

## Slow- and fast-release boron in a potassium macronutrient fertilizer

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Boron (B) is an essential micronutrient required by plants during all growth stages from seedling to flowering. A challenge of B fertilization is to provide adequate B throughout the season, even in high rainfall environments, without reaching levels too high causing toxicity at sowing. The most common B fertilizers are highly water soluble resulting in leaching followed by deficiency later at flowering. A second challenge is to provide a uniform spread of the relatively small amounts of B required over a wide area to ensure efficiency of supply to plants. This paper describes a range of fertilizers with slow- and fast-release B in different ratios designed to address these challenges. Borax, ulexite and colemanite with water soluble B varying between 100 and 22% were used in a co-compacted MOP (Muriate of Potash) fertilizer to produce MOP with 0.5%B. The B in the fertilizer was evenly distributed throughout the macro MOP matrix providing a uniform spread of B when applied to the soil. The kinetics of B release were determined using a column dissolution method, which showed the products release firstly the highly soluble B, followed by a prolonged slower B release. The spatial variability of the fertilizer B was assessed in incubated soil trays, which showed minimal variation for the co-compacted product, while a blend of MOP with borax showed B concentrations in the toxic range around the borax granule and deficient concentrations elsewhere. Finally, in a pot trial with simulated rainfall, B uptake by canola was higher for MOP compacted with a slow-release B source (colemanite) than for MOP compacted with borax only. These results demonstrate the usefulness of slow release B fertilizer, particularly in high rainfall areas.