

# From Waste to Value: Antioxidant and Antimicrobial Properties of Fresh and Dried Cardoon Leaf Extracts

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*Cynara cardunculus* L. (cardoon) is a resilient perennial crop that is highly productive under extremely challenging conditions. Even though its flowers are used in the cheese-making process, its bioactive-rich leaves are largely discarded [1]. This study assessed the antioxidant and antimicrobial potentials of fresh and dried cultivated cardoon leaves (var. *altilis* DC) using ethanolic and methanolic extracts as well as the effects of oven-drying with forced air circulation on the bioactive profile.

Dried leaf extracts showed better antioxidant activity than fresh leaf extracts, despite having a greater polyphenol profile. A total of 16 compounds were identified, and luteolin, apigenin, and chlorogenic acid were the most prevalent. The highest antioxidant activity was presented by dried leaf extracts for both the methanolic (EC<sub>50</sub> = 0.8 mg/mL, AAC = 279.67) and ethanolic (EC<sub>50</sub> = 2.1 mg/mL, AAC = 448.06) solvents.

Gram-positive bacteria were more sensitive to ethanolic and methanolic extracts than Gram-negative bacteria. With lower minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) values (125–2000 µg/mL) across most of tested bacteria, the dried leaf ethanolic extract showed greater antimicrobial activity. Although *Aspergillus fumigatus* was only mildly inhibited, dried leaf extracts demonstrated superior antimicrobial effectiveness compared to fresh leaf extracts.

These studies demonstrate the potential benefits of using dried cardoon leaves in the food, cosmetic, and pharmaceutical industries because of the bioactive components they have. These findings encourage sustainable production and consumption, which align with the goals of the United National Sustainable Development Goal 12, as well as the principles of circular economy. Cardoon leaves can be further transformed into relevant products in the current industrial world while simultaneously ensuring economic and environmental sustainability.

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## References:

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