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The Effects of Water Stress and Harvest Seasons on Yield and Biochemical Compositions of *Aloe Vera* L

Saeid Hazrati[1*], Zeinolabedin Tahmasebi-Sarvestani[1], Seyed Ali Mohammad Modarres-Sanavy[1] and Ali Mokhtassi-Bidgoli[1]

[1]Departement of Agronomy, Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran,

***Abstract*:** *Aloe vera is one of the most economically important medicinal plants in many countries. In order to study the effects of water stress and harvest seasons on yield and biochemical compositions of Aloe vera. An experiment was conducted in research greenhouse of Faculty of Agriculture, Tarbiat Modares University, Tehran, Iran in 2013 and 2014. The experimental design was a randomized complete block design arranged in split- plot treatments included water stress (20, 40, 60 and 80% of the filed capacity (FC) and harvest seasons (summer, autumn and winter). the highest leaf and gel fresh weight were observed in the winter when plants were irrigated after depleting 40% of the filed capacity. In addition, the results indicated that the maximum aloin concentration and proline accumulation were obtained in the summer when the plants were irrigated after depleting 80 and 60 % of the FC, respectively. Leaves collected in winter and Irrigation after 80% depletion of the FC resulted in highest fructose and glucose content. Finally, irrigation after depleting 40% of soil water content was the best treatment for yield, also depleting 80% of soil water content was the best treatment for biochemical compositions at three different seasons.*

Keywords: *Aloe vera, Field capacity, Harvest Seasons, Yield, Biochemical Compositions.*

1. Introduction

Aloe vera L. (syn. *Aloe barbadensis* Miller.) is a fleshy perennial plant originated from Africa which is cultivated widely in warm and dry regions of the world. The plant belongs to Xanthorrhoeaceae family and includes more than 548 species [1, 2] used in pharmaceutical and food industries. Extracted gel and sap are also used commercially in cosmetics and alternative medicine industries [3]. Water is one of the most limiting factors in crop production worldwide [4]. It is also one of the main factors affecting plant growth and development as well as morphological and physiological adaptation to environmental conditions. It has been reported that crop yield, especially in arid and semi-arid regions, strongly correlates water availability of and seasonal changes [1]. Although *A. vera* is a drought tolerant species, its water requirement depends on soil water holding capacity [5]. It has been stated that *A. vera* growth and yield would decrease with reducing soil moisture content [6]. Considering the fact that the major components in *A. vera* are made of polysaccharides and aloin [7]. gel production and phytochemicals are highly affected by environmental factors and growth stages [8]. The objective of this study was to effects of water stress and harvest seasons on yield and chemical compositions of *A. vera.*

2. Material and Methods

The current experiment was carried out as a randomized complete block design arranged as a spilt- plot with four replications treatments included water stress (20, 40, 60 and 80% of the filed capacity (FC) and harvest seasons (summer, autumn and winter). The plants were grown in research greenhouse of Faculty of Agriculture,