EVALUATION OF THE ANTIOXIDANT ACTIVITY OF SOULANUM NIGRUM BY RADICAL SCAVENGING ACTIVITY USING DPPH

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Abstract

In this research work, we studied a medicinal plant of Solanaceae family . In order to evaluate the importance of this plant, which grows spontaneously in our arid zone El-Oued (Algeria). Our research has been oriented towards the extraction of plant material (leaves). The maceration was carried out with both ethanol and distilled water solvents with the ratio (8/2). The clash of the extract hydroethanol obtained with the various polar and apolar solvents, led to obtaining the following extracts: the extract of chloroform, the extract of ethyl acetate and finally the n-butanol extract. Quantification of total polyphenols and total flavonoids was have been performed and the antioxidant activity was also performed. Furthermore, the results showed that EtOAc extract which had the highest level of polyphenol and flavonoid content ,whereas n.BuOH extract has stronger antioxidant capacity against the radical DPPH.

Key words: total polyphenols; total flavonoids; Solanum nigrum L; Extraction ;DPPH.

Introduction

Medicinal plants are playing an important role in the drug sections. We should know about the chemical constituent of plant because knowledge about these may help us to discover the actual valuable remedies [1]. Photochemical and polyphenols (phenolic acid, Hydrolysable tannins and Flavonoids) show antioxidant properties, anti-carcinogenic and anti-mutagenic effects [2]. The bioactive chemical constituents into plants like alkaloids, tannin, flavonoids, phenolic composition etc. are responsible for physiological and biochemical actions in the human body [3, 4]. Natural products from plants are also show antitumor and antioxidant activity [5]. Plant constituents have ecological and physiological role [6].

Oxidative process is one of the most important routes for producing free radicals in foods, drugs and even in living systems [7]. The most effective path to eliminate and diminish the action of free radicals which cause the oxidative stress is antioxidative defense mechanisms. Antioxidants are those substances which possess free radical chain reaction breaking properties.

Solanum nigrum L commonly as Black nightshade is a herbaceous plant of the Solanaceae family. also important aspects of medicinal plant resources for treatment of primary health care. It has several pharmacological properties [8], including antioxidant activity [9].our study concern to invistigute the important of this plant as antioxidant activities.

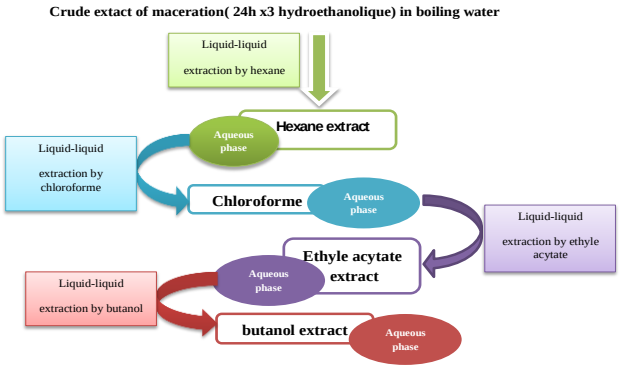
1/material and method

1/1Plant material

The studied plant was harvested during the month of December 2017 in the region of Oued Souf (Algeria).

Extraction with solvents with increasing polarity

the dry plant with (200 g) solanum nigrum was macerated at room temperature with EtOH / H2O (80:20 v / v) for 24 h, three times. After filtration, the filtrates were combined and dissolved in distilled H2O with magnetic stirring and then refrigerated overnight. After filtration, the resulting solution was successively extracted several times with hexane, chloroform, ethyl acetate and n-butanol. The organic phases were dried with Na2SO4, filtered with filter paper to obtain the extrects.



SCHEMA1:EXTRACTION PROTOCOL WITH SOLVENTS INCREASING POLARITY

2/PHYTOCHEMICAL INVESTIGATION

extract and solvent fractions of s. Nigrum were analyzed quantitatively for total phenolic and total flavonoid content using standard methods.

2.1. Total Polyphenol

content TPC was determined with the FolinCiocalteu reage nt following the method described by SingeltonRoss

[10]. Briefly, 100 µL of suitably diluted extract was added to 0.5 mL of newly diluted 10fold FolinCiocalteu reagent. Th en 2 mL of 20 % aqueous Na2CO3 solution was added. The mixture was stand in the dark for half an hour, and then the absorbance was measured at 760 nm against a blank solutio n. Gallic acid was used as a reference and the results were p resented as gallic acid equivalents/g of extract.

2.2. Total flavonoids content

TFC was determined as described by bahorun et al (2003) [11]. A mixture of 1 ml of extractand 1 ml of 2% AlCl 3 was added and mixed stirred thoroughly. and allowed a solutionto stand for 10 min. The absorbance of the mixture w as measured at 430 nm versus prepared blank solution. Rutin was used as a standard for the quantification of TFC. Results were expressed in mg of rutin equivalents/g of extract.

ANTIOXIDANT ACTIVITY

3.1. DPPH assay

The scavenging activity by the DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging method according to Ohini shi and others [12]. with some modifications, a 1 ml of diluted extract and 1 ml of DPPH (0.25 mM) were mixed, and after 3 0 min the absorbance was measured at 517 nm. The scavengi ng activity was measured as the decrease in absorbance of the samples versus DPPH standard solution. Results were express ed as radical scavenging activity percentage (%) of the DPPH according to the formula:

$I\% = ((A_0 - A_S) / A_0) * 100$

Where

A_0 : absorbance of the control

A_S : Absorbance of the sample.

4/RESULTS

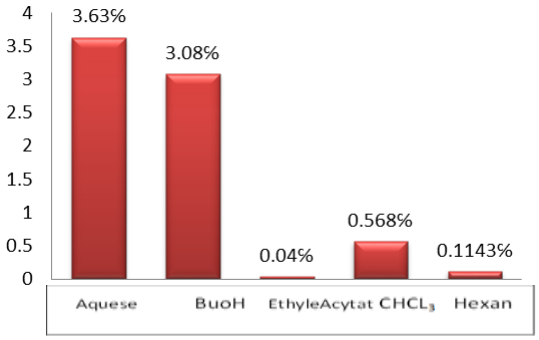


Figure 01: Extraction yield

	CHCl3 extract	EtOAc extract	n.BuOH extract
total polyphenols	64.531 ±0.008 mgGAE/g	99.92±0.012 mgGAE/g	39.498 ± 0.003 mgGAE/g
total flavonoids	42.52 ± 0.005 mgQE/g	60.54±0.02 mgQE/g	16.25 ±0.022 mgQE/g

TABLE1:DETERMINATION OF POLYPHENOLS AND TOTAL FLAVONOIDS

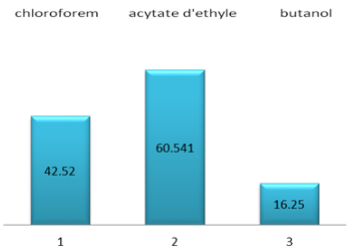


Figure 02: Total flavonoid

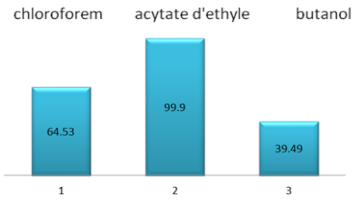


FIGURE 03: TOTAL POLYPHENOL

FIGURE 03: DPPH SCAVENGING RADICALS ACTIVITY

	LEAVES			
	CHCL3 Extract	Ethyl acytat extract	BuOH Extract	Ascorbic Acid
Antioxidant activity IC_{50}= (mg/ml)	**0.413**	**0.241**	**0.204**	**0.0069**

CONCLUSION

liquid liquid extraction was carried out successively using solvents of increasing polarity.

The use of different solvents with different polarity makes it possible to separate compounds according to their degree of solubility in the extraction solvent. After extraction of plant solanum nigrum, the highest yield was found in aqueous phase and n. BuOH extract.

As noted, the extract of ethyl acetate wish had the highest level of polyphenol and flavanoid content.

While DPPH radical-scavenging activity assay in n.BuoH extract showed to be the most potent free radical scavenger.

Finally these results have to reinforce the value and the importance of this plant.

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