Nitrate corrected the negative effects of ammonium and urea nutrition on the growth of Capsicum plants

The aim of this study was to compare the effects on plant growth of the main mixed N forms containing urea with that of nitrate and nitrate-ammonium as an N source for two plant species, wheat (tolerant to ammonium) and

Capsicum

(sensitive to ammonium). The experiment was performed in a growth chamber and plants were grown in siliceous sand pots.

Capsicum

plants received only one level of N: 8,5 mmol/L, whereas wheat plants received three levels of N: 2, 8,5 and 15 mmol/L. Treatment compositions for 8,5 mmol/L are described in Table 1.

Table 1. Composition of treatment solutions for a N level of 8,5 mmol/L. All concentrations are in mmol/L.

Treatment	NO_3^-	NH_4^+	U	NA	NU	AU	NAU
$Ca(NO_3)_2$	2						
KNO_3	4,5				4,25		
$(NH_4)_2SO_4$		4,3				2,13	
Urea			4,25		2,13	2,13	1,4
NH_4NO_3				4,25			2,85
K_2SO_4	0,3	2,5	2,5	2,5	0,38	2,5	2,5
KH_2PO_4	1	1	1	1	1	1	1
Mg_2SO_4	2	2	2	2	2	2	2

Nota U = urea, NA = nitrate/ammonium, NU = nitrate/urea, AU = ammonium/urea, NAU = nitrate/ammonium/urea

Results showed that for both wheat and

Capsicum

the growth of plants, fed with mixed nitrogen forms containing urea, was similar to that of plants receiving nitrate and nitrate/ammonium. Only for

Capsicum

, fed with ammonium/urea a significant decrease in plant growth was found (Table 2).The presence of nitrate (as for example supplied with KNO_3) corrected the negative effects of ammonium and urea nutrition on the growth parameters of

Capsicum

plants.

Table 2. Effects of different nitrogen forms on growth parameters of

Capsicum

plants.

Treatment	Height (cm)	Number of leaves	Leaf dry weight (g per plant)	Root dry weight (g per planta)
NO_3^-	19,0 cd	40,8 ab	4,85 b	2,72 bc
NH_4^+	13,0 ab	26,7 a	2,16 a	1,52 a
U	15,3 abc	55,0 b	3,92 ab	1,85 ab
NA	16,5 abc	43,5 ab	4,80 b	2,17 ab
NU	20,8 d	44,5 ab	4,97 b	3,29 c
AU	12,8 a	26,0 a	2,38 a	1,64 a
NAU	17,3 bcd	45,0 ab	4,72 b	2,16 ab

Nota U = urea, NA = nitrate/ammonium, NU = nitrate/urea, AU = ammonium/urea, NAU = nitrate/ammonium/urea