

# Comparative effects of urea plus gypsum and urea plus ammonium sulphate on growth, yield and nutrition in canola cropping system in calcarosol of south-eastern Australia

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The importance of nitrogen (N) and sulphur (S) in canola cropping systems is well established. However, in the past, urea and gypsum were the commonly used strategies for N and S nutrition. We hypothesised that the use of ammonium sulphate (AS) along with urea may enhance both N and S efficiency in a calcarosol growing canola. We conducted a field experiment to investigate the effects of combining urea and AS on canola growth, yield and nutrient uptake in a calcarosol at Walpeup in south eastern Australia. Irrespective of sources, nitrogen significantly ( $p \leq 0.05$ ) increased above ground biomass at flowering stage and grain maturity stage. Similarly, this was also reflected on a range of nutrient uptake. However, nutrient uptake (N, P, K, S, Ca, Mg and micro nutrients) at flowering stage also higher ( $p \geq 0.05$ ) in the urea plus AS treatment compared to that observed in the urea plus gypsum treatments. Although a response to S was not seen at flowering stage, a significant S response occurred at grain maturity stage in urea plus AS compared to urea plus gypsum. Urea plus AS significantly ( $p \leq 0.05$ ) increased agronomic N and S efficiency by 3.65% and 35.58% respectively, compared to urea plus gypsum. We hypothesise that the higher efficiency may be associated with lower ammonia volatilization and high acidification of the root zone in the alkaline calcareous soil which enhanced nutrient uptake. Further results on N and S uptake at maturity and <sup>15</sup>N studies of plant and soil under field micro-plots will be used to test our hypothesis.