



Evolution of organic matter in a soil after agrofood industry waste spreading.

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Land application of waste-derived organic matter is both environmentally and economically beneficial : it improves fertility and physical properties of soil. According to the double aim of (1) soil quality amelioration and (2) waste valorisation, a study is performed on organic matter spread on soil. In this subject, qualitative and quantitative evolution of organic matter are monitored :

- In lysimetric column after rum-distillery-washy spreading onto a brown soil from “La Réunion” isle
- In field condition, after POME (Palm Oil Mill effluent) spreading onto an Indonesian soil.

In this last case, and in order to modelise biogeochemical process of organic matter, evolution in soil is monitored after spreading 10 years ago. Cumulative effect is also observed.

Concerning “La Réunion” study, soil is mixed with rum-distillery-washy and put in lysimetric column with controlled temperature and moisturising. In the objective to identify different step of organic matter evolution, 2 temperature values are chosen (12 and 28°C). Soil and soil+washy are sampled at 3 dates : initial, 84 and 168 days-old.

For each solid sample obtained, humic substances are extracted according to IHSS modified protocol. For each IHSS-fraction obtained, TOC (Total Organic Carbon) is measured and UV spectrum is plotted (from 200 to 350 nm).

Quantitative evolution of organic matter in a soil is usually monitored through carbon quantities and, in order to obtain more details, through C_{HA}/C_{FA} ratio evolution (HA : humic acids and FA : fulvic acids). These parameters are partially satisfactory because they do not give information about molecular structure of humic substances. In order to complete information, UV spectroscopy has been chosen in this study.

Low molecular weight molecules absorb generally around 200 nm and higher ones around 280 nm. Humification and mineralization can be monitored by observed appearance or disappearance of compounds.

Indonesian and “La Reunion” soils are poor in organic matter. Organic matter spreading onto soil contribute to increase organic matter in studied samples. Observation of UV spectra furnish information more complete.

With Indonesian soil experiment, a transverse migration of some aromatic compounds is noted. These compounds appear after a long time spreading (more than 10 years). The presence of aromatic molecules decreases for samples which are far from the point of spreading, probably due to mineralization process. The only measure of TOC do not permit to observe these phenomenon.

Concerning “La Reunion” soil, humic substances containing aromatic molecules are low in all the samples (with or without organic waste) and non humified fraction represent more than 50 % of total humic substances. The evolution of TOC quantities is not important during time while structural evolution is noted. Carbon bring by washy is mineralised quickly and about 60 % of this carbon is mineralised after 168 days of experiment. The impact of temperature on humification or mineralization is low.

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