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EFFECT OF FERTILIZER SOURCE AND TIMING OF APPLICATION ON CADMIUM UPTAKE OF DURUM WHEAT

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Durum wheat (*Triticum turgidum* L. var. *durum* Desf.) is a market class of wheat grown in North Dakota, USA, which tends to accumulate Cd in harvested grain under certain environmental conditions. Due to potential international marketing concerns, ND durum wheat producers require strategies that might limit grain Cd accumulation in grain. These trials were conducted in order to determine the impact of type and placement of Zn fertilizer on grain seed Cd levels and to determine the best timing of foliar Zn-EDTA resulting in lowest grain Cd. Foliar Zn-EDTA applied at Feekes 10 growth stage had the lowest grain Cd of 0.97 mg kg⁻¹ when evaluating different fertilizer sources and application timings. Application of 22.4 kg ha⁻¹ KCl with the seed at planting resulted in the highest grain Cd of 0.151 mg kg⁻¹ and might be a concern when environmental conditions are conducive for Cd uptake from soil. Stepwise linear regression determined that soil pH and Cl explained 96% of the variability of grain Cd. Applying 1.1 kg Zn ha⁻¹ as foliar Zn-EDTA in combination with 33 kg N ha⁻¹ at Feekes 10.54 growth stage resulted in significantly lower grain Cd, and significantly higher grain Zn, Fe, and protein content. No treatments in either trial negatively impacted grain yield, test weight, or protein content. The treatments that most reduced grain Cd resulted in the most benefits from a production, marketing, and nutritional standpoint and represents an agronomic approach to biofortification of durum wheat.

ABSTRACT