

# Reduction of Cadmium in Flax Using Agronomic Strategies



**Objective:** to demonstrate the efficacy of zinc and calcium fertilization for reducing cadmium levels in flaxseed.

## Trial Design:

- Sites included Scott, Indian Head, Redvers and Yorkton, SK in 2022 and 2023.
- Treatments consisted of an untreated control along with 1.1, 1.9 and 4.4 lbs/ac of Zinc and 47, 94.2 and 188 lbs/ac of Gypsum seeded as sideband fertilizer to flax.

## Results:

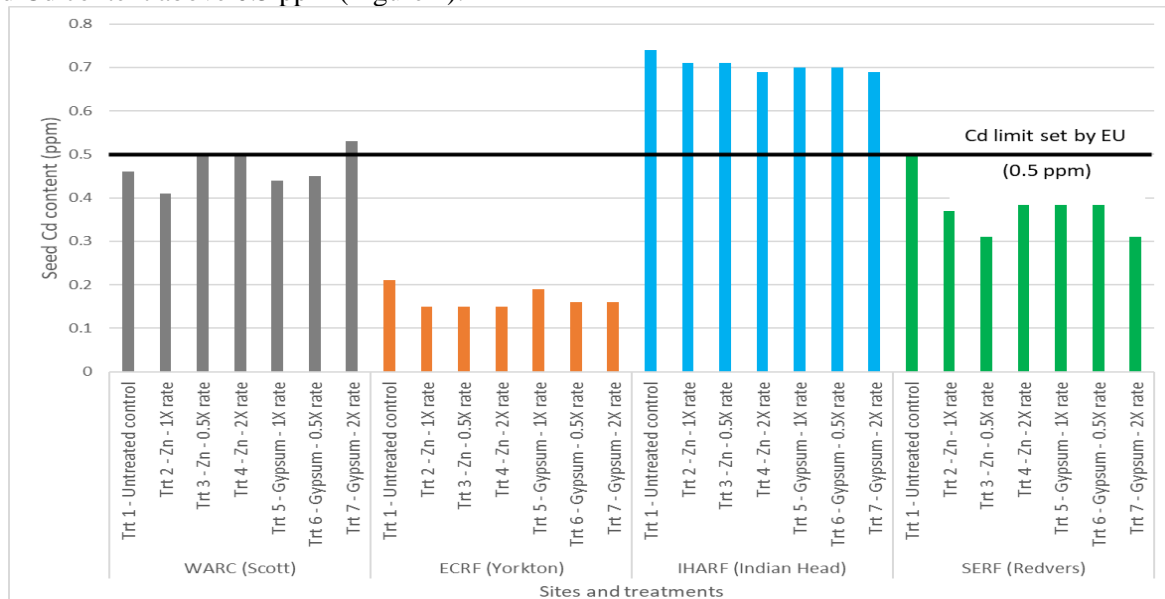
- Soil samples analyzed for cadmium (Cd) content showed low Cd in all 4 sites, ranging from <0.1 ppm to 0.2 ppm. Cd levels were more varied in MAP fertilizer samples collected from each site and ranged from 9.1 ppm at Scott to 39 ppm at Indian Head.
- No statistically significant differences in parameters were found between treatments, implying that treatment of zinc or calcium/gypsum did not affect plant density, plant height, yield, or seed Cd content at any of the sites.
- Seed Cd content for all treatments at Yorkton and Redvers were below the limit of 0.5 ppm set by the European Union. All treatments at Indian Head had seed Cd content above 0.5 ppm (Figure 1).

- Compared to 2022, flax yield was significantly reduced at all sites in 2023. Cd levels in harvested flaxseed were also lower in 2023 at all sites except Indian Head.
- An economic analysis was performed and showed that treatments ranged from 1-8% of yield revenue, with Gypsum at the highest rate being the most expensive.

## Conclusions:

While a causal relationship could not be established between MAP or soil Cd content and Cd content of harvested flaxseed, the location at Indian Head, with the highest seed and MAP Cd content, produced flaxseed with highest Cd levels. Average Cd content of seed harvested at all other sites was within the 0.5 ppm limit.

None of the treatments of zinc or calcium in either year at any of the sites led to a significant reduction in seed Cd levels compared to the untreated control. Findings from two years of this project suggest that at the rates and formulations used in this project, the application of neither zinc nor calcium is effective at reducing Cd accumulation in medium-high to high Cd-accumulating flax varieties.



**Figure 1.** Cadmium accumulation in harvested flaxseed for various treatments at four different sites in the trial. Black line indicates maximum limit for cadmium in flax seed set by the European Union (0.5 ppm).

The full report is available at [www.warc.ca](http://www.warc.ca). This project was a collaborative venture between the Saskatchewan Flax Development Commission and partial funding by the Government of Saskatchewan and the Government of Canada under the Canadian Agricultural Partnership. WARC Project #8-23 February 2024

