A summary of requirements for measurement and validation of biochemical methane potential (BMP)*

September 7, 2020

Document number 101. File version 1.0. This document is from the Standard BMP Methods collection. †

1 BMP measurement and validation requirements

BMP results that meet *all* the requirements listed in document 100 [Holliger et al., 2020] can be described as "validated". Otherwise tests should be repeated. These requirements relate to analysis of inoculum and substrates, test setup, calculations, and finally, validation criteria applied after calculating BMP. **Important requirements** include:

1. All conditions (blanks, positive controls, substrate) must be replicated in triplicate at the time of data analysis.
2. Tests continue until daily CH_4 production from individual batches (bottles) during 3 consecutive days is $< 1.0\%$ of the net accumulated volume of methane (substrate batch minus average of blanks).

After BMP values are calculated, the following **validation criteria** must be met:

1. Mean cellulose BMP is between 340 and 395 $NmL_{CH_4}\ g_{VS}{}^{-1}$.
2. Relative standard deviation for cellulose BMP is no more than 6%.

*Recommended citation (for document 100): Holliger, C.; Fruteau de Laclos, H.; Hafner, S.D.; Koch, K.; Weinrich, S.; Astals, S.; Alves, M.; Andrade, D.; Angelidaki, I.; Appels, L.; Astals, S.; Azman, S.; et al. Requirements for measurement and validation of biochemical methane potential (BMP). Standard BMP Methods document 100, version 1.6. Available online: https://www.dbfz.de/en/BMP (accessed on September 7, 2020).
Or see https://www.dbfz.de/en/BMP for a BibTeX file.

†For more information and other documents, visit https://www.dbfz.de/en/BMP. For document version history or to propose changes, visit https://github.com/sashahafner/BMP-methods.

2 More details

This document summarizes the minimal requirements for measurement and validation of biochemical methane potential (also called biomethane potential) (BMP) in batch tests. The present document summarizes only the most important parts of document 100, which is more comprehesive; for all requirements see the document itself [Holliger et al., 2020]. Development of the criteria is described in Hafner et al. [2020]. Only results from BMP tests that have followed the requirements given in document 100 [Holliger et al., 2020] can be considered "validated".

References

S. D. Hafner, H. Fruteau de Laclos, K. Koch, and C. Holliger. Improving Inter-Laboratory Reproducibility in Measurement of Biochemical Methane Potential (BMP). *Water*, 12(6):1752, June 2020. doi: 10.3390/w12061752. URL https://www.mdpi.com/2073-4441/12/6/1752.

C. Holliger, H. Fruteau de Laclos, S. D. Hafner, K. Koch, S. Weinrich, S. Astals, M. Alves, D. Andrade, I. Angelidaki, L. Appels, S. Azman, A. Bagnoud, U. Baier, Y. Bajon Fernandez, J. Bartacek, F. Battista, D. Bolzonella, C. Bougrier, C. Braguglia, P. Buffière, M. Carballa, A. Catenacci, V. Dandikas, F. de Wilde, S. Ekwe, E. Ficara, I. Fotidis, J.-C. Frigon, J. Heerenklage, P. Jenicek, J. Krautwald, R. Lindeboom, J. Liu, J. Lizasoain, R. Marchetti, F. Moulan, M. Nistor, H. Oechsner, J. V. Oliveira, A. Pauss, S. Pommier, F. Raposo, T. Ribeiro, C. Schaum, E. Schuman, S. Schwede, M. Soldano, A. Taboada, M. Torrijos, M. van Eekert, J. van Lier, and I. Wierinck. Requirements for measurement of biochemical methane potential (bmp). Standard BMP Methods document 100, version 1.6., 2020. URL https://www.dbfz.de/en/BMP.