Screening of tarragon accessions based on physiological and phytochemical responses under water deficit

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Abstract

In this study, screening of *Artemisia dracunculus* accessions ~~based on physiological and phytochemical traits~~ was investigated under water deficit based on physiological and phytochemical traits. The results clearly indicated that water deficit significantly reduced the relative water content, chlorophyll, and carotenoid contents and increased malondialdehyde, electrolyte leakage, and antioxidant activities. The responses of tarragon accessions to water deficit, however, were ~~quite~~ inconsistent. The HPLC ~~analyse~~analysis revealed the presence of chlorogenic, syringic, ferulic, ~~vanilic~~vanillic, chicoric, and *p*-coumaric acids as major phenolic acids, while quercetin and herniarin were detected as the predominant flavonoid and coumarin compounds in the extracts. Our findings revealed that the water deficit not only increased the amounts of herniarin, luteolin, apigenin, caffeic acid, and syringic acid, but also introduced quercetin that was not present under normal conditions in Estahbanat~~,~~. ~~However~~Nevertheless, these results were highly impacted by the accession type. The results indicated that Hamadan, Varamin, and Estahbanat accessions could be introduced as tolerant accessions. ~~Due to~~ Given the very different responses of tarragon accessions to water deficit and the ~~existence of~~ diversity between these accessions, the findings of the present study could be an effective step in identifying and achieving homogeneous, drought-tolerant and high-yield potential accessions, and may help tarragon breeding programs ~~and~~ as well as development of cultivation.

Keywords: Tarragon, Secondary metabolites, HPLC analysis, Antioxidant activity, Flavonoid and phenolic compounds

Introduction

A severe decrease in water availability most likely leads to drought stress ~~and~~ as well as some unsatisfactory physiological and phytochemical changes in plants. Drought is the most common environmental stress and is considered as an important factor limiting crop production worldwide which ~~decreases~~ reduces the production up to approximately 30-40% of the global agricultural fields[1].

The herbaceous and perennial *Artemisia dracunculus,* which belongs to the Asteraceae family, the subfamily of *Radia*, and *Artemisia* genus, has woody and yellowish-green or brownish-green stalks of 30 to 150 cm in height,