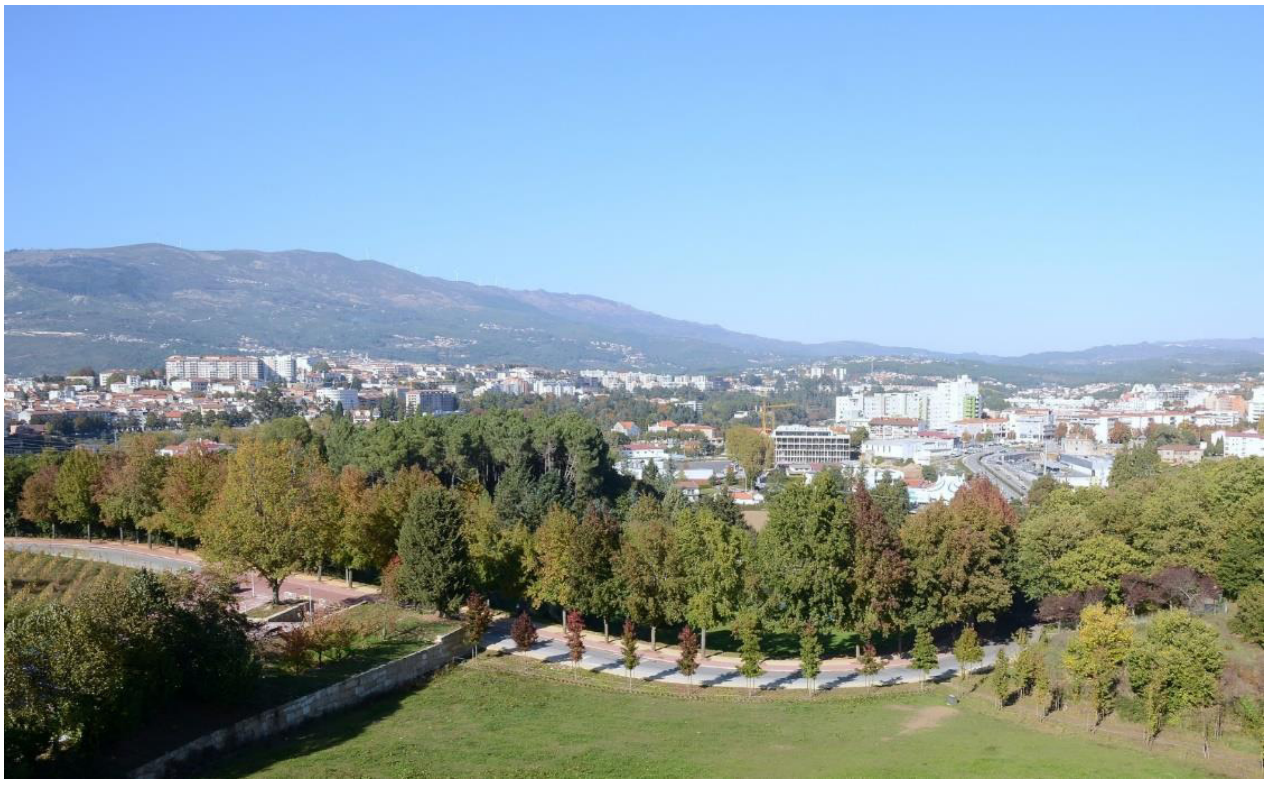
8 PYCheM

Portuguese Young Chemists Meeting

17-19 May 2023 Vila Real



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PHENOLIC COMPOSITION AND *IN VITRO* BIOACTIVITIES OF CARDOON BLADES: STUDY OF ITS POTENTIAL AS A FUNCTIONAL INGREDIENT

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Cynara cardunculus L. var. *altilis* DC., commonly known as cardoon, belongs to the Asteraceae family. This species is integrated into the Mediterranean diet and also has several industrial applications (e.g., pharmaceutical, cosmetic, energetic, paper pulp, and food industries) [1]. Over the last decade, cardoon has been attracting high interest from several industrial sectors. In addition to low requirements in agronomic inputs and high adaptation to adverse environmental conditions, cardoon exhibits a high concentration of bioactive compounds as well as biomass yields [1,2]. Despite the multifaceted applications of cardoon, vegetable tissues such as blades and floral stems are commonly discarded and consequently considered biowaste [1,3]. The adequate exploitation and characterization of the species are essential for circular economic stimulation and environmental impact reduction. Cardoon blades were collected in Greece at sixteen maturation stages (B1-B16). Phenolic composition and several *in vitro* bioactive properties of their hydroethanolic extracts were studied. The polyphenolic profile was analyzed by HPLC-DAD-ESI/MS. The antioxidant potential was studied through two cell-based assays: TBARS and OxHLIA. The anti-inflammatory activity was evaluated through the extracts' capacity to inhibit the formation of the pro-inflammatory mediator nitric oxide. Finally, the antiproliferative potential was evaluated against four tumors and a non-tumor cell line (PLP2) using the sulforhodamine B colorimetric assay. Twenty phenolic compounds were tentatively identified. 5-*O*-Caffeoylquinic acid, *trans* 3,4-*O*-dicaffeoylquinic acid, and luteolin-*O*-hexoside were the compounds found in higher concentrations. Immature blades (B3) exhibited the highest phenolic content (178 mg/g extract) and capacity to inhibit the thiobarbituric acid reactive substances formation (IC_{50} = 1.61 μg/mL). On the other hand, samples at more advanced stages of maturation exhibited higher antiproliferative (B8–B13, GI_{50} between 7 and 17 μg/mL) and anti-inflammatory activities (B13, IC_{50} of 10 μg/mL), as well as higher capacity to inhibit oxidative hemolysis (B8, IC_{50} = 25 and 47 μg/mL for Δt of 60 and 120 min, respectively). This study proved that the maturity stage influences the phenolic composition and bioactive potential of cardoon blades which could be valorized as a functional ingredient for food and pharmaceutical applications.

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