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Chemical Profile and Antioxidant Activity of *Allium chamaemoly* L. subsp. *chamaemoly* from Sicily (Italy)

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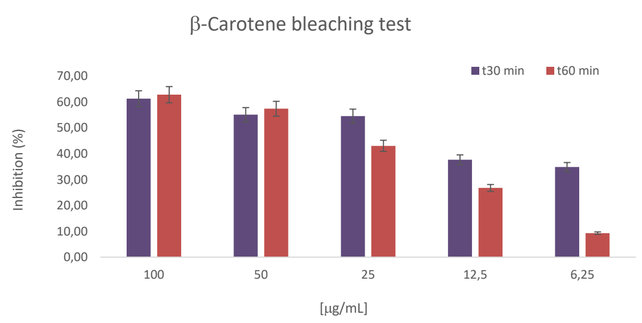
INTRODUCTION & AIM

The genus *Allium* belongs to the Alliaceae family formerly considered part of Liliaceae and Amaryllidaceae. The first centre of evolution of this genus extends along the Mediterranean basin and western North America. From these areas, *Allium* species have widely spread all over the northern hemisphere [1]. This study aimed to evaluate the total phenols (TPC) and flavonoids content (TFC) and the antioxidant activity of *Allium chamaemoly* L. subsp. *chamaemoly* known in Italy as "Agghiu di li maghi" [1].

RESULTS & DISCUSSION

Bulbs contained 56.22 mg CAE/g extract and 18.88 mg QE/g extract of TPC and TFC, respectively. A different radical scavenging power was observed using ABTS and DPPH tests with IC_{50} values of 287.13 μg/mL and 44.32% inhibition at 1000 μg/mL, respectively. the different activity can be ascribed to the reaction media. DPPH assay is conventionally conducted under 50% ethanol/water, whilst ABTS assay is carry out in aqueous conditions. In our case it is possible that bulb's phenols are more soluble in aqueous reaction media. IC_{50} values of 66.23 and 62.47 μg/mL were found in β-carotene bleaching test after 30 and 60 minutes of incubation, respectively. Higher bioactivity was recorded with *A. commotatum* with IC_{50} values of 31.9 and 21.5 μg/mL for DPPH and ABTS test, respectively. However, our value are quite similar to those found in β-carotene bleaching test (IC_{50} values of 72.8 and 75.3 μg/mL after 30 and 60 minutes of incubation, respectively) [2]. A lower DPPH radical scavenging activity was found also with *A. cornutum* and *A. cepa* bulbs from Croatian coast and island with percentage of inhibition of 60.50 and 64.82% at 100 μg/mL, and *A. cepa* cv. Bianca di Pompei (EC_{50} medium value of 19.94 μg/mL) [3].



CONCLUSION

The present study assessed the chemical profile, and *in vitro* antioxidant activity of "Agghiu di li maghi " bulbs. Bulbs extract exhibited a a promising content of bioactive compounds and antioxidant activity. Collectively, our results represent a starting point for further in vivo studies to promote the use of this species as nutraceutical or functional food product. Obtained data could help to support the identification of local varieties to counter the globalization of agricultural production and promote the biodiversity.

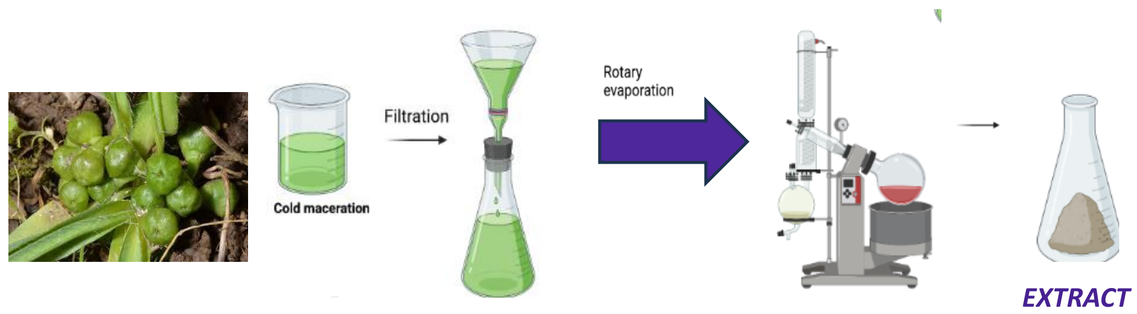
METHODS

Chemicals and Reagents

The reagents used for the experimental research were purchased from Sigma-Aldrich S.p.a. (Milan, Italy), while the analytical grade solvents were obtained from VWR International s.r.l. (Milan, Italy).

Plant Material and Extraction Procedure

The analysed population was found and collected in Sicily in the countryside of Castelluzzo (TP) at the base of the eastern slope of Monte Cofano in a flat area, a few meters from the sea, on a calcarenitic substrate with geographical coordinates 38°06'19" of N latitude and 12°42'58" E longitude.
Allium chamaemoly L. subsp. *chamaemoly* bulbs were dried for 10 days in the shadow, blended, and then extracted by maceration with ethanol (500 mL x 3-times). The extraction procedure was repeated three times and after each extraction cycle, solutions were filter and the solvent was evaporated. The obtained extracts were used for phytochemical content determination as well as biological activity assessment.



Total Polyphenols Content (TPC) and Total Flavonoids Content (TFC)

The TPC and TFC were measured using Folin-Ciocalteu method whereas the aluminium chloride colorimetric assay was applied to evaluate the TFC [2]. Briefly, thebulb's extract was mixed with Folin-Ciocalteu reagent (0.2 mL), sodium carbonate 15% (1 mL), and water (2 mL). After incubation at 25 °C for 2 h, the absorbance was read at 765 nm. Determinations were made in triplicate and the result was expressed as milligrams of chlorogenic acid equivalents (CAE)/g of extract. For TFC determination extract was added to distilled water (4 mL) and sodium nitrite 5% (w/v) (0.3 mL). After 5 min, 0.6 mL of 10% (w/v) AlCl3 was added. At 6 min 2 mL of 1 M NaOH and 2.1 mL of distilled water were added to the mixture. The absorbance was read at 510 nm. Determinations were made in triplicate and values were expressed as milligrams of quercetin equivalents (QE)/g of extract.

Antioxidant Activity

The antioxidant potential was assessed by using different methods: 2,2-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid) (ABTS), 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging activity, and β-carotene bleaching test. Briefly, a DPPH. radical solution was mixed with extracts diluted in methanol at concentration ranging from 1 to 1000 μg/mL. After thirty minutes the absorbance was read (517 nm). For ABTS assay, a solution of $ABTS^{\cdot+}$ radical (with an absorbance of 0.70 at 734 nm) was made and then extracts, diluted in methanol at different concentration (1-400 μg/mL), were added and left to react (25°C, 6 minutes). The absorbance was measured at 734 nm. Ascorbic acid was employed as positive control in both radical scavenging tests [2]. In β-carotene bleaching test, a β-carotene solution, linoleic acid, 100% Tween 20 and extracts diluted in methanol at different concentrations (2.5-100 μg/mL) were mixed. The absorbance was measured at 470 nm. Propyl gallate was used as positive control.

Statistical Analysis

Experiments were performed in triplicate. Prism GraphPad Prism Software (San Diego, CA, USA) was used to calculate the concentration causing 50% inhibition (IC_{50}). Data were analyzed by One-way analysis of variance (ANOVA) and significant differences were calculated according to Tukey's multiple range tests.

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