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Phenolic compounds content, antioxidant and antimicrobial activities of juniper (*Juniperus communis* L.)

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Juniper (*Juniperus communis* L.) berries are widely used in different products such as perfumes, pharmaceuticals and to aromatize alcoholic beverages. In particular, they are employed with other botanical ingredients in the production of commonly consumed juniper-based spirits, such as gin [1]. Juniper berries are also frequently used in the European gastronomy to season and flavour foods, being considered the only spice obtained from Cupressaceae plants and one of the few examples of spices produced in cold or temperate regions [2]. In the northeast region of Portugal, the berries are traditionally used in game meat dishes. Besides being used in drinks and for culinary purposes, *J. communis* berries are also used in folk medicine for their diuretic, antiseptic, stomachic, and carminative properties [3], being inscribed in different Pharmacopoeias.

In this work, the total content of phenolic compounds and of flavonoids, reducing power and antioxidant activity (in vitro measurement of 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging capacity) of the methanolic extracts of juniper (*Juniperus communis* L.) berries and leaves were evaluated using spectrophotometric techniques. Two samples of berries were acquired in a local supermarket and in a specialized store, respectively and one sample of berries and leaves were collected in the wild in Trás-os-Montes region. Additionally, the antimicrobial activity of a sample of essential oil obtained by hydrodistillation was determined by the macrodilution broth assay against several Gram-positive and Gram-negative bacteria and *Candida albicans*.

Total phenolics content, determined by the Folin-Ciocalteu methodology and expressed as mg gallic acid equivalents per gram of sample (GAE/g), ranged from 11.13±1.33 to 16.16±0.64 mg GAE/g for the berries samples, being significantly higher for the leaves sample (141.12±9.56 mg GAE/g). As expected, based on the phytochemicals content determined for the berries and leaves, the leaves showed a higher reducing power (EC₅₀=0.17±0.00 mg/mL) and antioxidant activity, measured as the ability to decrease to 50% the DPPH absorbance (EC₅₀= 0.10±0.01 mg/mL) compared to the berries (reducing power ranging from 2.40±0.04 to 3.48±0.26 mg/mL and antioxidant activity ranging from 1.74±0.04 to 3.84±0.39 mg/mL).

The essential oil was able to inhibit the growth of *C. albicans* and different bacteria (*Bacillus cereus*, *Bacillus subtilis*, *Staphylococcus aureus*, *Escherichia coli*, *Klebsiella pneumoniae* and *Enterococcus faecalis*) to different extents, while showing no activity against *Pseudomonas aeruginosa* and *Proteus mirabilis*.

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