

SULFUR TRANSFORMATION IN PADDY SOILS

Incubation experiments were conducted to determine the fate of ^{35}S applied to two paddy soils (Entisol, Ultisol) from China and an upland soil (Luvisol) from Germany. After incorporation of ^{35}S into the soils two different water levels were established: flooding conditions and 60% of maximum water holding capacity (WC), respectively. To simulate the change from flooded to upland conditions, the previously flooded soils were dried to 60% of WC 12 weeks after flooding. Soil samples were collected every other week during a period of 25 weeks. Water soluble and adsorbed sulfate (SO_4^{2-}) were determined after extraction by a liquid scintillation counter and the redox potential (E_h) with Pt-electrodes.

Under flooding conditions ^{35}S recovery decreased during the first seven (upper soil layer) and nine weeks (deep soil layer) in the Entisol and during the first five weeks in the Luvisol, whereas the Ultisol did not show any reaction. After adjusting the soil water content to 60% of WC in the previously flooded Entisol and Luvisol, ^{35}S recovery rate increased during about 6 weeks and afterwards stayed at almost the same level. The redox potential decreased after flooding in all soils and sampling areas, respectively, but only reached reducing conditions in the Entisol and the Luvisol. After drying it increased rapidly in both soils. Changes in ^{35}S recovery rate were significantly correlated with the changes in E_h in the Luvisol and in the deep layer of the Entisol. In the soil samples adjusted to 60% of WC from the start of the experiment ^{35}S recovery was constant in both inorganic S fractions during the whole experimental period.