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'Can agroecological farming feed the world? Farmers' and academia's views.'

Comparative Study of Biogas Production from Anaerobic Bio-Digestion of Peelings and Effluents from Cassava Processing Factories in southern Benin

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Introduction

With an annual production of 4,161,660 T in 2020, Cassava is the second most commonly crop grown after maize in Benin. It is the third staple food in the country after corn and rice. Its process into various food products (gari, Tapioca, lafun, etc.) generate significant wastes that are bulky and difficult to manage.

To carry out their activities, cassava processing factories are dependent on energy. Whereas, the waste from processing can be recovered as energy to reduce the energy bill.



Peelings generation



Effluent generation

Figure 1 : Stages of cassava processing at Small Scale Level

Research questions

Between the bio-digestion of cassava peelings and that of effluents, which provides more volume of biogas?

Experimental apparatus

A Fischer block comprising the following seven treatments all with the addition of 400 g of water:

- T1 : 400 g of crushed cassava peelings
- T2 : 300 g of peelings + 100 g of cow dung
- T3 : 200 g of peelings + 200 g of cow dung
- T4 : 400 g of effluent
- T5 : 300 g of effluent + 100 g of cow dung
- T6 : 200 g of effluent + 200 g of cow dung
- T0 : 400 g of cow dung



Figure 2 : Digesters used for the tests

Results

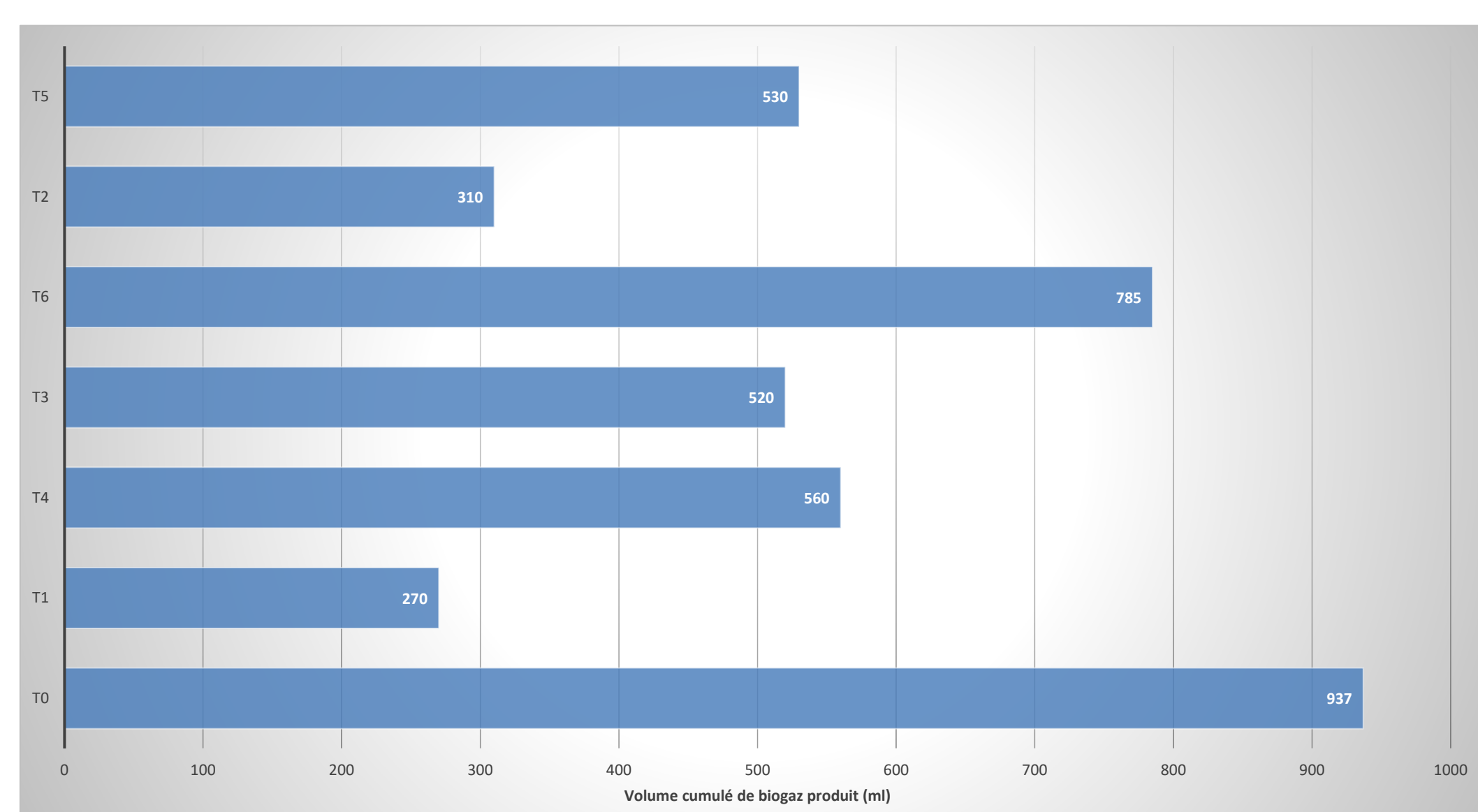


Figure 3 : cumulative volumes of biogas production

Table 1 : Average Volumes of Biogas

	T0	T1	T2	T3	T4	T5	T6
Average (ml)	40,74	11,74	13,48	22,61	24,35	23,04	34,13
	25 th day	33 rd day	31 st day	29 th day	27 th day	27 th day	21 st day

The variance homogeneity test ($p=1,15.E-05$) carried out revealed a significant difference between the average volumes of biogas. However, multiple comparison tests reveal that T6 provides better performance in terms of biogas than T0. Finally, the bio-digestion of cassava effluents can be considered as the best system to improve the production of biogas between the two biomass wastes from cassava processing in southern Benin.

Conclusion of the work

The bio-digestion of cassava effluents can be considered as the best system to improve the production of biogas between the two biomass wastes from cassava processing in southern Benin.