EFFECTS OF PHOSPHORUS FERTILIZER AND PLANT GROWTH PROMOTING RHIZOBACTERIA ON THE CHLOROPHYLL AND NITROGEN CONTENT IN SOYBEAN UNDER SUFFICIENT AND LOW WATER SUPPLY

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Abstract

Nitrogen is a crucial element in the production of both leguminous and non-leguminous crops and has pivotal impact on the growth of legumes. The yield of soybean mainly d[1]depends on the accumulation of nitrogen and chlorophyll content in leaves. A pot experiment was conducted to determine the effects of phosphorus (P) and plant growth-promoting rhizobacteria (PGPR) treatments, applied in combination with *Pseudomonas fluorescence* and *Azotobacter chroococcum* on the chlorophyll and nitrogen content in soybean (*Glycine max. (L) Merr*). P and PGPR were applied in the soil before sowing. Soybean plants (cv Zodiac) were grown on soil-sand mixture with P deficiency at two water regimes - 70% water holding capacity of soil (WHC) as sufficient supply and 35% WHC as low water supply. The results revealed an overall increase in chlorophyll *a* and total chlorophyll content in the PGPR treated plants, compared to control (unfertilized) samples under normal soil moisture conditions. With regard to P supply, chlorophyll content was uniform in all treatments and there were no significant changes of chlorophyll concentration in normal soil water regime. However, phosphorus supply decreased chlorophyll concentration under water stress conditions. Phosphorus fertilization and PGPR application increased significantly the nitrogen concentration in leaves of cv. Zodiac under sufficient water supply. Under low water supply the P application increased the concentration of nitrogen in roots in comparison to control plants. Hence, the results suggest that the utilization of rhizobacteria and P supplemental nutrition have the potential to enhance the chlorophyll and nitrogen content of soybean in normal water regime of soil.

Key words: Chlorophyll, nitrogen, phosphorus, rhizobacteria, soybean