



Quantifying the contribution of nitrification and denitrification to the nitrous oxide flux using ^{15}N tracers

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Microbial transformations of nitrification and denitrification are the main sources of nitrous oxide (N_2O) from soils. Relative contributions of both processes to N_2O emissions were estimated, on an agricultural soil using ^{15}N isotope tracers ($^{15}\text{NH}_4^+$ or $^{15}\text{NO}_3^-$), for a ten-day batch experiment. Under unsaturated and saturated conditions, both processes were significantly involved in N_2O production. Under unsaturated conditions, 60% of $\text{N-N}_2\text{O}$ came from nitrification, while denitrification contributed around 85-90% under saturated conditions. Estimated nitrification rates were not significantly different whatever the soil moisture content, whereas the proportion of nitrified N emitted as N_2O changed from 0.13% to 2.32%. In coherence with previous studies, we interpreted this high value as resulting from the decrease in O_2 availability through the increase in soil moisture content. It thus appears that, under limiting aeration conditions, some values for N_2O emissions through nitrification could be underestimated.