Cardoon

Subjects: Plant Sciences

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Cardoon, *Cynara cardunculus* L., is a perennial plant belonging to the family Asteraceae, which is native to the Mediterranean area. Cardoon, also known as artichoke thistle, is a complex species comprising three botanical varieties: the globe artichoke (var. *scolymus* (L.) Fiori), the cultivated cardoon (var. *altilis* DC.), and the wild cardoon (var. *sylvestris* (Lamk) Fiori). Cardoon is commonly used in the preparation of salads and soup dishes, production of energy and its flowers are used as vegetal rennet in cheese making. Cardoon leaves and stems, main by-products, are rich in bioactive compounds with important health benefits.

Keywords: Cardoon ; Cynara cardunculus L. ; cardoon leaves ; by-products ; antioxidant activity ; antimicrobial activity

1. Introduction

Cardoon, *Cynara cardunculus* L., is a perennial plant belonging to the family Asteraceae, which is native to the Mediterranean area. Cardoon, also known as artichoke thistle, is a complex species comprising three botanical varieties: the globe artichoke (var. *scolymus* (L.) Fiori), the cultivated cardoon (var. *altilis* DC.), and the wild cardoon (var. *sylvestris* (Lamk) Fiori) [1][2][3][4]. Cardoon can grow in adverse climate conditions, with high temperatures, severe drought, and in thin unproductive and stony soils, and has been spread to several other countries like the United States of America, Mexico, Australia, and New Zealand. Cardoon can grow up to two meters high with thick and rigid stems and has an annual development cycle, with the reproductive cycle completed by summer. In the Mediterranean, cardoon is commonly used in the preparation of salads and soup dishes [1][5][6][7].

2. Data, Model, Applications and Influences

Cardoon can be used in different areas. Cardoon flowers (the pistils) are used as milk clotting in cheese making, producing a cheese with a creamy soft texture and a genuine and slightly piquant aroma [1][8][9][10][11]. Cardoon crops have been identified as potential crops for energy production and cardoon crop by-products are mainly used to produce biomass for different applications. At an industrial level, cardoon crops represent a great interest in the production of solid biofuel, seed oil, biodiesel, paper pulp, green forage, and pharmacologically active compounds [5][12][13][14][15][16][17][18]. Stems and leaves are the most abundant waste regarding cardoon crops and may represent also a source of bioactive compounds [1][19]. Stems has been identified as a source of caffeoylquinic acids [1][19][20][21] which are natural antioxidants associated with the structural support of the plant since they establish bridges with the polymeric compounds of the cell wall [1][20][19]. Caffeoylquinic acids have been suggested to decrease the risk of chronic diseases including cancer and cardiovascular disease [22]. Cardoon leaves have shown beneficial properties, such as diuretic, hepato-protective, choleretic, hypocholesterolemic, anti-carcinogenic, and antibacterial effects [1][5][23][24][25]. Such properties are due to the high content in bioactive compounds presented by the leaves, such as chlorogenic acid, cynarine, and luteolin [1][23][19][26][27]. Cardoon leaves present also a high content of sesquiterpene lactones. The sesquiterpene lactones are responsible for the phytotoxic, cytotoxic, fungicidal, antiviral, and antimicrobial activity of cardoon [1][28]. Cardoon leaves, constituted by several bioactive compounds with antioxidant and antimicrobial activity, can be considered a potential ingredient in the food industry. The leaves could be used as a food additive or as an ingredient in the development of a novel food with functional properties and health benefits [29][30]. Another potential application of cardoon leaf is in the cosmetic industry as several members of the Asteraceae family are currently used in the cosmetic industry for their bioactive compounds [31]. Also, normally plant extracts and plant essential oils with known antioxidant and antimicrobial activity have been used in food packaging to control lipid oxidation and microbial deterioration, therefore, cardoon leaf extract, it can present itself as a potential candidate in the production of active packaging [1][32][33][34][35][36][37].

3. Conclusion

Cardoon is considered to be a valuable crop as it shows high yields, drought tolerance, and low input needs, and it provides benefits regarding soil properties, erodibility, and biological and landscape diversity. The edible parts of cardoon are commonly used in Mediterranean cuisine and the flower is used in cheese making as a vegetable rennet substitute. Cardoon by-products are mainly composed of leaves, stems, and seeds, and they are used to produce biomass for energy; and oil for human consumption, biodiesel, and animal feed. Recent studies have indicated that cardoon leaves are rich in several polyphenol compounds, with several health benefits and have been suggested for use as natural additives for extending the shelf life of food products. Cardoon by-products and their potential for application in several industrial fields such as cosmetics, food, and food packaging is still not entirely known and should be investigated further for a better comprehension of the potential uses of this valuable Mediterranean crop.

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