



## Paper (2)

### **Effect of dual inoculation with *Rhizobium leguminosarum* and silicate bacteria (*Bacillus circulans*) on growth and yield of faba bean under graded levels of feldspar amendment in sandy soil**

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Two field experiments were carried out in sandy soil at newly reclaimed lands in Minia Governorate during the two successive winter seasons of 2009/2010 and 2010/2011 years, to study the influence of inoculation with *Rhizobium leguminosarum* bv. *viceae*, individually or in combination with silicate bacteria (*Bacillus circulans*) on nodulation status, growth, N and K contents as well as yield and some yield components of faba bean (cv. Giza 40) under three levels of potassium fertilizer (50, 75 and 100%) in the form of feldspar as a natural potassium source (10.5 % K<sub>2</sub>O). A split plot design with four replicates was used.

Results showed that inoculation with *Rhizobium* caused significant increases in faba bean nodulation status. Also, inoculation of faba bean with silicate bacteria relatively increased nodulation status. Dual inoculation with *Rhizobium* and silicate bacteria caused significant increases in nodulation status over the plant inoculated with *Rhizobium* or silicate bacteria alone. However, using dual inoculation under moderate levels of feldspar from 262 kg to 393 kg/ha improved nodulation status much more. This trend was true in both seasons. Data of shoot dry weight and its nitrogen and potassium contents revealed that co-inoculation with *Rhizobium* and silicate bacteria remarkably increased plant dry matter and plant contents of nitrogen and potassium. Also, feldspar amendment had a significant effect on shoot dry weight, nitrogen and potassium contents in both seasons. However, plant amended with 262 or 393 kg/ha gave significant increases in the above mentioned parameters.

Sole inoculation with *Rhizobium* recorded significant increases in faba bean yield and its components compared to the treatment inoculated with silicate bacteria only. Increases occurred in the faba bean yield and some of its components were significantly magnified, when faba bean seeds were co-inoculated with *Rhizobium* and silicate bacteria conjointly in comparison to sole inoculation during the two investigated seasons. Additionally, co-inoculation with *Rhizobium* and silicate bacteria amended with 393 kg feldspar/ha gave values of faba bean yield similar to or higher than values resulted from uninoculated treatment received the recommended dose of NPK fertilizers.