

# ANTIOXIDANT ACTIVITY AND PHENOLIC CONTENT OF THREE VARIETIES OF ALGERIAN COMMON DATES

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## **Abstract:**

The date palm is a typical plant of the arid and semi arid areas. Unfortunately in fact they are not all the varieties that profits from an economic interest except for Deglet-Nour. Thus, it represents a danger to the genetic inheritance and the biodiversity. In this study, we investigated the antioxidant activity of methanol water extracts from three date palm fruit (DPF) common varieties, Degla Baidha (DB), Tamjhourt (Tam), and Tafezauine (Taf), from the Ouargla region (Algeria). The antioxidant capacities of these varieties were evaluated by using different methods, namely ABTS<sup>·+</sup> (2,2'-azino-bis-(3-ethylbenzthiazoline-6-sulphonic acid)) scavenging activity expressed as Trolox equivalent antioxidant capacity (TEAC), DPPH (2,2-diphenyl-1-picrylhydrazyl) radical scavenging activity, Reducing power expressed as Ascorbic acid equivalents antioxidant capacity (AEAC). Total phenol content (TPC) was determined by using Folin-Ciocalteu Reagent. Total flavonoid content (TFC) was determined by using aluminum chloride method. ABTS radical cation scavenging activity (Trolox equivalent), the TEAC values decreased in the order of DB>Tam>Tef. Effective scavenging concentration (IC<sub>50</sub>) on DPPH radical decreased in the order of Tam>DB>Tef. Effectiveness in reducing powers was in a descending order of Tam >DB>Tef. The TPC was found from 41.8 to 84.73 mg/100g gallic acid equivalents, the order of TPC of DPF is: DB>Tef>Tam, while TFC to vary from 7.52 to 14.1 mg/100g rutin equivalents, and in a descending order of DB>Tam >Tef. These results suggest that all date varieties serve as a good source of natural antioxidants and could potentially be considered as a functional food or functional food ingredient.

**Keywords:** date palm fruit; Antioxidant capacity; ABTS; DPPH; Reducing power; Total phenolic content and total flavonoid

## **1. Introduction**

Date palm is an important crop in all of the southern regions in Algeria where the estimated annual production is 468000 tons from an area of 140000 hectares planted with date palms [1]. More than 940 cultivars have been currently identified [2]. In Wilaya Ouargla covers an area of 20 622 hectares for a total palm 2 341034 producing about 849082 tones in 2007 [3].

The aim of this study was to investigate the in vitro antioxidant capacities of the methanol water extracts from three date palm fruit (DPF) varieties from the Ouargla region (Algeria). In the present study, methanol water extracts were prepared from dried and powdered plant material. The antioxidant activity was examined for all the three varieties using two antioxidant assays such as, free radical scavenging, reducing power. Furthermore, the total phenolic content and flavonoids contents were also measured from plant extracts.

## 2. Materials and methods

### 2.1. Plant material

Three different Algerian ripe date palm fruit (DPF) varieties, Degla Baidha variety(DB), Tamjhourt variety(Tam), Tafezauine variety(Taf), fruits were collected from the Ouargla region (Algeria), the fruit were segmented and their seeds were carefully removed, and stored in paper bags in refrigerator.

### 2.2. Sample preparation and extraction

The phenolics from samples were isolated by a modified version of the method described by Djerridane et al (2006) [4].

### 2.3. Determination of antioxidant capacities

Antioxidant activity evaluated using three different assays: ABTS<sup>+</sup> scavenging activity according to the modified TEAC method of Cano, Hernández-Ruiz, García-Cánovas, Acosta, & Arnao(1998) [5], DPPH (2,2diphenylpicryl hydrazyl) scavenging activity Djerridane et al (2006) [4], and reducing power assay according to the method of Oyaizu(1986) [6].

### 2.4. Determination of total phenol and flavonoid contents

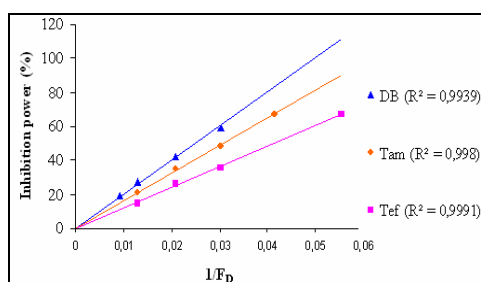
The concentration of total phenolics (TPC) was determined by the Folin–Ciocalteu colorimetric method [7].

The total flavonoid content (TFC) was determined according as the aluminum chloride colorimetric method described of Chang, Yang, Wen, and Chern (2002) based on the method of Woisky and Salatino (1998) [8,9].

## 3. Results and discussion

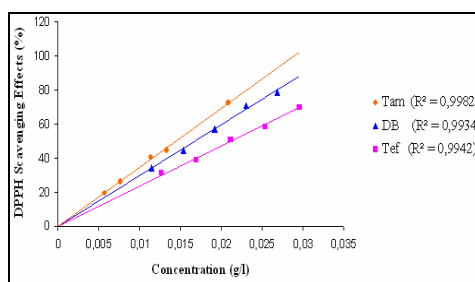
### 3.1. Determination of antioxidant capacities

#### 3.1.1. ABTS<sup>+</sup> scavenging activity



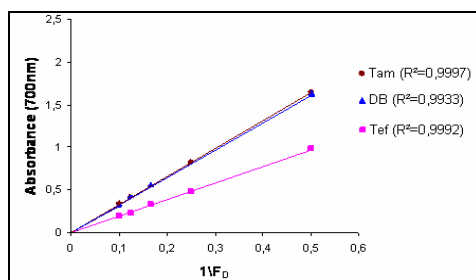
**Fig. 2. Concentration-response curves for inhibition of the absorbance of ABTS<sup>+</sup> cation at (416 nm) for DPF extracts.**

### 3.1.2. DPPH radical scavenging activity



**Fig. 3. DPPH scavenging effect of DPF extracts.**

### 3.1.3. Reducing power activity



**Fig.4. Reducing power effect of DPF extracts.**

## 3.2. Total polyphenol and flavonoid contents

### 3.2.1. Total phenolic content

The DB had the highest phenolic content, with 84.73 mg gallic acid equivalents/100 g dw sample, while lowest content was measured for Tam with 41.8 mg. The order of TPC of DPF is: DB >Tef >Tam.

### 3.2.2. Total flavonoid content

Most of the flavonoids possess strong antioxidant properties following chain breaking mechanism. The highest TFC was observed for DB followed by Tam and Tef, respectively. A controversial order relative to other methods of antioxidant activity evaluation was observed.

The antioxidant activities of fruits (dates) of the date palm can be contributed by phenolic compounds, such as mainly cinnamic acids and flavonoids (flavones, flavonols and flavanones) [10,11]. Thus, the DPPH radical scavenging activity of FDP extracts may be mostly related to their phenolic hydroxyl group. The concentration of hydrogen peroxide in water may vary according to the phenolic compounds. Since phenolic compounds present in the extract are good electron donors, they may accelerate the conversion of H<sub>2</sub>O<sub>2</sub>–H<sub>2</sub>O [12].

## 4. Conclusion

In this study, it was demonstrated for the first time that the methanol water extracts from three date palm fruit varieties from the Ouargla region (Algeria) possessed a good antioxidant activity which may be associated with their alleged health benefits.

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