

عنوان مقاله:

Physiological Responses of Black Cumin to Chemical and Biological Nitrogen Fertilizers under Different Irrigation Regimes

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خلاصه مقاله:

The objective of this study was to investigate the physiological responses and biological yield of black cumin (*Nigella sativa* L.) to nitroxin biofertilizer and chemical nitrogen fertilizer in the form of urea under different irrigation regimes. A split plot experiment was conducted on the basis of randomized complete block design with three replications. The main factor included four irrigation regimes (i.e., weekly from emergence to harvest and withholding from blooming to maturity, flowering to maturity, and the start of seed formation to maturity) and sub-factor included five levels (i.e., no application of fertilizers, 80 kg N ha⁻¹, 40 kg N ha⁻¹, combination of 40 kg N ha⁻¹+nitroxin biofertilizers, and nitroxin biofertilizer). Application of 80 kg N ha⁻¹ under full irrigation and the combined application of 40 kg N ha⁻¹ and nitroxin under all withholding irrigations produced the highest glycinebetaine, polyphenol oxidase and catalase enzyme, total chlorophyll, and biological yield. Withholding irrigation from the blooming stage and also the application of 80 kg N ha⁻¹ resulted in the highest concentration of malondialdehyde. In combined application of 40 kg N ha⁻¹ and nitroxin, polyphenol oxidase, proline, and soluble protein were at the highest levels. Generally, the combined application of 40 kg N ha⁻¹ and nitroxin increased the activity of the antioxidant enzymes and the compatible osmolites accumulation under all withholding irrigation treatments and thus decreased the negative effects of drought stress on black cumin, resulting in increased biological yield.

کلمات کلیدی:

Biofertilizer, Chlorophyll, Compatible osmolites, Enzymatic defense system, Withholding irrigation

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