetin, isorhamnetin and kaempferol aglycones) and polyunsaturated fatty acids, (mainly calendic acid) [5]. Today, many products essentially cosmetic and pharmaceutical [6] contain *calendula arvensis* and even *Dandelion*, like ointments and creams, and avoid chemical synthesis products that cause irritation and skin diseases [7] .
The present work aims at valorizing some work on the elaboration of ointments prepared by the method of grinding the flowers of plant calendula arvensis and dandelion. The subject has been reinforced by characterizations namely physical analysis by measuring pH, conductivity and water resistance test, chemical analysis by infrared spectroscopy and morphological analysis (visually and microscopically).

II. Materials and Methods

II.1. Materials

The flowers of Calendula arvenisis and Dandelion were collected on the campus of the University of Bejaia-Algeria. Beeswax olive oil are of the natural raw materials used in this work [7].

II.2. Methods

The following steps summarize the preparation of calendula arvensis and Dandelion ointments (see Figure 1):

- Carry out a drying of the flowers of the calendula in an oven regulated at a temperature of 45°C during four days (04), then chop the latter to have a fine powder.
- Melt the wax added with olive oil in a water bath until you have a homogeneous oily solution, then add the powder obtained to the liquid and let it simmer 15 minutes while stirring.
- Pour the mixture into a cheesecloth to filter, squeeze the mixture to extract as much liquid as possible.

- Quickly pour the liquid ointment into jars and close them without forcing.
- Once the preparation has cooled, screw the lids on tightly. The ointment obtained must be kept away from heat and light for about 3 months.

Figure 1: A- *calendula arvensis powder*, B- Beeswax *with olive oil*, C-the addition of plants powder into Beeswax *with olive oil* , D-.Ointment prepared

III. Analysis

- **The pH measurements and conductivities:** Measurement of pH and conductivity of obtained ointments and olive oil.
- **Morphological aspect** (macroscopically and microscopically aspect**):** provide information on the homogeneity of our ointments.
- **Chemical analysis**: FTIR spectra of the different samples were recorded using Agilent Technologies Cary 630 FTIR in the range of 4000-400 cm^{-1} with a resolution of 4 cm^{-1}.
- **Water resistance:** we have deposed a droplet of water on thin layer of ointment; the photos were taken of the different samples using an optical microscopy.

IV. Results and discussion

IV.1. Measurement of pH and conductivity

According to the obtained results of table 1 of pH [8] and conductivity values, the pH of DO is more than of CAO, and at the same time its conductivity is superior to that of CAO, which can be explained by the displacement of ions [7], [9]. i.e. the increase of the pH led to the enhancement of the conductivity.

IV.2. Macroscopic aspect

According to the results obtained from the macroscopic characterization shown in the Figure 2, a semi-solid consistency and homogeneity for the two ointments prepared by the method of grinding the flowers of two plants: calendula arvensis and dandelion [10].

IV.3. Microscopic aspect

According to the Figure 3 prepared ointments have a better physical stability; the latter is characterized by a homogeneous appearance, which was found for all prepared ointments of CA and D [11].

IV.4. Chemical analysis by FTIR

According to the results of figure 4, the characteristic bands of the different ointments that show the same appearance are summarized in the table. According to the results obtained from the ointments. The yellow flowers ointment DO shows a better chemical stability than the CAO orange flower by the presence of increase of intensity in all the characteristic bands.

Table 1: Measurement of pH and conductivity of ointments

Samples	pH	Conductivity(µs/cm)
Olive oil	6.82	2.80
Dandelion ointment (DO)	5. 45	3
Calendula arvensis ointment (CAO)	5.3	2.5

Dandelion ointment (DO)

Calendula arvensis ointment (CAO)

Figure 2 : Macroscopic aspect of CAO and DO (Before and after application on the skin)

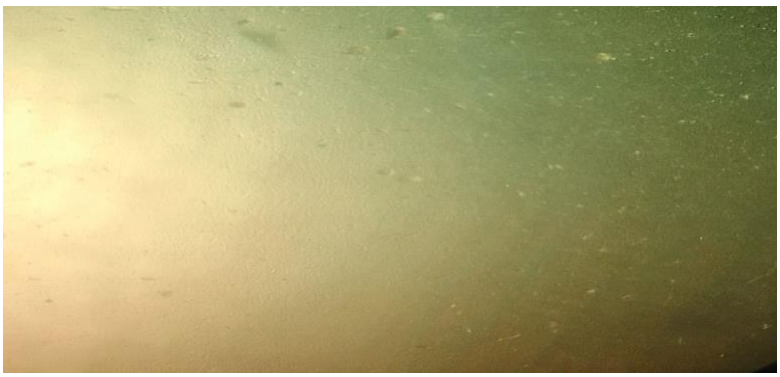


Figure 3 : Microscopic aspect of CAO and DO

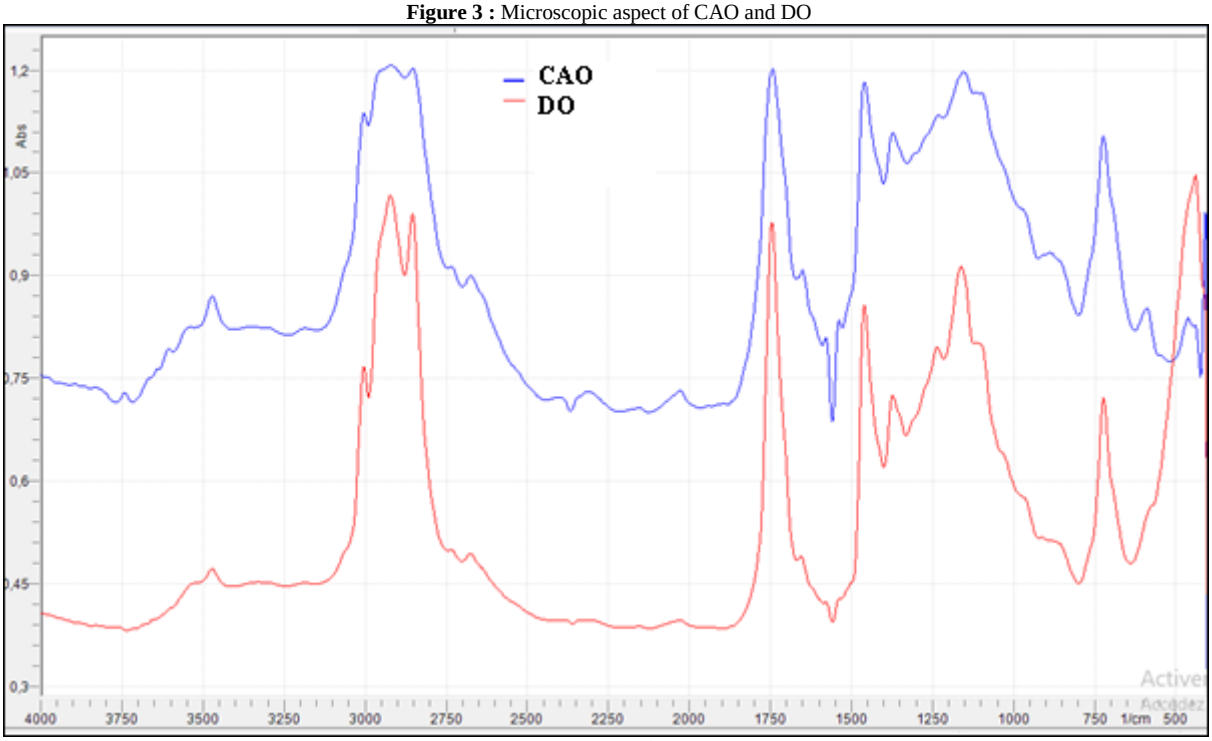


Figure 4: FTIR spectrum of the DO and CAO

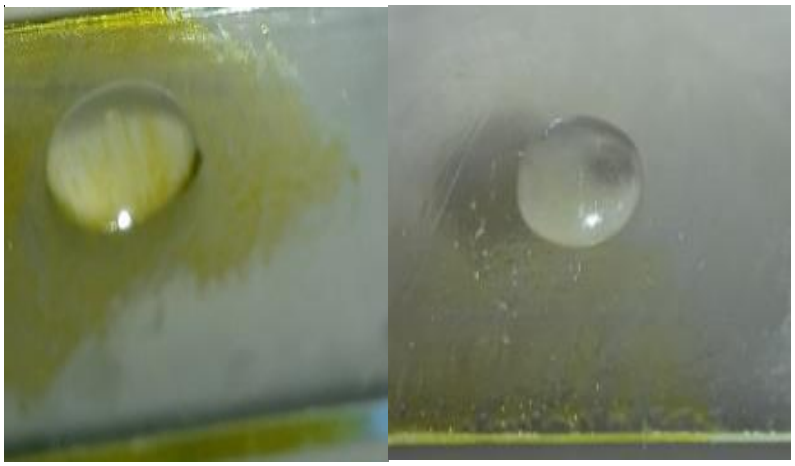
Table 2: peak values and functional groups observed for orange flower (CAO) and yellow flower (DO).

Bands (cm^{-1})	**Fonctionnel groups**
3475.86	O-H
3005.64	C-H
2925.70	C-H
2855.17	C-H
2668.96	C-H
1737.93	C=O
1471.78	C=C
1374.92	O-H
1152.03	C-O-
717.55	$-CH_2-$

IV.5. Water resistance

Concerning the Figure 5, The both ointments prepared according to the adapted protocol are non-miscible, non-adherent on the skin and have an almost spherical shape, especially for the yellow DO flowers. Therefore, both ointments are water resistant.

Dandelion ointment (DO)



Calendula arvensis ointment (CAO)

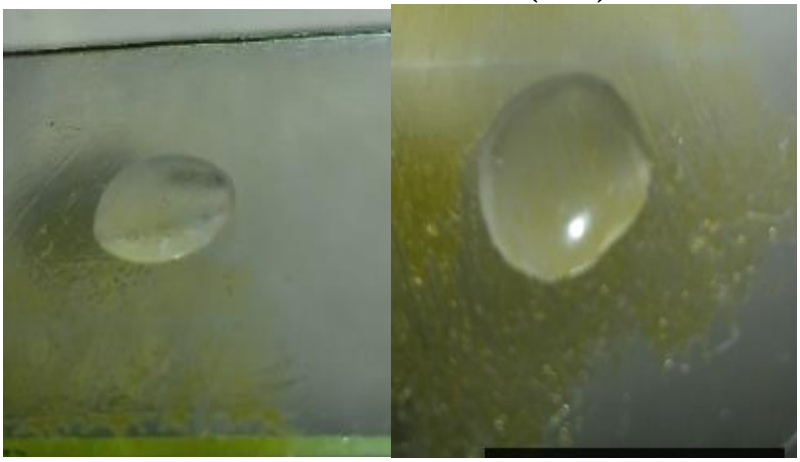


Figure 5: Water resistance of CAO and DO

V. Conclusions

The results obtained constitute a more relevant scientific justification for the traditional use of Calendula arvensis and Dandelion, confirming once again the reliability and effectiveness of traditional remedies in the treatment of numerous ailments.

From the results, we noticed that in the macroscopic characterization, a semi-solid consistency and homogeneity for the two ointments prepared by the method of grinding the flowers of two plants: calendula arvensis and Dandelion. Microscopically, the both ointments (CAO and DO) have a better physical stability; the latter is characterized by a homogeneous appearance, which was obtained. The yellow flowers ointment DO shows a better chemical stability than the CAO orange flower by the presence of increase of intensity in all the characteristic bands, which confirmed by FTIR analysis, finally, both ointments are water resistant, which was confirmed by the test of water resistance .

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