



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

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Reçu le 01/04/2018; publié le 15/06/2019

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 μCG 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.



Commission Sous-Régionale des Pêches
Sub-Regional Fisheries Commission



International Conference ICAWA 2017 & 2018 Extended book of Abstract

THE AWA PROJECT
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ISBN: 978-2-9553602-0-6



Bundesministerium
für Bildung
und Forschung



Trilateral German-French-African research initiative

Edited by

Patrice BREHMER (IRD, France)

Technical support: Ndague DIOGOUL (IRD, Sénégal), Cordula Zenk (Geomar, Germany) and Mahaut de Vareilles (UiB, Norway)

With the collaboration of

Noel Keenlyside (Norway), Jorge M. NASCIMENTO (CABO VERDE), Vito Melo RAMOS (CABO VERDE), Bamol Ali SOW (SENEGAL), Heino FOCK (GERMANY), Joern SCHMIDT (GERMANY), Werner EKAU (GERMANY), Adama MBAYE (SENEGAL), Assane FALL (MAURITANIA), Ivanice MONTEIRO (CABO VERDE), Aka Marcel KOUASSI (IVORY COAST), Osvaldina SILVA (CABO VERDE), Timothée BROCHIER (FRANCE), Moussa SALL (SENEGAL), Mohamed MAYIF (MAURITANIA), Vamara KONÉ (IVORY COAST), Thomas GORGUES (FRANCE), Carlos FERREIRA SANTOS (CABO VERDE), Idrissa Lamine BAMY (GUINEA), Iça Barry (GUINEA BISSAU), Momodou Sidibe (THE GAMBIA), Hamet Diaw DIADHIOU (SENEGAL)

ISBN: 978-2-9553602-0-6

Cover design: AWA (BMBF – IRD) project

Logo and flyers: Laurent CORSINI (IRD)

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**International PREFACE International
Conference on Ocean, Climate and
Ecosystems joint with ICAWA 5th, editon
2018**

**Session 4: «Climate prediction Marine
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climate change». Thursday 19th April
2018**

Poster presentation