

March 29-31, 2018
Vienna, Austria

Abdelhadi A W et al., J Environ Res, Volume 2

POTENTIAL OF 5-AMINOLEVULENIC ACID ON DATE PALM WATER USE EFFICIENCY UNDER DESERT CLIMATE

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Under hot and desert climate, efficient utilization of the meager water resources is of vital importance. Date palm trees (*Phoenix dactylifera* L.) play crucial role on food security pertaining to its ability to withstand desert climatic conditions and high soil salinity. Eighteen young date palm trees were established for about four years in concrete lysimeters equipped with access tubes for soil moisture monitoring using a calibrated Diviner 2000 capacitance probe. Split plot experiment with main plots as three irrigation water salinities: medium (12-15 dS/m), high (18-20 dS/m) and control (dS/m < 1) under 5-ALA and no 5-ALA treatments as subplots. Data collected included actual irrigation water applied (AW) mm and calculated actual water used in evapotranspiration from soil moisture depletion (ET) mm. Physiological water use efficiency (PWUE) was obtained by dividing actual ET by AW for 46 irrigation events that extended over 446 days during 2016-2017. Results showed that salinity has overriding and significant effects on date palm ET and PWUE. 5-ALA and salinity interaction was highly significant in increasing ET under electrical conductivity (EC) < 1 while actual date palm ET was reduced under medium and high EC. The application of 5-ALA under EC < 1 dS/m resulted in 77% photosynthetic water-use efficiency (PWUE) compared with 31-59% on various combination of 5-ALA and medium and high salinity levels. Various effects of 5-ALA and salinity interactions on flowering and chlorophyll contents were also discussed. Such results are encouraging for further investigations on different levels of 5-ALA applications and fruit quality and food safety.

Recent Publications

1. A A Salih, A A Mohamed, A A Abahussain and F Tashtoosh (2017) Use of Some Trees to Mitigate Air and Soil Pollution Around Oil Refinery, Kingdom of Bahrain. *Journal of Environmental Science and Pollution Research* 3(2):167-170.
2. Kawkab E Babiker, Abdelhadi A W Mohamed, Imad-

eldin A Ali-Babiker and Hussni O Mohammed (2015) Managing Rainfall Variability in Arid Rain-fed Agriculture Using Adaptive Varieties and In-suit Water Harvesting. *Sudan Academy of Sciences Journal - Special Issue (Climate Change)* 11:74-82.

3. Asma Ali Abahussain, Abdelhadi Abdelwahab Mohamed, Ahmed Ali Salih, Ahmad Al Safe, Nader Abdul Hamed Mosa and Yahya Othman (2014) Soil Salinization in Some Irrigated Areas of the Kingdom of Bahrain. *Journal of Agricultural Science and Technology A* 4:112-122.
4. Maie Kabbashi Alla Jabow, Ahmed Ali Salih, Abdelhadi A W and Bashir M A (2013) Crop water requirements for tomato, common bean and chick pea in Hudeiba, River Nile State, Sudan. *Sudan Journal of Agricultural Research* 22:11- 22.
5. Abdelhadi A W, H S Adam, Mohamed A Hassan and Takeshi Hata (2004) Participatory management: Would it be a turning point in the history of the Gezira scheme? *Irrigation and Drainage* 53(4):429-436.

Biography

Abdelhadi A W has obtained his PhD in Global Science from Kobe University, Japan in 2000 where he spent two years in Postdoctoral studies. He obtained his MSc degree in Agriculture and Biological Science from the University of Newcastle upon Tyne in 1992. He worked for the Agricultural Research Corporation, Gezira Research Station for 22 years and as the Director of Soba Research Station for Saline & Sodic Soils. He worked for the Arab Organization for Agricultural Development before joining the Arabian Gulf University in 2011. He participated in more than 20 international conferences and workshops and published more than 29 papers in refereed prominent journals and is serving as a Referee for more than five reputable scientific journals.

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