Plants and their Pathogens

LS.3.P121 Evaluation of antioxidant capacity and total polyphenolic content in the tincture of *Hyssopus offinalis* L.

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Hyssopus officinalis L. (*Lamiaceae*) is one of the most popular herbal preparations, mainly distributed in the East Mediterranean to central Asia. Hyssop is an important perennial culinary and medicinal plant. It has a very strong spicy taste and intensive flavor and it is commonly used in folk medicine. Hyssop is considered to have antiviral, anti-inflammatory, antiseptic, diuretic, expectorant and stimulant properties. As a medicinal herb, it is used in viral infections such as colds, coughs, sore throats, bronchitis and asthma. It can also be used in treatment of chronic indigestion, excessive gas, abdominal bloating and colic. The flowering tops of hyssop produce a pleasant essential oil responsible for most of biological activities of this plant. In addition to the particular aroma, the essential oil exhibit muscle relaxant, antibacterial and antifungal activities [1,2].

The aim of this work was to study the chemical composition and the antioxidant activity of Hyssopus officinalis L. from Romania [3,4] The identification and guantification of major phenolic compounds was performed by a HPLC-MS method. The total phenolic compounds (TPC) were determined using the modified Folin-Ciocalteu method and for flavonoids determination was used a colorimetric aluminum chloride method. The antioxidant activity was determined using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) bleaching method and SNP-based method. The growth of silver nanoparticle (SNP)-based method for evaluating the antioxidant capacity of polyphenolic compounds (i.e., hydroxycinnamic acids, flavonoids, simple phenolic) from vegetal extracts was also used [4]. The reduction of Ag⁺ to spherical silver nanoparticles (SNPs) by polyphenols in the presence of trisodium citrate and silver seed was produced an intense absorbtion band of SNPs at 423 nm. The absorbance of SNPs allowed the quantitative spectrophotometric detection of polyphenols. The results of this method were correlated with those of other antioxidant methods (DPPH assay). In the aerial parts extract of hyssop four hydrocynnamic acid derivates (caftaric, caffeic, chlorogenic, ferulic acids) and two aglycones of flavone (luteolin, apigenin) were detected. The flavonoid content values were expressed as rutin equivalent (g RE/100 g dry plant) was 0.52%. TPC values were expressed as gallic acid equivalent (g GAE/100 g dry plant) was 9.25%. The total polyphenolic (TPC) and flavonoids content values were summarized for Hyssopus tincture in "Table 1". The tincture was exhibit antioxidant activity 29.58% with an IC₅₀ value of 189µg/ml in DPPH radical scavenging method, "Table 1". Using SNP-based method there was found 0.09±0.74 µg GAE/g. It was found that the radical-scavenging activities of the tincture of hyssop were moderate. The results of the study suggest that hyssop contain a large amount of total polyphenolic compounds, but nevertheless, the antioxidant activity was moderate. The presence of polyphenols in Hyssopus officinalis can be related to diuretic or anti-inflammatory properties. Thus hyssop flowers may be considered a source of important polyphenols to be explored for the pharmaceutical applications.

^{1.} J. Bruneton in "Pharmacognosie. Phytochimie. Plantes medicinales" 2^{eme}edition, Londres Technique et Documentation, Lavorsier New York (1993), p.428.

^{2.} V. Ciocârlan in "Illustrated Flora of Romania. Pteridophyta et Spermatophyta", Ceres Publishing House: Bucharest, Romania (2009), p. 662.

^{3.} D. Benedec, L. Vlase, D. Hanganu and I. Oniga, Dig J Nanomater Bios 3 (2012), p. 1263-1270.

^{4.} M. Ozyürek, N. Güngör, S. Baki, K. Güçlü and R. Apak, Anal Chem. 18 (2012), p. 8052-9.

Samples	TPC (g gallic acid/100 g plant material)	Flavonoid (g rutin/100 g plant material)	DPPH radical scavenging, IC50 (µg/ml)	SNP (µg gallic acid/g plant material)
Tincture of H. officinalis	9.25±0.75	0.52±0.06	189±1.25	0.09±0.005
Trolox			12±0.65	

Table 1. Total phenolic (TPC) and flavonoids content in Hyssopus officinalis and antioxidant activity