قسم النبات
كلية العلوم
جامعة الفيوم

البحث رقم (5)

Title:	Investigating the combined effects of β-sitosterol and biochar on nutritional value and drought tolerance in *Phaseolus vulgaris* L. under drought stress
عنوان البحث:	دراسة التأثيرات المشتركة لـ بيتا-سيتوستيرول والفحم الحيوي على القيمة الغذائية وتحمل الجفاف في نبات الفاصوليا *Phaseolus vulgaris* تحت إجهاد الجفاف
اسم المجلة ومعلومات النشر (السنة، العدد، الصفحات):	Functional plant biology (2024) https://doi.org/10.1071/FP24023

Research Article (5)

English Abstract

Background

Climate change-induced drought stress decreases crop productivity, but the application of β-sitosterol (BS) and biochar (BC) boosts crop growth and yield.

Results

To examine the effects of alone and combined application of BS and BC on the growth and yield of Phaseolus vulgaris under drought stress, a pot experiment was conducted. The synergistic application of BS and BC increased plant height (46.9 cm), shoot dry weight (6.9 g/pot), and root dry weight (2.5 g/pot) of Phaseolus vulgaris plants under drought stress. The trend of applied treatments for photosynthetic rate remained as BC (15%) < BS (28%) < BC+BS (32%), compared to drought-stressed control. Similarly, the trend of applied treatments for water use efficiency was BS < BC < BC+BS, compared to the drought stress control. The levels of malondialdehyde and hydrogen peroxide were reduced by the combined application of BS and BC under drought stress, measuring at 22.8 and 66.4 μmol/g FW, respectively.

Conclusions

The combined use of BS and BC significantly alleviated drought stress more than when applied individually. Thus, employing BS and BC together as key agents in drought-stressed common bean plants could promote resilience, fostering growth amid ongoing climate change.