Cytological and molecular studies on the effect of herbicides on *Rhizobium* spp. symbiotic with *Vicia faba*

By

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B.Sc. Agric. Sci. (Genetics), Ain Shams University (1994)

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CYTOLOGICAL AND MOLECULAR STUDIES ON THE EFFECT OF HERBICIDES ON RHIZOBIUM SPP. SYMBIOTIC WITH VICIA FABA

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ABSTRACT


Faba bean plays an important role in the national economy and agricultural production for its high nutritional value and various ways of utilization. This study was aimed to investigate the symbiotic relationship between faba bean and rhizobium as affected by some herbicides. Three cultivars of faba bean (Giza 2, Giza 714 and Giza 461) and one Rhizobium leguminosarum strain 481 were tested for symbiotic property in the present of three herbicides (Glyphosate [Roundup], Basagran and Fusilade) at different concentrations. Different parameters such as SDS-PAGE, plasmid profiles optical density (for rhizobium growth and % of leghaemoglobin) and inhibition zone experiment was used to determine the toxicity of these herbicides.

The effect of high dosage of herbicides was found to be more aggressive on faba bean than Rhizobium leguminosarum strain 481. The Basagran herbicide has a high toxicity effect on both faba bean and Rhizobium leguminosarum strain 481. The Rhizobium leguminosarum strain 481 showed the highest resistance and also recovery against Glyphosate (Roundup) herbicide, where the bacteria have biodegraded this herbicide to useful components.
On the other hand, proteins of both rhizobium and faba bean cultivars on the level of SDS-PAGE were effected by treatment with the three herbicides.

Key Words: Vicia faba - faba bean - Rhizobium leguminosarum - herbicide - symbiotic - plasmid - SDS-PAGE - biodegradation.
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