

Accepted Manuscript

Methane production and fertilizing value of organic waste: organic matter characterization for a better prediction of valorization pathways

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PII: S0960-8524(17)30844-1

DOI: <http://dx.doi.org/10.1016/j.biortech.2017.05.176>

Reference: BITE 18202

To appear in: *Bioresource Technology*

Received Date: 13 March 2017

Revised Date: 26 May 2017

Accepted Date: 27 May 2017

Please cite this article as: Jimenez, J., Lei, H., Steyer, J-P., Houot, S., Patureau, D., Methane production and fertilizing value of organic waste: organic matter characterization for a better prediction of valorization pathways, *Bioresource Technology* (2017), doi: <http://dx.doi.org/10.1016/j.biortech.2017.05.176>

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1 **Methane production and fertilizing value of organic waste:**
2 **organic matter characterization for a better prediction of**
3 **valorization pathways**

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8 **Abstract**

9 Organic wastes are potential sources of both energy as well as crop production fertilizers.
10 Correlations and models, involving organic matter characterization, have been previously
11 described by several authors although there is still a lack in knowledge on the potential of
12 simultaneous predictions of methane and organic fertilizer quality to optimize the wastes
13 treatments. A methodology combining chemical accessibility and fluorescence spectroscopy
14 was used to characterise 82 different organic wastes. Characterization data were compared
15 with the biochemical methane potential (BMP), and with the biodegradable organic carbon
16 obtained by soil incubation (C_bio). High correlations values were observed (R^2 of 0.818 for
17 BMP and 0.845 for C_bio). Model coefficients highlighted the differences and similarities
18 between anaerobic and aerobic soil biodegradation, suggesting that anaerobic recalcitrant
19 molecules could enhance soil fertility. This is a first step in the development of a tool for
20 optimizing both types of valorisation according to agrosystem needs and constraints.

21 **Key words** biodegradability, methane production, soil, fluorescence, accessibility

22 **List of abbreviations**

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