

P 17. EFFECTS OF ELEMENTAL SULFUR AND K-HUMAT ALONGSIDE FESO₄ AND FEEDDHA APPLICATIONS ON IRON NUTRITION OF CORN

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ABSTRACT: This study was aimed at determining the effects of FeSO₄.7H₂O (19% Fe) and FeEDDHA (6%) compounds, which were supplied with elemental sulfur and K-Humat on the active and total iron content of corn plant in greenhouse conditions, and the study was conducted with four replications according to a randomized complete block design. In the experiment, 0 (control) and 10 mg Fe kg⁻¹ iron were applied to soil before planting. FeSO₄.7H₂O (19% Fe) and FeEDDHA (6%) with an ortho-ortho isomer of ratio 6 as an iron source were used in the study. Ferrous sulfate alone, 400 mg kg⁻¹ elemental sulfur and 250 mg kg⁻¹ K-humate were applied in 3 different forms. ANT CIN 98 corn variety was cultivated in an experimental soil characterized by mild alkaline reaction (7.53), clay loam texture, high lime content (28%), poor organic matter (1.68%) and insufficient level of iron (1.21 mg kg⁻¹). In the experiment, it was determined that the active and total iron contents of the corn plant leaves varied depending on the iron sources and this change was statistically significant at 1%. While the active and total iron contents in the leaves of corn plant were 18.2 and 50.9 mg kg⁻¹ in the control, respectively, these values respectively increased in the ratio of 26% and 28% by FeSO₄.7H₂O, 15% and 5% by FeSO₄.7H₂O + Elemental S, 73% and 28% by FeSO₄.7H₂O + K-Humat, and 95% and 37% by FeEDDHA application. In addition, although iron supply of corn plant was sufficient in all applications according to the total iron contents of plant leaves (50-250 mg Fe kg⁻¹), iron deficiency symptoms were observed in control, FeSO₄.7H₂O and FeSO₄.7H₂O + Elemental S applications. Under this circumstance, it shows that the total iron content of the plant leaves is not an important indicator for determining the iron nutrition status of the corn plant and also increase in total and especially active iron contents of the plant by the application of these sources is not sufficient. FeSO₄.7H₂O + K-Humat and FeEDDHA applications did not show any signs of iron deficiency in corn plant leaves. Thus, we think that the iron content is higher than the control, rather than the increase in the total iron content of the leaves with the application of these sources. As a matter of fact, it was observed that the ratio of the active iron content in the total iron was 51% for FeEDDHA, followed by FeSO₄.7H₂O + K-Humat with 48%, FeSO₄.7H₂O + Elemental S with 43%, Control with 36% and FeSO₄.7H₂O with 32%. The failure of FeSO₄.7H₂O + Elemental S in the iron nutrition of the plant was due to the lack of pH decrease induced by sufficiently conversion of the elemental S to sulphate by the microbial pathways and the low organic matter in the soil. It was also determined that FeEDDHA was the best source of iron in terms of feeding of the plant while FeSO₄.7H₂O + K-Humat could be preferred in terms of economic status.

Keywords: Active iron, FeEDDHA, FeSO₄.7H₂O., elemental S, K-Humate, corn, total iron