



Methanogenic potential of aquaculture waste a smart initiative for green aquaculture in the framework of blue growth

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Abstract

All predictions agree that tilapia is destined to become the major aquaculture species of tomorrow. Tilapia is grown in more than 100 countries and production reaches 4.3 million tonnes making this fish group the second largest for global aquaculture, after that of carp. The modern development of its breeding requires energy for production systems *e.g.* to supply oxygen equipment or automatic food vending machines or the heating of livestock ponds. This work proposes to valorise the waste resulting from the activities in fish farming by the processes of anaerobic digestion to produce energy. For this, faeces of *Tilapia Oreochromis niloticus* were sampled periodically and their methanogenic potential (BMP test) determined and compared to a reference substrate (poultry droppings); with or without inoculum. The μ CG analysis made it possible to determine the relative proportions of methane (CH_4) in the biogas as a function of the duration of production. Biochemical methane potential (BMP) tests showed rapid kinetics of biogas production of fish faeces in the presence of inoculum (+ inoculum) compared with the production of biogas in faeces alone. This kinetics of biogas production is reversed between the third and fourth week. In both cases, the proportion of methane is generally greater than 60% from the second week of incubation, which shows the quality of the biogas produced. The composition of CH_4 and CO_2 does not change with or without inoculum. However, there is a significant difference in total CH_4 volume which is twice as large with inoculated fish faeces than uninoculated fish or poultry droppings. Our results show that fish droppings are good methanogenic substrates and the use of the inoculum allows for a quick start of biogas production and avoids MO losses. Realized on a large scale, the valorisation of aquaculture fish faeces could constitute a source of green energy for the development of fish farming in Africa. And thus a smart initiative to fight against climate impact on small pelagic fish stock displacement in tropical areas.



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