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Phenolic profile and antioxidant capacity of some Algerian olive oil cultivars

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INTRODUCTION & AIM

In recent years, antioxidants have been the subject of many scientific research concerning their biological properties with regard to oxidative stress considered to play a pivotal role in the pathogenesis of aging and a number of clinical cases such as arthritis, atherosclerosis, diabete, cancer and a vast range of other conditions [1]. There are several varieties of olive oils containing healthy levels of antioxidant polyphenols. Phenolic content of olive oil varies depending on many factors such as cultivar, degree of maturation, climate and type of extraction method [2]. There is no scientific evidence found concerned with antioxidant content of these cultivars Adjeraz, Aharoun, Aymel and Agnaw.

The objective of this work is to study the phenolic profile and antioxidant activity of four different olive oil (*Olea europaea* L.) cultivars grown in the region of Bordj Bou Arreridj.

METHOD

Olive oils samples

The extra virgin olive oils were obtained from four different olive varieties (*Adjeraz, Aharoun, Aymel and Agnaw*) of identical growing conditions. The olive oil samples were extracted using a laboratory scale hammer mill.

Extraction of polyphenols

The extraction of polyphenols from the olive oils was performed as described previously [3]. Olive oil samples (10 g) were dissolved in 10 mL of n-hexane and 10 mL of a 60:40 (v/v) methanol/water solution. Two phases were obtained, the soluble in methanol/water (polar) fraction was used.

Total phenol contents

Total phenol contents were estimated using the Folin-Ciocalteu method [4]. Aliquots (200 µl) of appropriately oil were added to 500 µl of Folin-Ciocalteu (10%). The mixture was incubated at room temperature for 5 min and 1500 µl of Na_2CO_3 (7.5%) were added then incubated for 30 min. The absorbance was recorded at 765 nm using UV-1601 PC UV visible spectrometer. Total phenolic contents were expressed as mg gallic acid equivalents (GAE)/kg

Total flavonoid contents

Total flavonoid contents were measured by colorimetric method [5]. One mL of each extract was reacted with 1 mL of aluminum chloride (2 %). After incubation at room temperature for 1 h, the absorbance of the reaction mixture was measured at 420 nm. Total flavonoid contents were calculated as mg of quercetin equivalent (QE)/kg.

Ferric reducing power

The ferric reducing power reported by Oyaizu [6] was tested. A volume of 2.5 mL of each extract was mixed with 2.5 ml of phosphate buffer (0.2 M, pH 6.6) and 2.5 ml of potassium ferricyanide (1 %). The mixtures were incubated for 20 min at 50 °C. After incubation, 2.5 mL of trichloroacetic acid (10 %) were added to the mixtures, followed by centrifugation at 3000 rpm for 10 min. The upper layer (1 mL) was mixed with 1 mL of distilled water and 0.5 mL of ferric chloride (0.1 %). The absorbance was measured at 700 nm.

DPPH radical-scavenging activity

Olive oils extracs were tested using a 1,1-diphenyl-2-picryl hydrazyl (DPPH) technique [7]. Two ml of each extract were added to 0.4 ml solution of DPPH radical in methanol (0.5 mM). Absorbance was measured at 517 nm after 30 min. Inhibition of free radical DPPH was calculated as follows: DPPH I% = 100 x (A blank A sample) / A blank.

RESULTS & DISCUSSION

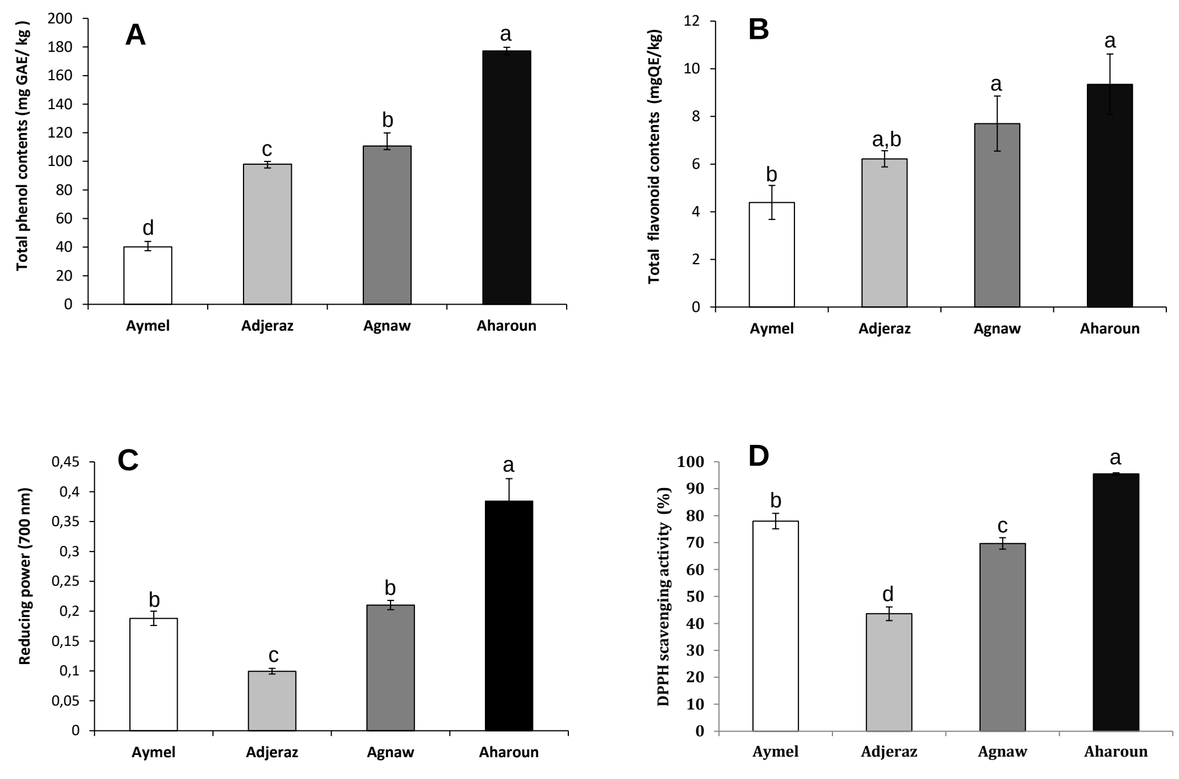

Fig. 1. Total phenol contents (A), total flavonoid contents (B), reducing power (C) and DPPH scavenging activity (D) of olive oils extracts. Results are presented as mean ± SD (n = 3). Data with different letters were significantly different ($p < 0.05$)

The results showed that *Aharoun* olive oil presented the highest contents of polyphenols (177.12 ± 2.59 mg GAE/Kg) and flavonoids (9.34 ± 1.27 mg QE/Kg). The same olive oil exhibited the highest reducing power (0.38 ± 0.037) and was the most effective against the DPPH free radical (95.46 ± 0.39 %). A positive correlation between the phenolic/flavonoid contents and antioxidant activity was observed.

CONCLUSION

The studied olive oils showed important quantity of phenolics and flavonoids with interesting antioxidant activity. These findings support the fact of the need to intensify olive cultivation in Algeria to improve food security and promote national growth economy.

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