Biological assessment of a Mediterranean invasive weed for a better ecological farming management

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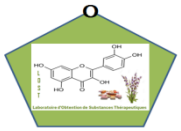

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Abstract: In the framework of enhancing wild medicinal plants of the Mediterranean flora, the present work investigates phytochemical screening of different parts' extracts of a wild medicinal plant from Asteraces family *Inula viscosa* L.: roots, leaves, flowers and aerial parts. It also highlights the quantification of the main secondary metabolites; total polyphenols and flavonoids and its correlation with *in vitro* antioxidant and antimicrobial activities. Biological tests have shown encouraging results for the antioxidant activities namely: reducing power FRAP test, hydrogen peroxide and hydroxyl radical scavenging, and exhibit flowers extract as promising source of phenols and potent antioxidants with the ability of breaking hydroxyl free radical chain generating, the main responsible of oxidative stress, on the other hand antibacterial and antifungal activities tested by discs diffusion method on agar medium, were carried out; and the effectiveness of tested extracts has been demonstrated against five pathogen bacterial and fungal referential strains. Obtained results exhibit aerial part as better phenols sources, whereas roots extract showed better *in vitro* antimicrobial activity. Obtained results showed nice correlation and open large perspectives on bioactive compounds assessment for the development of an ecological farming adjuvant.

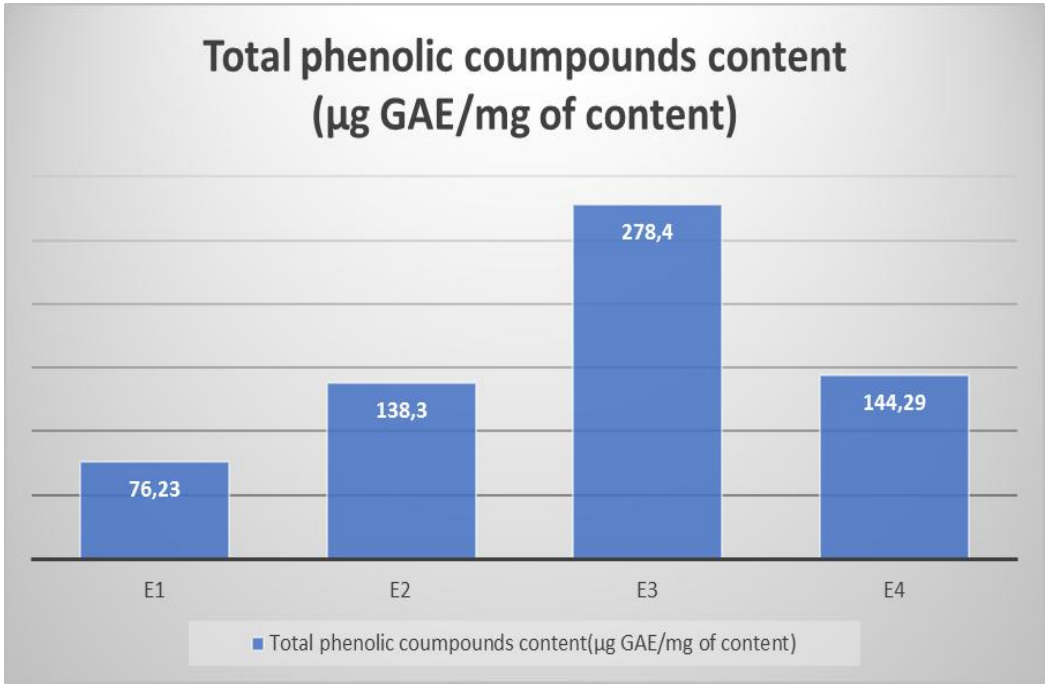
Keywords: Invasive weed, Polyphenols, Flavonoides, Antioxidant activity, Antimicrobial activity.

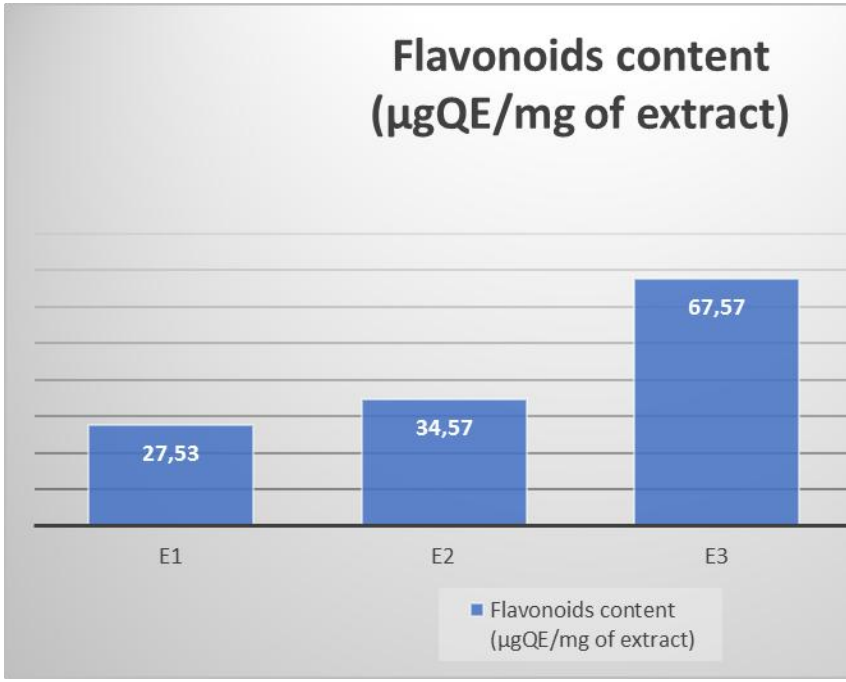
Results and Discussion

Total phenols and flavonoids contents

TFC & TPC Results

Extracts	Total phenolic compounds content (µgGAE/mg of extract)	Total Flavonoids content (µgQE/mg of extract)
E1	76,23±0.00	27,53±0.01
E2	138,30±0.00	34,57±0.04
E3	278,40±0.01	67,57±0.00
E4	144,29±0.00	23,21±0.00

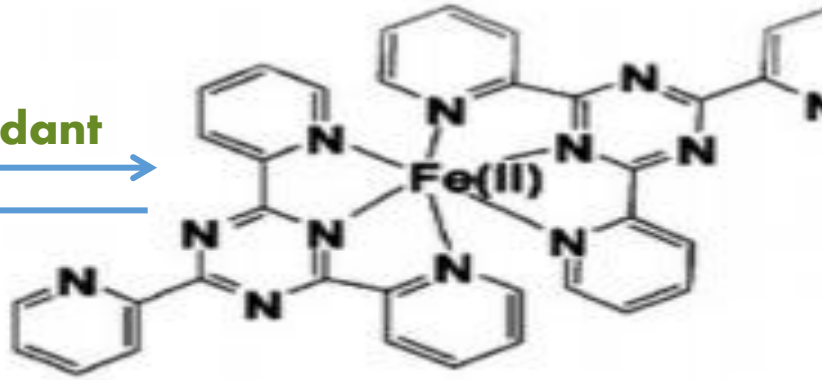




FRA

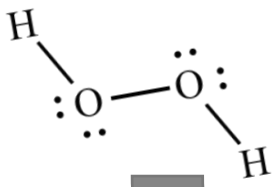
$[Fe(III)(TPTZ)_2]^{3+}$

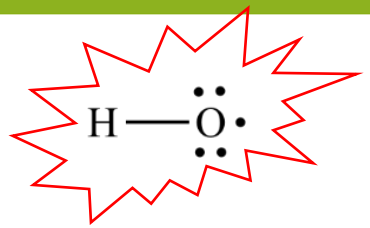
Antioxidant

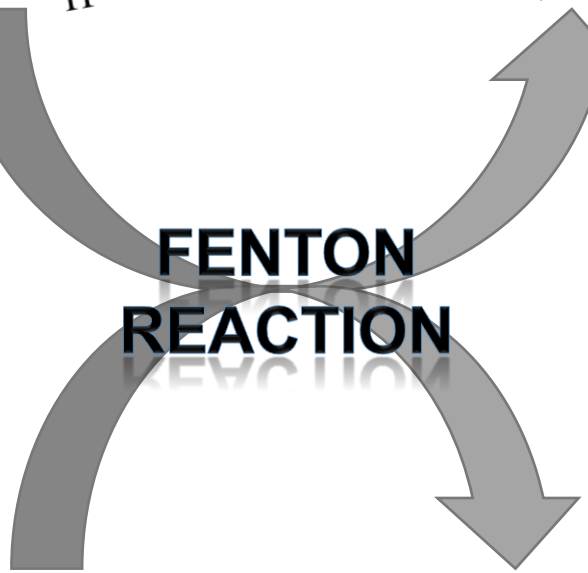


$[Fe(II)(TPTZ)_2]^{2+}$

The Hydrogen peroxide activity and hydroxyl radical scavenging assays



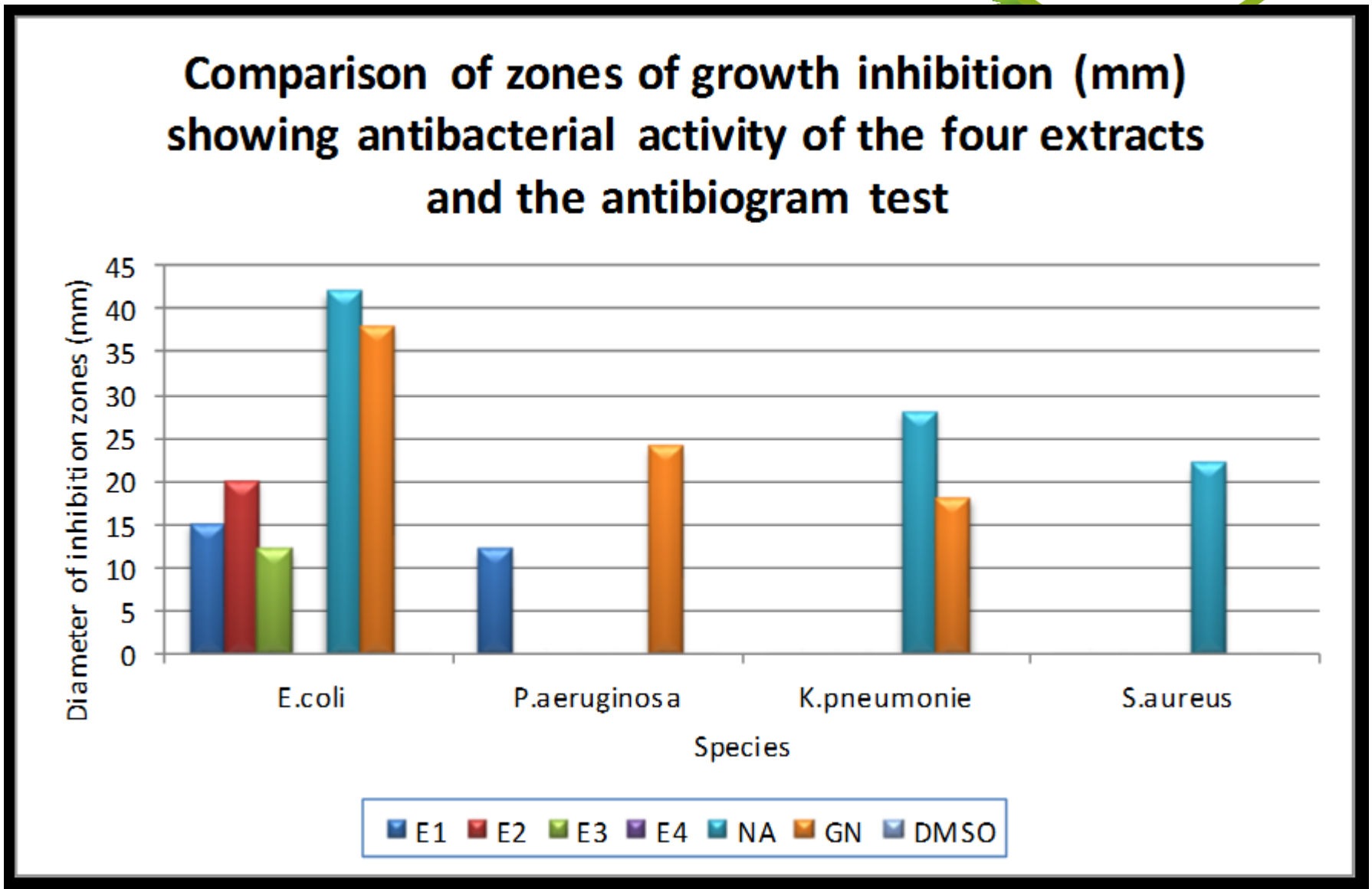


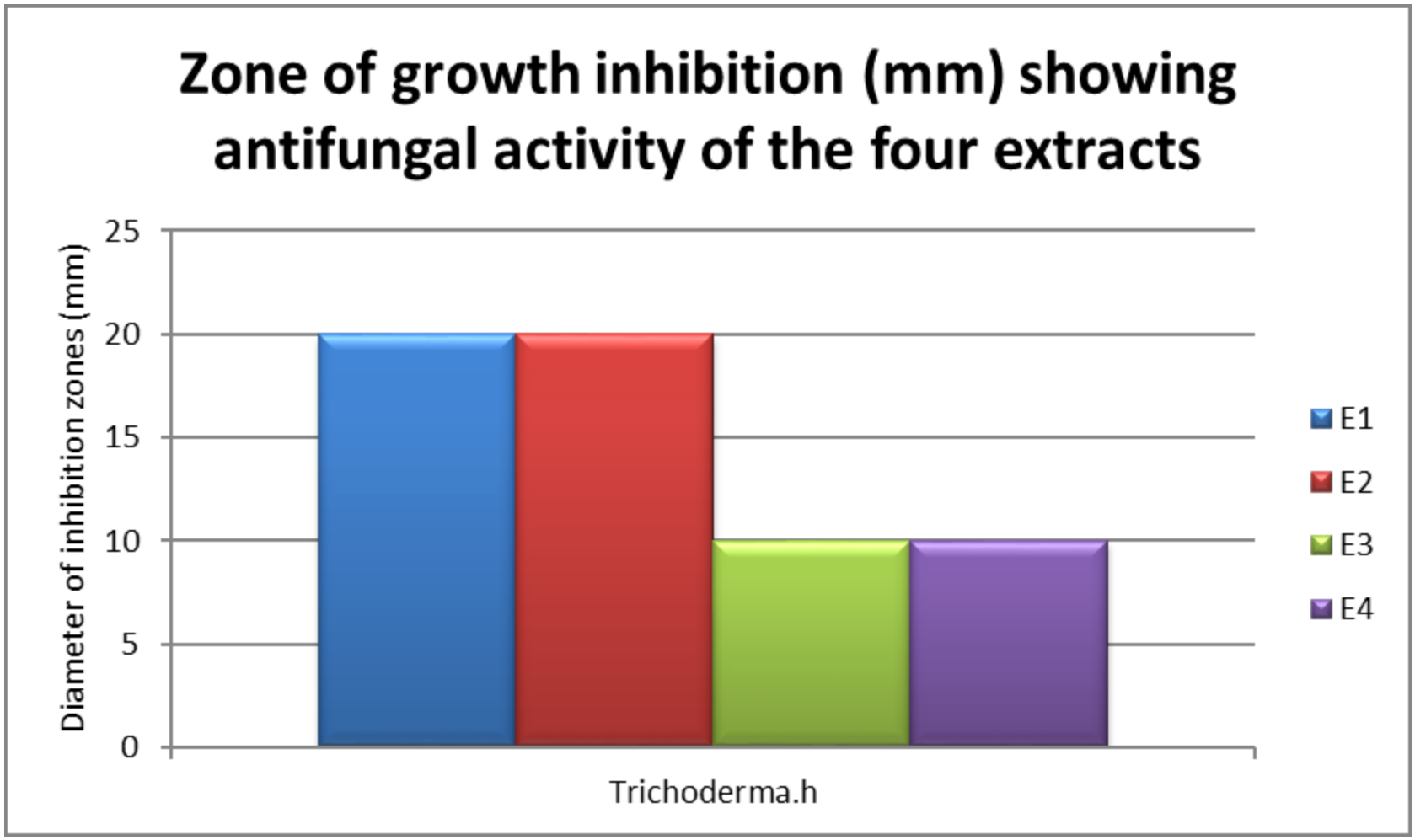


Fe^{2+} Fe^{2+}

$H_2O_2 + O2^{\bullet -} \rightarrow OH^{\bullet} + OH^- + O_2$

Antimicrobial activity




Zone of growth inhibition (mm) showing antifungal activity of the four extracts
Diameter of inhibition zones (mm)
25
20
15
10
5
0
Trichoderma.h
E1
E2
E3
E4

Conclusions: The present work aimed at promoting a Mediterranean invasive weed as a sustainable Biosourced therapeutic agent for human health treating as well as farming management and look for alternatives to harmful synthetic chemicals, this research has been conducted based on the quantitative determination of total polyphenols, total flavonoids and the assessment of antioxidant, antimicrobial and antifungal properties of studied plant.

Through this study, a correlation between the total phenol content, the flavonoid content and the antioxidant potential was establish and which turned out to be probably due to the plant richness in phenol compounds, flavonoids and other secondary metabolites, making it a promising source for treatment of many human and plant diseases by using it as multidisciplinary natural phytosanitary agent.

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