

Flash BMP®: Calibration for the Biochemical Methane Potential of solid organic waste using Near Infrared Spectroscopy (NIRS)

S. Preys¹, S. Roussel¹, N. Schafroth², N. Schnell², B. Stefanovic²

Why recycling organic waste?

- √ Reduction of the waste quantity
- √ The production of methane for use as a fuel (biogas production by a process known as anaerobic digestion)

Why measuring BMP (Biochemical Methane Potential)?

- The methane production optimization in industrial digesters requires to determine the methane potential of waste
- The BMP test is a commonly used parameter for waste characterization. It determines the volume of methane a waste can potentially produce in anaerobic conditions
- Traditionally, the methane potential (BMP) is measured using the 30-day standard biological test by fermentation (Angelidaki et al. 2009)

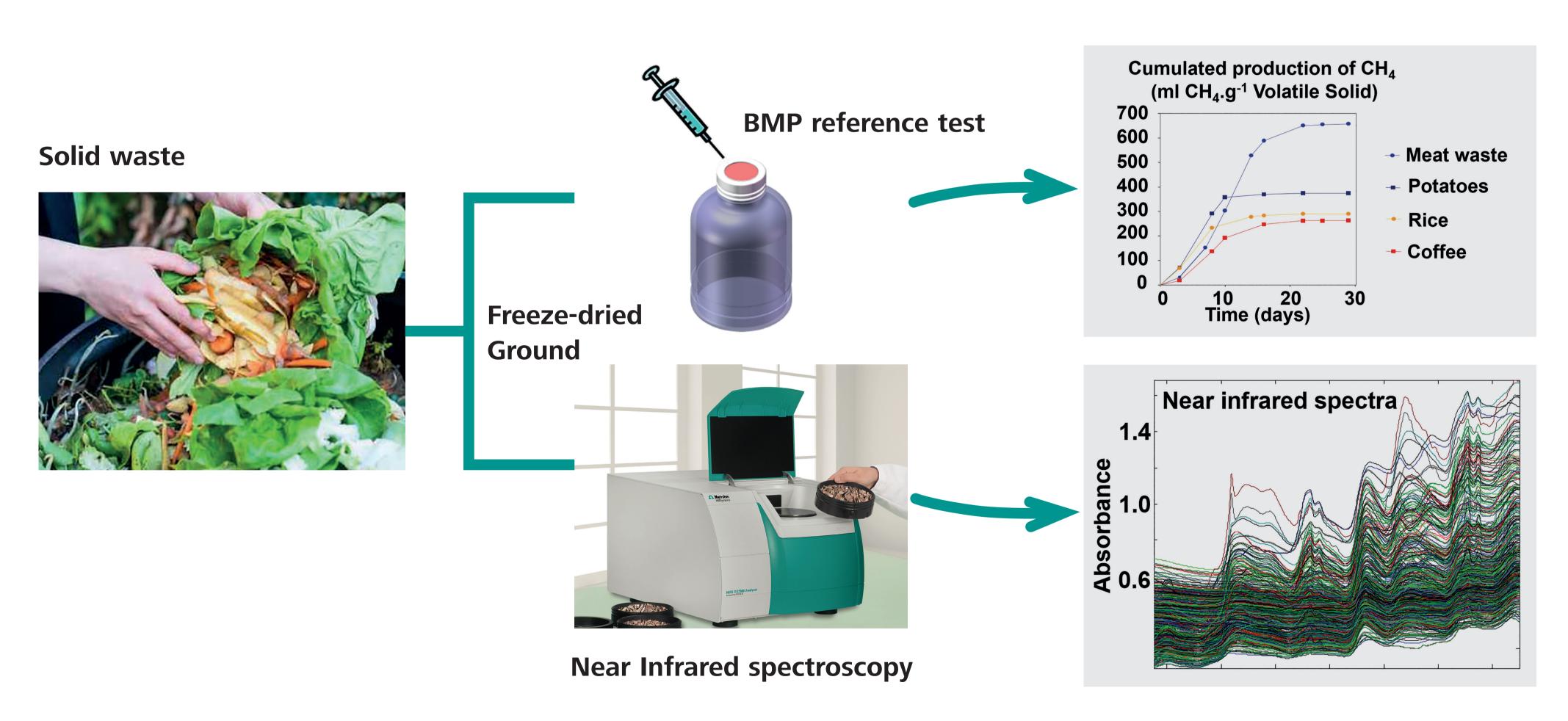


Objectives of Flash BMP[®] using NIRS

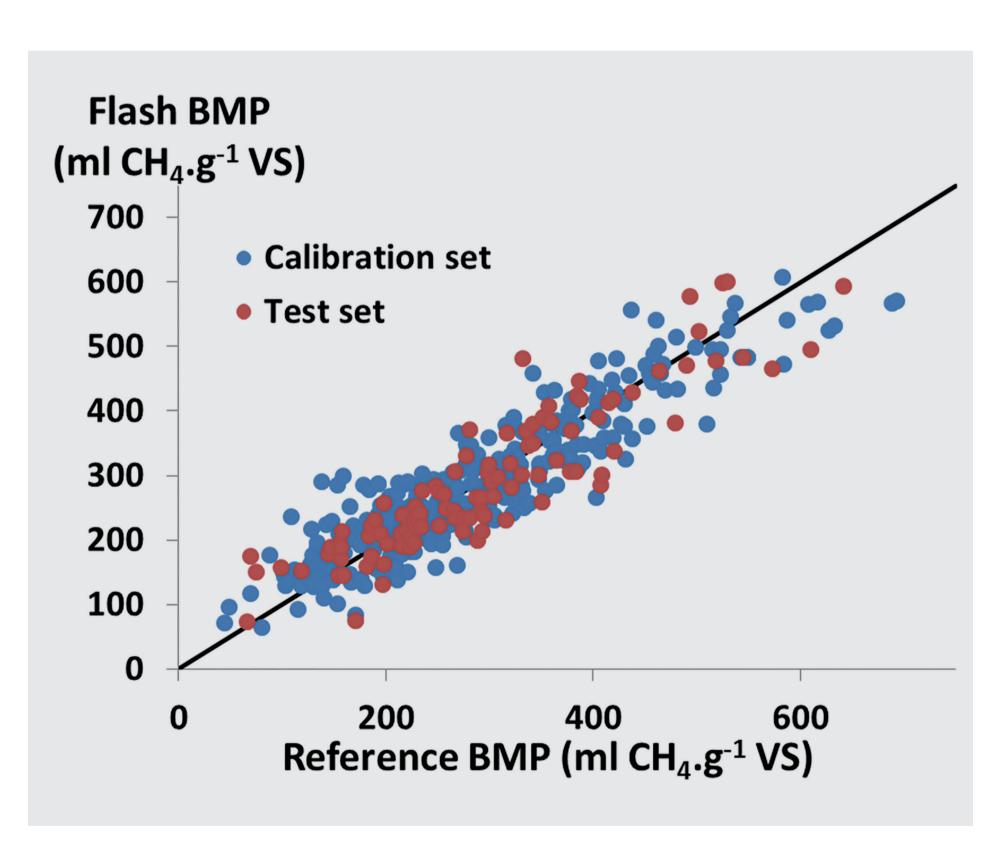
- √ Replace the costly and lengthy (>30 days) reference measurement of BMP by fast NIR assessment
- √ Improve the industrial anaerobic digester monitoring (Lesteur et al., 2010)



Material and Methods



Results and Conclusions



- √ Instantaneous measurement after 2 days of sample preparation
- √ Highly representative substrate sampling
- √ No consumables
- √ Large database: 500 samples
- √ Range: [20–700] ml CH₄.g⁻¹ VS
- ✓ Model accuracy: 15–20% (similar to the reference method)
- √ Model validity: Green waste, agricultural waste, energy crops, agro-industrial waste, municipal solid waste, sludge

References

- Angelidaki, I., Alves, M., Bolzonella, D., Borzacconi, L., Campos, J. L., Guwy, A. J., Kalyuzhnyi, S., Jenicek, P., and van Lier, J. B. (2009) Defining the biomethane potential (BMP) of solid organic wastes and energy crops: a proposed protocol for batch assays. Water Sci. Technol. 59(5), 927-934.
- Lesteur, M., Bellon-Maurel, V., Gonzalez, C., Latrille, E., Roger, J. M., Junqua, G., and Steyer, J. P. (2010) Alternative methods for determining anaerobic biodegradability: A review. Process Biochem. 45(4), 431-440.

Acknowledgements

The INRA Research Institute in Narbonne (LBE), France, and Veolia Environment, France have contributed to this work.







