

Effect of micronutrient enriched *Azospirillum* biofertilizers on nutrient uptake in maize (*Zea mays* L.)

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SUMMARY

Attempts were made to study the effect of application of enriched biofertilizers on micronutrients content and uptake using maize as a test crop. The study was initiated using two strains of *Azospirillum brasilense* viz., ACD-20 and ACD-L₄ biofertilizers enriched with optimum concentration (100ppm) of different micronutrients (individually and in combination) with two forms of application (seed inoculation and soil application). Results obtained from the study indicated that, irrespective of forms of application and *A. brasilense* strains (ACD-20 and ACD-L₄), enrichment of *Azospirillum* biofertilizer with 100ppm concentration of Zn + Mo, Zn+Fe+Mo and Mo alone have recorded maximum uptake of Zinc (1386.6 to 1410.3 mg/plant), Iron (11.96 to 12.21 mg/plant) and Molybdenum (590.09 to 641.12 mg/plant), respectively over control. It was also observed that the treatment receiving *Azospirillum*+ Zn+ Fe+ Mo resulted in higher shoot nitrogen uptake (731.1 to 740 mg/plant) over control (349.3 to 393.0 mg/plant). Thus it is evident from the experimentation that the seed and soil application of micronutrient enriched (Zn, Fe and Mo) *Azospirillum* biofertilizers enhanced the nutrient content and uptake and favoured for higher yield potential in the crop.

Key words : *Azospirillum*, Micronutrients uptake, Nitrogen fixers, Maize etc.

Micronutrients play a vital role in growth and development of plants and occupy an important position by virtue of their essentiality in increasing crop yields. In fact their essential role in plant nutrition and increasing soil productivity makes their importance even greater. In view of intensive cropping with high yielding varieties and application of major and secondary nutrient fertilizers, incidence of micronutrients deficiencies have been more pronounced. Among the major factors considered for low yields of several crops, the deficiency of micronutrients due to imbalance of nutrients in plants has been recognized as one of the major causes. Therefore, role of micronutrients in crop production is over emphasized.

Growing fertilizer needs of the country and increasing fertilizer prices have directed emphasis on the use of biofertilizers in Indian agriculture. The research work on biofertilizers in combination with micronutrients is lacking. The present study was, therefore, undertaken to find out the effect of *Azospirillum* biofertilizer enriched with micronutrients (Zn, Fe and Mo) on the uptake of nitrogen and micronutrients using maize as a test crop.

MATERIALS AND METHODS

A pot culture experiment was conducted under greenhouse condition at Department of Agricultural

Microbiology, UAS, Dharwad, Karnataka, India during 2002 to know the effect of micronutrients supplemented *Azospirillum* biofertilizer on nutrient content and uptake in Maize. The enriched biofertilizer was applied as seed treatment and soil application using two strains of *Azospirillum brasilense* ACD-20 and ACD-L₄. Uptake of nitrogen and micronutrients (Zn, Fe and Mo) by maize was studied with the following treatment combinations.

Treatment details :

T₁ – *Azospirillum brasilense* + Zinc @ 100 ppm

T₂ – *Azospirillum brasilense* + Iron @ 100 ppm

T₃ – *Azospirillum brasilense* + Molybdenum @ 100 ppm

T₄ – *Azospirillum brasilense* + Zinc + molybdenum @ 100 ppm each

T₅ – *Azospirillum brasilense* + Iron + Molybdenum @ 100 ppm each

T₆ – *Azospirillum brasilense* + Zinc + Iron + Molybdenum @ 100 ppm each

T₇ – Inoculated control (IC)

T₈ – Uninoculated control (UIC)

Plant sampling was done at regular intervals (30, 60 and 90 DAS) and nutrients viz., Nitrogen (N), Zinc (Zn) and Iron (Fe) were analyzed at all the stages while

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