Agricultural valorisation of organic waste in Réunion island: andosols characteristics

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Réunion island presents a great variability of soils, climatic conditions, farming systems, etc. according mainly with altitude and exposition. It results a contrasted evolution of the bed rock because the western part of the island receives approximately 600 mm/year while average precipitations in the east part can reach several meters/year.

The farming systems presents on the andosols, mainly located in the "tops", are not the same one as on the soils of "bottoms" rather ferrallitic. The production of animal organic waste like the manures, liquid manures, etc as of composted waste are different according to these places.

However, the andosols properties remains particular and especially with tropical conditions. Thus, some studies relate the mineralisation of different kind of waste on andosols to evaluate the degradation of the organic matter (quantity, speed, bio-availability for the plant, etc). Table 1 present the characteristics for severals waste.

Table 1. Identification and characteristic of studied organic materials

Id	Nature of the product	C/N	O.M.	Soluble fraction	Cel.	Hem.	Lic.	BIS
A	Compost of natural waste (6 months)	12.7	52	51.9	18.6	6.35	23.2	0.30
B	Compost of natural waste and sewage muds (6 months) (1)	11.4	48	56.3	19.4	5.97	18.3	0.26
C	Compost of poultry manure (12 months)	11.0	62	38.1	24.6	10.1	27.2	0.26
D	Fresh poultry manure on chips	8.1	84	48.5	20.0	27.0	4.5	0.07
E	Compost of liquid manure of pig on bagasse (7 months)	10.5	59	26.2	22.9	18.7	32.1	0.96
F	Compost of liquid manure of pig and poultry litter on sawdust (2) (3 months)	18.8	78	10.8	45.5	12.5	31.2	0.34
G	Manure of bovines on straw of cane	26.9	87	15.6	43.0	33.7	7.67	0.13
H	Compost of manure of bovines on straw of cane (6 months)	14.9	70	29.0	27.1	21.6	22.3	0.49
I	Compost of scums of sugar refinery (8 months)	9.0	54	38.9	16.9	14.3	29.9	1.11

O. M.: organic matter.
Cel., Hem. and Lic.: Cellulosic fractions, hemicellulosic fractions and lignins + cutins fractions extracted according to the Van Soest method and expressed as a percentage of the dry matter.
BIS: Biological Index of Stability (Linères and Djakovitch, 1993).
(1): initial mixture of 2/3 of green waste and 1/3 of muds.
(2): mix of 88 % of liquid manure of composted pig and 12 % of fresh poultry litter.

Figures 1 and 2 present, respectively, dynamic mineralisation of carbon and nitrogen. The quantities of carbon mineralized after three months lie between 10 and 35 % according to these differents wastes. For nitrogen,

certain waste immobilizes nitrogen in the soil (until 20 % for the product C after three months) whereas the product D sees 80 % of its nitrogen mineralized.

The degradation of the organic matter is strongly influenced by the kind of soil. The agronomic consequences are thus very differents according to the type of waste which we seek to develop and the comparisons with the ferrallitic soils located in "bottoms" show significant variations.

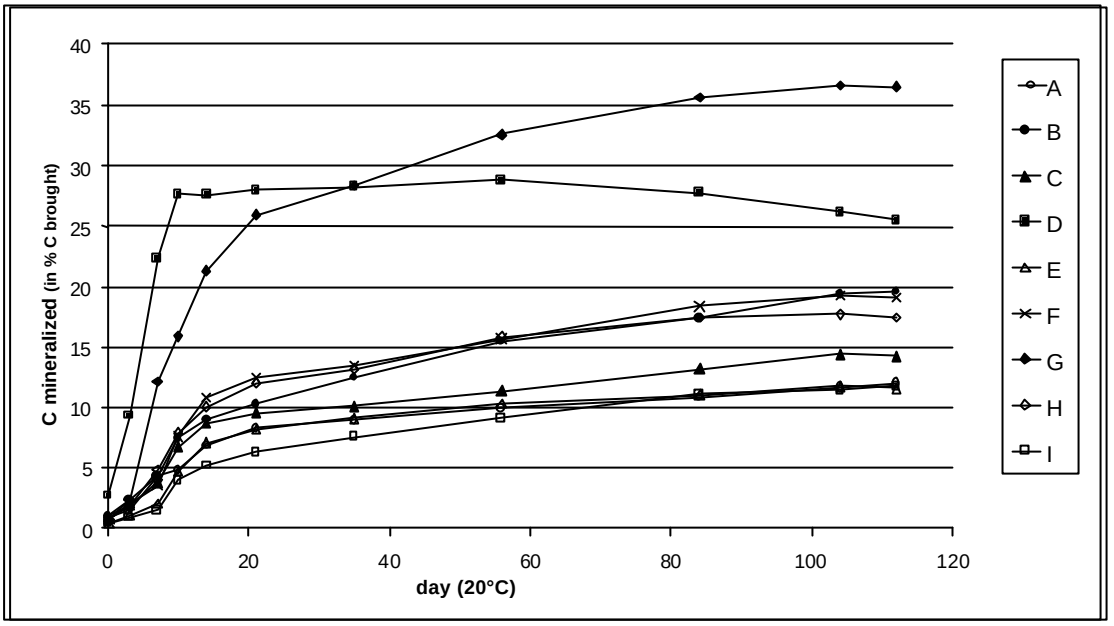

Figure 1. Dynamic of mineralisation of carbon of the 8 studied soils.

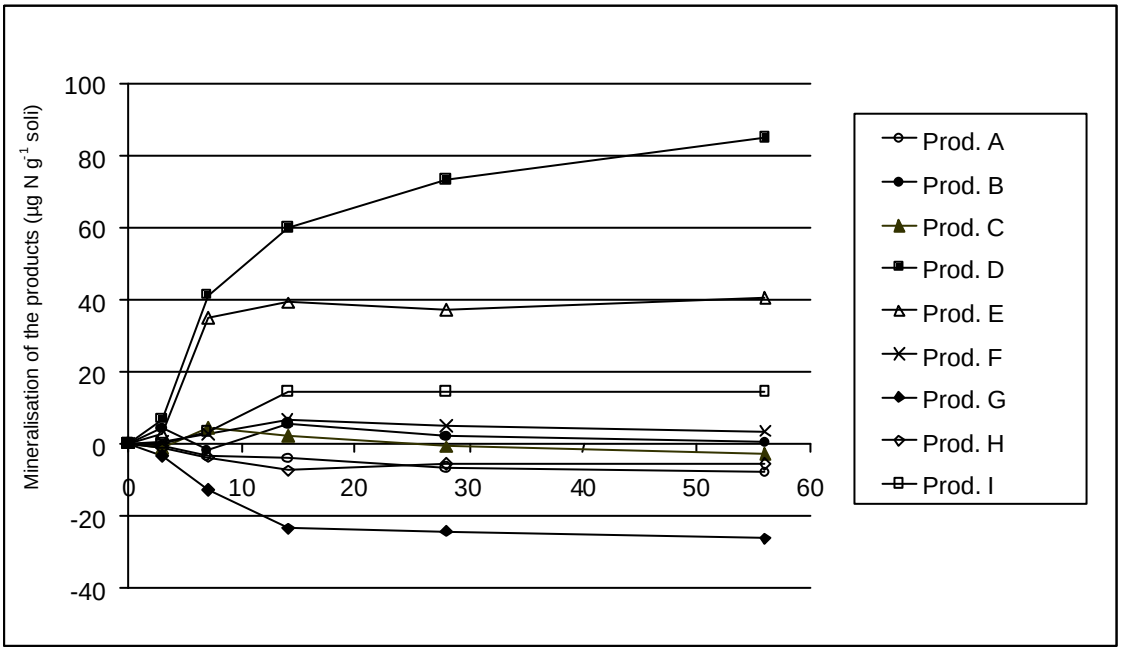

Figure 2. Dynamic of mineralisation of nitrogen of the 8 studied soils.