Superb solutions to meet micro-element requirements in oilseeds

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Micro-element deficiencies should be proactively identified and addressed in a bid to prevent yield losses. Soil and foliar analyses along with advanced products can ensure the cost-effective provision of each element to each soil type, crop and yield scenario.

Soil concentrations

The threshold values (mg/kg) for topsoil above which we do not expect strong reactions to applications are >2 for zinc (Zn), >2,5 for copper (Cu), >5 for manganese (Mn) and >4,5 for iron (Fe) mg/kg (DTPA). Likewise, this value is >2mg/kg for boron (B) (hot water) and >0,3mg/kg for molybdenum (Mo) (ammonium oxalate). Maximum values for B <4mg/kg and Mn <40mg/kg according to the same methods are indicated to prevent toxicities.

Soil pH

When the soil pH (H_2O) is >8, deficiencies of especially B, Mn and Fe, but also Cu and Zn can occur regardless of soil concentrations. Toxicity levels of Mn and B can be addressed through liming under acidic conditions. However, Mo is more accessible under alkalic conditions, but less accessible under acidic conditions (pH [H_2O] <5). Liming will improve the availability of Mo under acidic conditions, but with acid-tolerant crops such as soya beans it is more economical to spray Mo on the leaves if liming is not yet necessary.

Foliar analyses

Timeous monitoring of the threshold values for foliar analyses that have been calibrated for specific growth stages is important for the following reasons:

- Elements such as B and Mo can leach to soil layers which are deeper than the rhizosphere.
- The degree of acidity or alkalinity in the root zone affecting element absorption is not entirely predictable.
- Expected yield may change during the season.
- The effectiveness of specific products can be monitored.

Table 1: Micro-element uptake in all above-ground parts for each ton of seed produced.

Element	Uptake of whole plant (g/ton seed)			
	Soya	Sunflower	Groundnuts	Canola
Zn	61	99	186	163
B	39	113	196	86
Cu	25	17	40	26
Mn	90	118	113	74
Mo	7	2	2	2
Fe	366	209	499	906

Application rates

The micro-element uptake/ton of seed differs significantly among oilseed crops (*Table 1*). Application rates are calculated by multiplying uptake/ton of seed by expected yield. Using only uptake figures is justified when highly effective products are placed in close proximity of roots or spayed directly onto leaves.

While the best product formulations are not 100% effective, there are usually partial uptake from the soil. Foliar application of more than expected uptake is justified for Zn, Cu, Mn and B under strong alkalic conditions, and under acidic conditions for Mo.

Fertiliser granule coating

Nano-oxide forms of Zn, Cu, Mn as well as specially formulated B and Mo applied to fertiliser granules, provide a solution within normal pH limits. At pH (H_2O) levels of up to about 8, nano-oxide compounds are well absorbed, but an acidifying fertiliser band in an alkaline environment will nonetheless promote the absorbency of most micro-elements. Nano-oxides are more efficiently absorbed by roots, translocated and metabolised as opposed to sulphates or chelates, regardless of the pH of the growth medium.

Mo will become available as the acidic fertiliser band becomes neutralised under alkalic conditions. When both the soil and fertiliser band are acidic, it is not recommended that Mo be applied to fertiliser granules.

Foliar applications

Foliar application of Zn, Cu, Mn and B is unavoidable when the pH of the soil is very high, and for Mo, it is essential when the soil is very acidic. Leaching of B and Mo often also necessitates foliar applications.

The use of specially formulated nano-oxide forms of Zn, Cu, Mn and specifically formulated B and Mo for foliar uptake are highly suitable for this purpose. Foliar application of nano-oxides are more effective than sulphates, powder oxides or chelates in terms of yield increases, even at much lower concentrations.

Kimleigh Chemicals can compile different packages for fertiliser granule coating or foliar applications based on each customer's requirements.

Consult Kimleigh Chemicals for product details, location-specific applications and references. Visit *www.kimleigh.com* or call 018 293 1028.