



## Water Use Efficiency of Maize Under Water Deficit Using Cashew Gum Hydrogel

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### Abstract

The application of hydrogels, recognized as water-absorbing hydrocolloids, is a commonly implemented approach in the agricultural sector to improve water resource control in light of rising food requirements. This study aimed to evaluate the water use efficiency of maize under different levels of water deficit using cashew gum-based hydrogels versus polyacrylamide hydrogels. The experiment was carried out in a greenhouse at the Federal University of Mato Grosso do Sul. A completely randomized experimental design was used in a 2x4x4 factorial scheme with 3 repetitions. The first factor was composed of types of hydrogels: cashew gum-based hydrogel with 5% K<sub>2</sub>HPO<sub>4</sub> (H1) and Hydroplan – commercial hydrogel (H2); the second factor corresponded to four inputs: 0, 60, 120, and 240 mg pot<sup>-1</sup>, corresponding to 7.5, 15, 30, and 60 kg ha<sup>-1</sup>; while the last factor was four irrigation levels: 0, 25, 50, and 100% of water storage capacity. At 30 days after maize germination, gas exchange was analyzed using an infrared gas analyzer. Physiological variables evaluated were: net photosynthesis (*A*) and transpiration (*E*). From this data, water use efficiency (*WUE*) was quantified by the *A/E*. Our findings reveal that *WUE* is significantly influenced by the interaction between types x inputs of hydrogels, but there is no interaction between types x inputs x irrigation levels. Using cashew gum hydrogel is similar to using commercial hydrogels in terms of water use efficiency. Hydrogels, originating from natural substances and utilizing renewable resources in their manufacturing process, contribute to the sustainability of food production.

**Keywords:** irrigation, photosynthesis, sustainability, transpiration, *Zea mays*