

البحث السادس

Taia A. Abd El-Mageed, **Eman E. Belal**, Mohamed O. A. Rady, Shima A. Abd El-Mageed, Elsayed Mansour, Mohamed F. Awad and Wael M. Semida (21 June 2021). Acidified Biochar as a Soil Amendment to Drought Stressed (*Vicia faba L.*) Plants: Influences on Growth and Productivity, Nutrient Status, and Water Use Efficiency. *Agronomy*, 11, 1290.

البيوتشار الحامضي كمحسن تربة لنباتات الفول المجهدة بالجفاف: التأثيرات علي النمو والانتاجية، حالة العناصر الغذائية وكفاءة استخدام المياه.

ملخص البحث باللغة الانجليزية:

Drought is one of the major threats to global food security. Biochar use in agriculture has received much attention and improving it through chemical modification offers a potential approach for enhancing crop productivity. There is still limited knowledge on how acidified biochar influences soil properties, and consequently its influences on the agricultural productivity of drought stressed plants. The water use efficiency (I-WUE) of drought stressed faba beans was investigated through the effects of acidified biochar (ACBio) (a 3:100 (w:w) combination of citric acid and biochar) on soil properties, growth, productivity, nutrient uptake, water productivity (WP), and irrigation. Two field experiments (2016/2017 and 2017/2018) were conducted in saline soil (EC_e , 7.2 dS m⁻¹) on faba bean plants grown under three irrigation regimes (i.e., 100, 80, and 60% of crop evapotranspiration (ET_c)) combined with three levels of ACBio (0, 5, and 10 t ha⁻¹). Plants exposed to water stress presented a significant decrease in plant height, dry matter, leave area, chlorophyll content (SPAD), the quantum efficiency of photosystem II (F_v/F_m , F_v/F_0 , and PI), water status (membrane stability index and relative water content), and seed yield. Acidified biochar soil incorporation improved soil properties (chemical and physical), plant growth, physiological responses, WP, I-WUE, and contents of N, P, K, and Ca. Results revealed that the application of ACBio at 10 t ha⁻¹ and 5 t ha⁻¹ significantly increased seed yield by 38.7 and 25.8%, respectively, compared to the control. Therefore, ACBio incorporation may find application in the future as a potential soil amendment for improving growth and productivity of faba bean plants under deficit irrigation.

