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Moringa leaf extracts biostimulants improves water use efficiency, physio-biochemical attributes of squash plants under deficit irrigation
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Abstract

Natural plant growth biostimulants are intensively used nowadays for plant growing in normal and adverse conditions. Severely affected by salt and drought stresses, squash (*Cucurbita pepo* L.) is an important vegetable crop that highly ranked in economic importance worldwide. The current study aimed to evaluate whether leaf extract of *Moringa oleifera* (MLE), as a novel natural biostimulant for plant growth, could play a role in improving drought tolerance in squash plants under saline condition. In summer and fall seasons of 2016, MLE (3%) was foliar sprayed for plants under full (100% of ETc) or deficit irrigation (DI; 80 or 60% of ETc). The effect of MLE on the growth, yield characteristics and water use efficiency (WUE), physio-biochemical attributes, and leaf anatomy of squash plants exposed to DI stress was assessed. MLE-treated plants exposed to DI had higher growth and yield characteristics, harvest index (HI), WUE, chlorophyll fluorescence (Fv/Fm and PI), photosynthetic pigments, soluble sugars and free proline, leaf anatomy, relative water content (RWC%) and membrane stability index (MSI%) and had lower electrolyte leakage (EL%) compared to MLE-untreated plants. Application of 3% MLE was effective in alleviating damages of drought stresses in squash plants by maintaining higher RWC, WUE, and osmoprotectants, and lower EL.