

EFFECT OF DAIRY EFFLUENTS PRE-TREATMENT ON N₂O EMISSIONS AND N ORGANIC DEGRADATION AFTER SOIL APPLICATION

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Nitrous oxide (N₂O) is a potent greenhouse gas that plays a key role in climatic forcing contributing to the greenhouse effect by about 4 %, and also contributes to stratospheric ozone depletion. Cattle slurries are commonly applied to agricultural soils, inducing an increase of soil nitrous oxide emissions. Therefore, many procedures were developed for slurry pre-treatment in order to improve soil slurry application and reduce nitrogen losses, namely N₂O emissions.

The aim of this work was to compare N₂O emissions and the kinetic of N organic degradation from treated and untreated cattle-slurry after its incorporation in agricultural soils.

Laboratory incubations of mixture soil/slurry were performed under controlled temperature (20°C) and moisture content (28 %), and the N₂O emissions and the mineral nitrogen content of soil were measured during 94 days. The whole slurry (WS) was compared to the liquid (LF) and solid fractions (SF) obtained by mechanical separation of the whole slurry, and to the superficial (PAM-sup) and sediment (PAM-sed) fraction obtained by chemical separation of the liquid fraction with a chemical agent, polyacrylamide (PAM). Results obtained showed that slurry pre-treatment allows decreasing N losses from soil (total N emissions) observed after slurry incorporation. Furthermore, it was observed a liquid mineralization of 4.8 % of the WS organic N, and immobilization of -23.1% in treatment with SF, -23.9 % with LF, -4.6 % with PAM-sed and -6.9 % with PAM-sup.