ANALYZE OF ANTIMICROBIAL POWER OF COTULA CINEREA ESSENTIAL OIL (WESTERN ALGERIA)

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Abstract- The essential oils of many plants have become popular in recent years and their bioactive principles have recently won several industry sectors, however their use as antibacterial and antifungal agents has been reported. This study focuses on the physico chemical and phytochemical with a study of the antimicrobial activity of essential oils of aromatic and medicinal plant of southwest Algeria, this essential oil was obtained by hydro-distillation of aerial parts of Cotula cinerea, belonging to the Asteraceae family, it is very extensive in the spring season in a region called Kenadza road, located 12km from Bechar. Variable antifungal activity of the essential oil of Cotula cinerea (yield 2%) were revealed about four fungal strains, the minimum inhibitory concentrations of essential oils were determined by the method of dilution in agar. Significant fungal sensitivity of Penicillium sp with an inhibition of 32.3 mm area.

Keywords- Cotula Cinerea, Essential Oil, Physico- Chemical Analysis and Phyto- Chemical, Antifungal Power.

I. INTRODUCTION

PLANT resources of the Sahara are spontaneous flora of about 500 species of higher plants [6], some of which still used today by people as medicinal plants. Some species of the spontaneous flora have pharmacological properties which confer medicinal interest. Natural remedies and especially medicinal plants have long been the sole remedy of the oral tradition to treat pathologies, and the first material for modern medicine [2]. The antimicrobial properties of aromatic and medicinal plants have been known since antiquity. However, these are due to antimicrobial properties of the essential oïl fraction contained in plants.

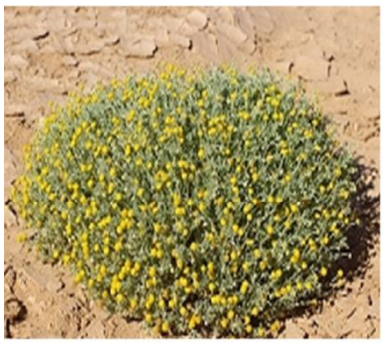


Fig. 1 Cotula cinerea from the wild



Fig. 2 The zoning of the wilaya of Bechar in Algeria (http://fr.wikipedia.org/wiki/B%C3%A9char)

Knowledge more about the physicochemical, phytochemical and microbiological properties of plants of our region "Bechar" we chose Cotula cinerea (Gartoufa), belonging to the "Asteraseae" family is among the most medicinal plants used by the population local, due to their medicinal properties. Cotula cinerea is used against insolation, colic, coughs and bronchopulmonary cooling, it is also used as a tea to aid digestion [1].

II. RESULTS AND DICUSSIONS

A. Botanical description

Plant stem lying then straightened, many, tufted, cut-sheet hairy and dark green; involucral bracts with broad membranous margin, flowers all in tubes; achene topped with a longer than him membranous shell, rejected on one side and having the appearance of a ligule (Figure 1). [3]

B. Station description

The town of Bechar, is located 950 km south west, The wilaya of Bechar is geographically limited to the north by the province of Naama and the Wilaya of El-Bayadh east, south by the wilaya of Adrar Tindouf and to the west by the Kingdom of Morocco (Figure 2). The climate of Bechar has a very contrasted thermal regime. In summer, temperatures easily exceed 50 ° C in the shade, and the relative humidity remains low at around 27%, also in winter the outside temperature can drop to -5 ° C at night with scarce rainfall and irregular. In addition to these unfavorable characteristics, there for half seasons violent sand winds that can reach 100 km / h [5].

In our work, we proceed to the extraction of essential oils by hydro distillation technical of aromatic plant; undergoing preliminary drying (protected from light

and at room temperature), the plant material is composed of aerial parts of Cotula cinerea.

The essential oils obtained were stored in a refrigerator (0-4°C) in small flasks sealed and wrapped in aluminum to avoid degradation of air and light.

C. Result of essential oil yield by hydro distillation

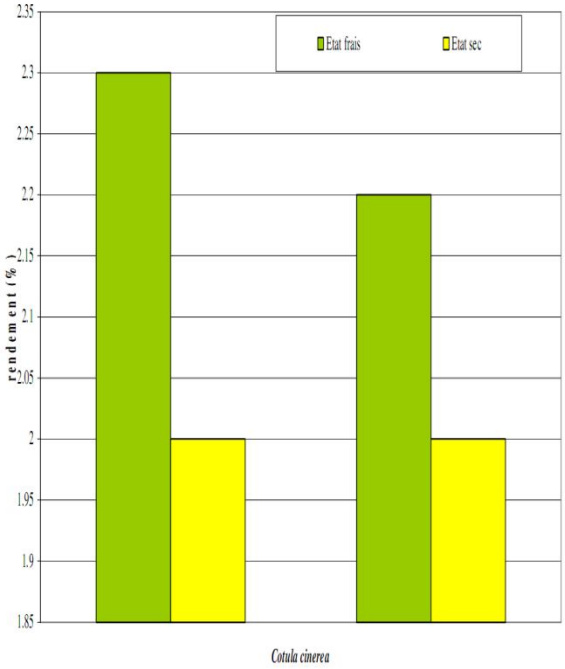


Fig. 3 Rendements en huile essentielle obtenus en état frais et état sec pour Cotula cinerea

This histogram shows that the average yield of the plant Cotula cinerea essential oil fresh is between 2.2% and 2.3%, While the average yields obtained in the dry state, which is equal to 2%; a significant.

The drying effect observed on Cotula cinerea, decreased the yield of essential oils of 20% after 13 days of drying in the shade.

In other baths when the extraction of essential oils is in a dry state performance is less important if these plants are used directly after harvest is to say without undergoing preliminary drying.

This species has an efficiency greater or less essential oil. Several distillations are needed to have a sufficient amount for the analysis

D. Organoleptic Properties of Cotula cinerea essential oil The essential oil of Cotula cinerea is liquid, pale yellow and has a mild, characteristic odor and flowery.

E. Results of physicochemical tests

The different physicochemical parameters obtained for Cotula cinerea are summarized in the table I.

TABLE I
RESULTS OF PHYSICOCHEMICAL PARAMETERS ANALYZED

Parameters tested	Results	
Humidity (%)	Fresh plant	Dry plant
	28	9,5
Ash (%)	9	
Refractive index	1.481	
Relative Density at 20°C	0.928	
Ester (%)	34.50	
Acide value (%)	0,6	

F. Results of phyto-chemical tests

The results of the phyto-chemical tests are presented in Table II:

TABLE II
PHYTO-CHEMICAL CHARACTERISTICS OF Cotula cinerea

	Cotula cinerea
Saponins	++
Flavonoïds	++
Sterols	++
Terpenes	++
Tanins	++
Amidon	+
Alkaloïds	-

These results indicate a strong presence of saponins, flavonoids, tannins, sterols and terpenes, low amidon presence and absence of alkaloids, which have Cotula cinerea essential oils, this family has numerous medicinal properties, Antioxidants, anti-inflammatory, antiviral and fight against infections [2].

G. Result of the antifungal activity (molds) tested by the disc method

TABLE III
AVERAGES OF INHIBITION ZONES OF FUNGAL STRAINS

	Zone Diameter in mm
	Cotula cinerea
Penicillium jensinii	23.3
Penicillium sp	32.3
Penicillium expamsum	31.7
Aspergillus flavus	28.3

The results obtained in the table III show that by the disc method or the method of Vincent, all tests are positive about the fungal strains Penicillium jensinii, Penicillium sp, Penicillium and Aspergillus flavus expamsum and average zone of inhibition obtained, vary between 23.3 and 32.3 mm. The highest activity obtained with the essential oil of Cotula cinerea is against Penicillium sp with an inhibition of up to 32.3 mm area.

H. Result of fungal activity (mold) tested by the method of direct contact

The results of the antifungal activity of Cotula cinerea essential oils of Bechar area, tested by the method of direct contact are shown in table IV.

Table IV
ANTIFUNGAL POWER OF ESSENTIAL OILS BY DIRECT CONTACT

Dilutions	witness	Stock solution	1/10 (10^{-1})	1/100 (10^{-2})	1/1000 (10^{-3})	1/10 000 (10^{-4})
Aspergillus flavus	++	-	-	-	++	++
Penicillium sp	++	-	-	+	++	++
Penicillium expamsum	++	-	-	+	++	++
Penicillium jensinii	++	-	-	-	++	++

++: Significant growth +: Growth -: No growth

From the table above, can be seen the growth of all strains tested in the 10-3 and 10-4 dilutions. The antifungal activity by direct contact showed that the sensitivity of all fungal strains tested is between 10-1 and 10-3 dilutions of the essential oil of Cotula cinerea.

Table VI
MINIMUM INHIBITORY CONCENTRATIONS (MICs) OF THE ESSENTIAL OILS

Fungal strains	Minimum Inhibitory Concentration (MIC)			
	Rapport	mL/Ml	mg/mL	µg/mL
Aspergillus flavus	1/100	0.01	9.28	9280
Penicillium sp	1/90	0.0111	10.31008	10310.08
Penicillium expamsum	1/90	0.0111	10.31008	10310.08
Penicillium jensinii	1/100	0.01	9.28	9280

The above table shows the MIC obtained for different essential oil related to Cotula cinerea strains tested, which it is noted that all the strains were inhibited at a concentration between 9.28 mg / mL and 10.31008mg/mL. Aspergillus flavus and Penicillium jensinii strain are more sensitive with MIC equal to 9.28 mg / ml. In the end, the essential oils are often fungistatic rather than fungicidal [4].

CONCLUSION

However, these traditional medicines have not been immune to the changes that have occurred otherwise, they are more broadly diversified, differentiated and adapted to their new tasks. In our study, it also shows the power that has antifungal essential oil of Cotula cinerea. All strains were inhibited at a concentration of 9.28 mg / mL and 10.31008mg/mL of culture medium, given the importance of these medicinal plants play in our sanitary life, and taking into account the results obtained in this study, we are interested to complete other points:

- Extend the spectrum of germs tested with this oil;
- Using other methods to evaluate the antimicrobial end power of essential oils, such as the method of wells;
- From a scientific point of view, it would be interesting to analyze the chemical composition of the essential oil of Cotula cinerea by gas chromatography coupled to a spectrometer.

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