

## Efficiency of immobilization technique for *Azotobacter chroococcum* and its effect on the growth and yield of wheat *Triticum aestivum* L.

**Authors:**

**Abdualla Kreem Jbar,  
Hanoon Nahi Kadhem and  
Ghanem Bahlol Noni**

**Institution:**

Lecturer, Agriculture  
College, Al-Muthanna  
University, Iraq.

**Corresponding author:**

**Abdualla Kreem Jbar**

**ABSTRACT:**

Two local isolates of *Azotobacter chroococcum*, were used to study its nitrogen fixation one of which was isolated and identified in the Microbiology Laboratory of the Faculty of Agriculture, Al-Muthanna University. It was selected among the ten local isolates, isolated from different locations of Al-Muthanna province and its ability to nitrogen fixation in the liquid media and other isolates were originated from Agriculture college, University of Sulaymaniyah. The isolation was activated by Sucrose mineral-salts. A field experiment was conducted by Randomized Complete Block Design (RCBD) by three replicates to study Immobilization, inoculant effect and bentonite as a bacterium for the concentration of nitrogen increasing and growth of wheat plant using two factors. The first factor is the addition of bio-fertilizer at three levels *viz.*,  $A_0$  = without the addition of the bacterium,  $A_1$  = *Azotobacter chroococcum* isolated from Al-Muthanna province soils,  $A_2$  = *Azotobacter chroococcum* isolation sourced from the University of Sulaymaniyah. The second factor was the utilization of a bio-fertilizer carrier by two levels  $B_0$  = bio-fertilizer and the addition of bentonite carrier as Conventional inoculant  $B_1$  = immobilized inoculant. The study aims to investigate the immobilized inoculant technique and its effect, that favours bacteria capsulation by in a polymeric compound such as sodium alginate and bentonite as a carrier of bio-fertilizer in the growth and yield of wheat. The results showed that immobilized inoculant was superior to the bentonite carrier method in most characters studied with the isolation locally, The plant weight was 49.7 cm, with a significant increase of bentonite carrier. The dry weight of the plant was significantly increased in the same regard by immobilized inoculant (0.68 g). On the other side, the same treatment registered the weight of 500 grain and the total yield was registered as 4.69 g and 4.174 mega grams  $ha^{-1}$  sequentially.

**Keywords:**

Immobilized inoculant, Bentonite, Bio-fertilizer.