

BIOLOGICAL ACTIVITY OF SOYBEAN RHIZOSPHERE SOIL IN DEPENDENCE ON WATER CONTENT AND NUTRITIONAL STATUS

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Abstract

Transformations of soil organic matter into easily assimilated nutrient forms by plants are mediated, to a greater extent, by soil microbiota. Soil biological activity characterizes both its fertility and the degree of environmental factors' influence. The aim of the current study was to explore the influence of suboptimal soil water content, mineral fertilizers, and plant variety on biological potential of soybean rhizospheric soil. Experiment was set up in greenhouse complex. Two soil water content levels were examined: optimal – 70% water holding capacity (WHC) and reduced – 35% WHC, established in the blossom–flowering stage. The treatments were: (1) NP soil fertilization and (2) deficient nutrient content. Soybean plants were represented by two varieties, also, the soil without plants were taken into account. Following biotic parameters were analyzed in the rhizosphere soil: C-MB (microbial biomass carbon), BSR (basal soil respiration) and the H-FDA (fluorescein diacetate hydrolysis). The results highlights that C-MB and the general hydrolytic activity (H-FDA) were reduced under temporary (17 days) soil water content deficiency. Estimated BSR as functional activity of microbiota, showed higher values at 35% WHC. This could indicate that additional energy expenses of bacterial community to maintain vital processes. Soil biological activity depended on the plant nutritional condition, showing a clear increase at NP fertilization, especially at soil water content deficiency. It was found that the examined parameters had greater levels in rhizosphere soil of Aura variety, compared to Clavera one. In soil without plants values were the lowest.

Key words: soybean, rhizosphere soil, microbial biomass, soil basal respiration, FDA hydrolysis