

Soil Enzyme Activity as Influenced by Post-emergence Herbicides Applied in Soybean [Glycine max (L.) Merrill]

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Abstract : A field experiment was conducted during Kharif 2021 at Agricultural Research Station, Kota, to evaluate the effect of different post-emergence herbicides applied to soybean [Glycine max (L.) Merrill] on soil enzymes activity viz. dehydrogenase, phosphatase, and urease. The soil of the experimental site was clay loam (vertisols) in texture and slightly alkaline in reaction with 7.7 pH. The soil was low in organic carbon (0.49%), medium in available nitrogen (210 kg/ha), phosphorus (23.5 P₂O₅ kg/ha), and high in potassium (400 K₂O kg/ha) status. The results elucidated that no significant adverse effect on soil dehydrogenase, urease, and phosphatase activity was determined with the application of post-emergence herbicides over the untreated control. Two hands weeding at 20 and 40 DAS registered maximum dehydrogenase enzyme activity (0.329 µgTPF/g soil/d) closely followed by herbicides mixtures and sole herbicide while pre-emergence application of pendimethalin + imazethapyr 960 g a.i./ha and pendimethalin 1.0 kg a.i./ha significantly reduced dehydrogenase enzyme activity compared to control. Urease enzyme activity was not much affected under different weed control treatments and weedy checks. The treatments were found statistically non-significant, and values ranged between 1.16-1.25 µgNH₄N/g soil/d. Phosphatase enzyme activity was also not influenced significantly due to various weed control treatments. Though maximum phosphatase enzyme activity (30.17 µgppp/g soil/hr) was observed under two-hand weeding, followed by fomesafen + fluzifop-p-butyl 220 g a.i./ha. Herbicidal weed control measures did not influence the total bacteria, fungi, and actinomycetes population.

Keywords : dehydrogenase, phosphatase, post-emergence, soil enzymes, urease.

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