



## **A semiautomatic chromatography system to evaluate greenhouse gas emissions and C sequestration potential in soil amended with organic wastes**

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Recycling of organic wastes in soil represents a suitable way to increase soil C sink capacity as a strategy to tackle the emissions of greenhouse gases (GHG). Most of the research on this area is based on the measurement of gas emission fluxes during organic waste transformation and/or from amended soil. This paper shows a semiautomatic chromatography system designed to continuously monitor CO<sub>2</sub>, N<sub>2</sub>O and CH<sub>4</sub> evolution during incubation experiments in order to evaluate the fluxes of GHG from amended soil under different experimental conditions. The system basically operates as an “open chamber” system in which sample containers are continuously aerated by means of an air pump. At regular intervals, a temporal closed chamber is created for a single container over a period ranging from 10 to 60 min. The GHG concentrations in the chamber are automatically measured at the beginning and the end of this closure period by a gas chromatograph and the difference between the final and initial measurements provides the rate of gas production for the selected time interval. The advantage of the system is that, besides measuring the total amount of GHG evolved during the experiment, it allows to determine the dynamics of such evolution. The continuous monitoring of gas fluxes could give important information on the degree of stabilization of added materials and the effects of the transformation of the organic wastes in the soil on the C and N cycles. Two applications of the system are shown. In the first, CO<sub>2</sub> evolution was investigated during the incubation of a soil amended with olive mill waste composts at different degree of stabilization. The system succeeded in showing that the amount of C immobilised in the soil is directly related to the degree

of stabilization of compost. In the second experiment, soil CO<sub>2</sub> and N<sub>2</sub>O emissions were monitored following addition of three different organic fertilisers with high N content. Results indicate that CO<sub>2</sub> and N<sub>2</sub>O evolution were clearly different for the three fertilizers and show the importance of the origin and chemical composition of the organic wastes in determining the amount and dynamics of N<sub>2</sub>O emission.