

# Antitumoral and antioxidant activities of lipophilic and phenolic extracts from *Cynara cardunculus* L. var. *altilis* (DC)

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- [Congress Abstract](#)

*Cynara cardunculus* L. var. *altilis* (DC) (Cca) grows under the semi-arid conditions as those of south of Portugal. Given to high cellulose and hemicelluloses contents, paper pulp production has been proposed [1]. Moreover, the extraction of bioactive compounds could also be considered for an integrated valorization of Cca. Sesquiterpene lactones (SL) and pentacyclic triterpenes, the major constituents of Cca leaves and capitula lipophilic fractions [2] showed lower tryglyceride levels in rat serum [3] and anti-inflammatory [4] actions, respectively. Besides, cardoon extracts displayed antioxidant [5] and antitumor properties [6, 7], mainly due to hydroxycinnamic acid derivatives. The present work aims to determine the chemical composition of Cca lipophilic and phenolic fractions, by analyzing respectively their dichloromethane (DCM) and methanol/water/acetic acid (MWAA) (49.5:49.5:1) extracts, by gas chromatography and high temperature-ultra-high pressure liquid chromatography coupled with mass spectrometry. Furthermore, the antitumoral activity of Cca DCM extracts was evaluated on human breast cancer cells (MDA-MB-231), by assessing cell proliferation (2 – 500 µg/mL), cell cycle and Akt molecular signaling (10.4 µg/mL). Additionally, the antioxidant activity of MWAA extracts (7.5 – 400 µg/mL) was determined by DPPH scavenging assay. Cca leaves DCM extract, containing  $48.5 \pm 3.1\%$  SLs (Table 1), and the major compound, cynaropicrin (2), strongly inhibited MDA-MB-231 cellular viability, inducing cell cycle arrest at G2 phase, with inhibition of Akt phosphorylation at serine 473. In addition, MWAA extracts from Cca stalks outer part, containing  $5.9 \pm 0.5\%$  hydroxycinnamic acids (HA), were the most effective to scavenge DPPH free radicals. The antioxidant activity was correlated to phenolic ( $r = -0.897$ ) and HAs ( $r = -0.990$ ) contents. In conclusion, Cca leaves and stalks outer part are valuable sources of respectively SLs and HAs, with a great antitumoral and antioxidant potential.

*Tab. 1:* Chemical composition of *Cynara cardunculus* L. var. *atilis* (DC) leaves dichloromethane extract by gas chromatography mass spectrometry analysis.

<i>Compound</i>	<i>Extract content (% w/w)</i>
Sesquiterpene lactones	48.5 ± 3.1
Cynaropicrin	45.5 ± 2.9
Grosheimin	2.1 ± 0.1
Deacylcynaropicrin	0.9 ± 0.1
Pentacyclic triterpenes	3.7 ± 0.2
Taraxasterol	1.0 ± 0.3
ψ-Taraxasterol	0.5 ± 0.2
Taraxasterol acetate	0.5 ± 0.1
Lupeol	0.4 ± 0.2
ψ-Taraxasterol acetate	0.4 ± 0.5
β-Amyrin	0.3 ± 0.1
β-amyrin acetate	0.3 ± 0.2
α-Amyrin	0.1 ± 0.1
α-amyrin acetate	0.1 ± 0.1
Lupeoyl acetate	0.1 ± 0.1
Sterols	0.4 ± 0.2
Fatty acids	0.3 ± 0.0
Long chain aliphatic alcohols	0.2 ± 0.3
Aromatic compounds	< 0.1
Others	0.3 ± 0.1
Total	53.4 ± 3.3

*References:*

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