# rhizosphere effect on biodegradation of pollutants

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This study was conducted to investigate the effect of the rhizosphere of corn and soybean plants on themineralization of P-nitro phenol ”PNP”, dichlorophenoxyacetic acid ”2,4-D” and glyphosate inclay loam and silty loam soils. The effect of corn andsoybean root exudates as well as synthetic rootexudates on the mineralization process were alsoconsidered.A modified model system was used for thecultivaion of corn and soybean seedlings underlaboratory conditions. PNP,2,4~D and Glyphosate wereapplied at a concentration of Ippm in the surface ofthe soils used. The mineralization of the threeradiolabeled compounds was determined as the amount of14COz evolved dur~.ng the m~.nera1~.zat i~on process. Cornand soybean root exudates as well as synthetic rootexudates were added to the surface of the soils under14 investigation and CO2 evoloved from themineralization of PNP,2,4-D and glyphosate was measuredover time of the experiments.The obtained results revealed that :-1. Both corn and soybean plants had a non-significanteffect on PNP mineralization in both clay loam andsilty loam soil.2. In the soil irrigated with either corn or soybeanroot exudates, there was a highly significantdifference in PNP mineralization compared with thesoils irrigatedcomparative study.with nutrient solution as a3. In soil irrigated with synthetic root exudates,there was a highly significant difference in PNPmineralization compared with soil irrigated withdeionized water as a control.4. from the obtained results, it can be concludedthat, both corn and soybean root exudates as wellas synthetic root exudates may provide PNP degraders with a necessary nutrients to facilitateits mineralization.5. In comparing PNP mi.ne raLizat i.on in the presence of·corn and soybean plants, it was observed that therewas a slightly increase in the extent of PNPmineralization in the presence of soybean plantsthan that in corn plants in the same type of soil. 6. It was also observed that,PNP mineralization in clay loam loam soil.soil was much better than that in silty7. mineralization was stimulated in the presence ofcorn plant compared with soil without plant in clayloam soil, Therefore, the presence of therhizosphere of corn plant may be considered-responsible for the increase of 2,4-0mineralization.8. When pH of 2,4-D soln. was changed from pH= 4 topH=6 , the adjustment of pH did not accelerate themineralization process.9. It was observed that, the presence of soybean plantdid not accelerate the mineralization of 2,4-0 in-clay loam soil.10. In silty loam soil, the results showed that, therewas non significant increase in 2,4-0mineralization in soil cultivated with corn orsoybean plant compared with soil without plant.11. In soil irrigated with corn or soybean rootexudates, the results showed that, there was aslight increase in 2,4-0 mineralization but this increase was non significant compared with thesame type of soil irrigated with nutrient soln.12.The previous trend was observed in soil irrigatedwith synthetic root exudates.13. Data revealed that clay loam soil cultivated withcorn or soybean plant showed a significant increasein glyphosate minerali zation compared withuncultivated soil, so, the rhizosphere of corn orsoybean plant may provide a favourable environment”for stimulating the breakdown of glyphosate.14. In silty loam soil, the results indicated that,neither corn nor soybean plant showd a significanteffect on glyphosate mineralization.15. In soil irrigated with corn or soybean rootexudates, the results showed that irrigation withnatural root exudates failed to gave anysignificant effect on glyphosate mineralization. 16. The applicationsli9ht increase of synthetic root exudates gave a in glyphosate mineralization compared with soil irrigated with deionized water.