



## DIRECT AND INDIRECT ANTIBACTERIAL EFFECT FROM A MODERATELY POLAR EXTRACT & THE DIRECT ANTIBACTERIAL TEST BY TLC BIOAUTOGRAPHY OF FLAVONOID AGLYCON FROM AN ENDEMIC *CENTAUREA* SPECIES GROWING IN ALGERIA (ASTERACEAE)

ZATER Hanène <sup>1,2\*</sup>, ALIOUCHE Lamia<sup>2</sup>

<sup>1</sup>Unité de recherche Valorisation des Ressources Naturelles, Molécules Bioactives et Analyses Physicochimiques et Biologiques (VARENBIOMOL), Département de Chimie, Faculté des Sciences Exactes, Université Frères Mentouri Constantine 1, Route d'Aïn El Bey, 25000, Constantine, Algeria.

<sup>2</sup>Département des sciences de la matière, Faculté des sciences exactes et sciences de la nature et de la vie, Université d'Oum El Bouaghi « Larbi Ben M'Hidi », PB 358 route de Constantine, Oum el Bouaghi 04000, Algeria.

Code CCO14

Email\*: [h.zater@yahoo.fr](mailto:h.zater@yahoo.fr); [zater.hanene@univ-oeb.dz](mailto:zater.hanene@univ-oeb.dz)

### Introduction & Objectives:

The Asteraceae family is one of the largest flowering plant families in the world, comprising 1600 genera and more than 23000 species. Several members of this family are grown as ornamental plants for their flowers such as, chrysanthemum, and others [1]. Although, many Asteraceae species possess medicinal properties and are used in traditional medicine [2]. The genus *Centaurea* is one of the best known genera of this family, their species are important for their uses in chemical and pharmaceutical purposes, traditional and folk medicines. They are potential reserves of various bioactive secondary metabolites. These properties have been highlighted and correlated to biological activities such as: antioxidant, antimicrobial, antibacterial and antitumor [3-4]. The present work concerned initially the *in vitro* evaluation of the direct and indirect antimicrobial activities of the chloroform soluble part of the hydroalcoholic extract of the aerial parts of *Centaurea*, an endemic species to Algeria and Morocco which constitutes one of our selection criteria for this plant. To investigate the chemical composition of this extract obtained from the aerial parts (leaves and flowers) of plant material.

### Methodology (Material and methods):

Biological data allowed to guide the chemical composition of the extract by fractionation, separation and purification on silica gel 60 (CC and TLC). This study led to the isolation at this stage of a pure product in a pure state and the identification by the combination of several spectroscopic analyses, mainly HR-ESIMS, HR-EIMS, UV and NMR experiments (<sup>1</sup>H, <sup>13</sup>C, COSY, ROESY, HSQC and HMBC). The Direct and indirect antibacterial and antifungal activities were determined using microdilution method for the extract and TLC bioautography and microdilution method against standard and clinical strains for the isolated compound.

### Results and Discussion:

Inactive against 7 tested microorganisms (plant pathogens) fungi, bacteria and yeast, and also inactive in the direct antibacterial test, the CHCl<sub>3</sub> extract was able to potentiate the effect of β-lactam antibiotics on methicillin-resistant *Staphylococcus aureus* (MRSA), reducing the



minimal inhibitory concentrations (MICs) by a factor of 2-32-fold. No synergy was found between the extract and streptomycin.

#### Conclusion:

The identified compound (flavonoid aglycone) was evaluated for antimicrobial activities. In the direct antibacterial test by TLC bioautography, flavonoid aglycone showed a moderate antimicrobial activity but this activity was relatively weak on the positive and negative Gram bacteria (MIC of 200 µg).

**Keywords:** Asteraceae, *Centaurea*, Flavonoid, Direct and indirect antimicrobial activity, MRSA, TLC bioautography.

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