Physikalisch-Technische Bundesanstalt
Braunschweig and Berlin
National Metrology Institute

An enhanced metrological practice for the determination of biofuels calorific Value

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EMPIR
EURAMET
The EMPIR initiative is co-funded by the European Union's Horizon 2020 research and innovation programme and the EMPIR Participating States

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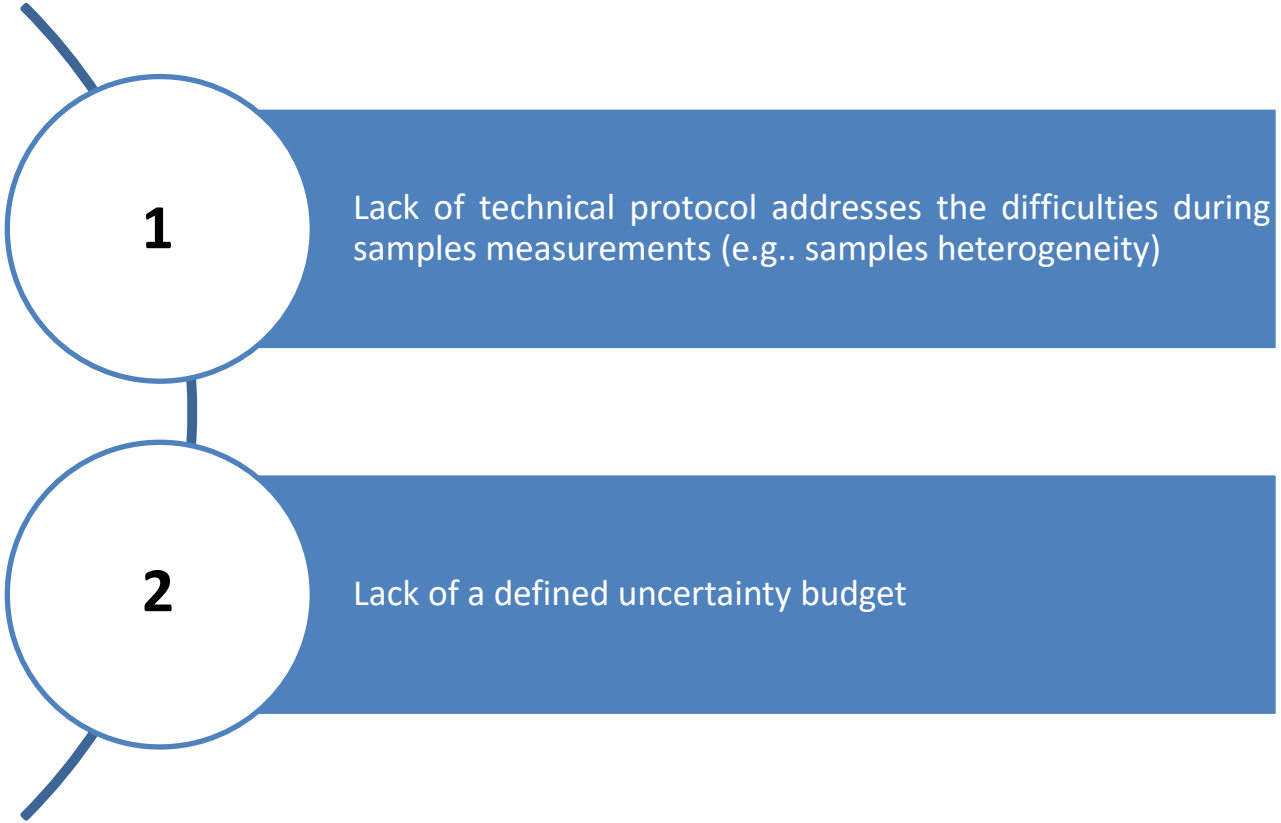
Calorific value - Challenges



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Experimental setup

Two test cycles were performed using Bomb calorimeter and IC

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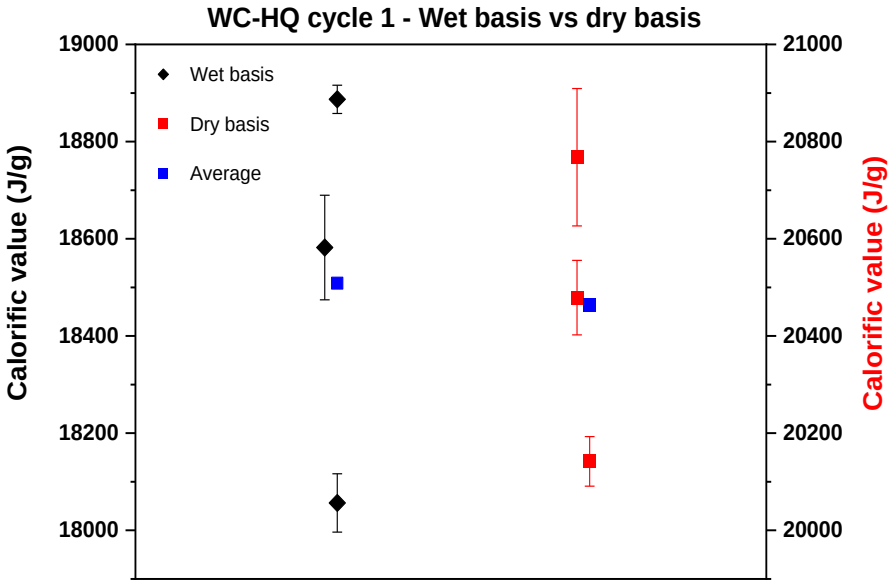
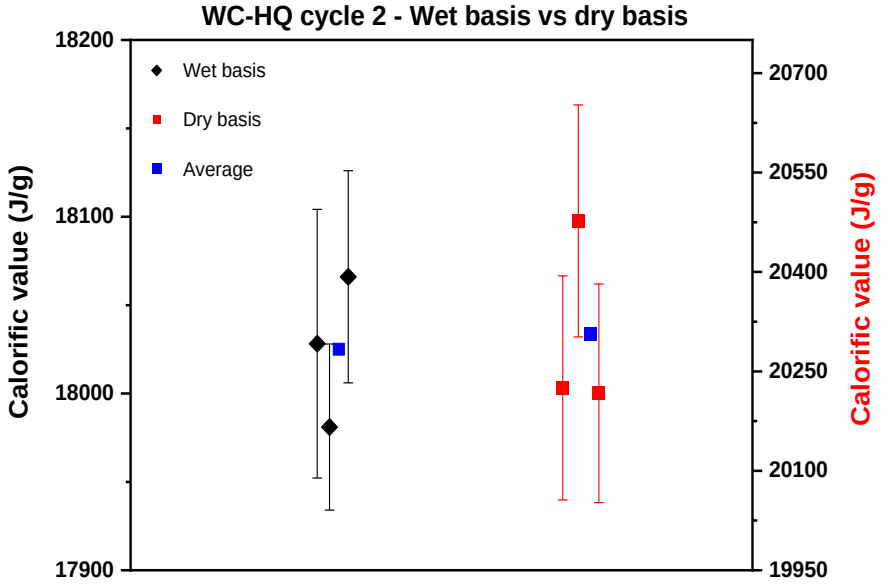
Results – Wood chips high quality (WC-HQ)



ISO 18125:2017



Improved practice

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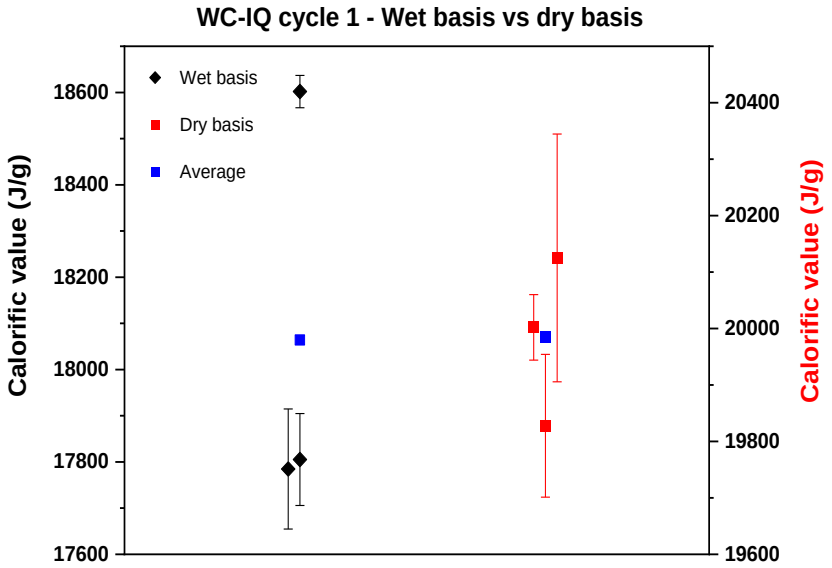
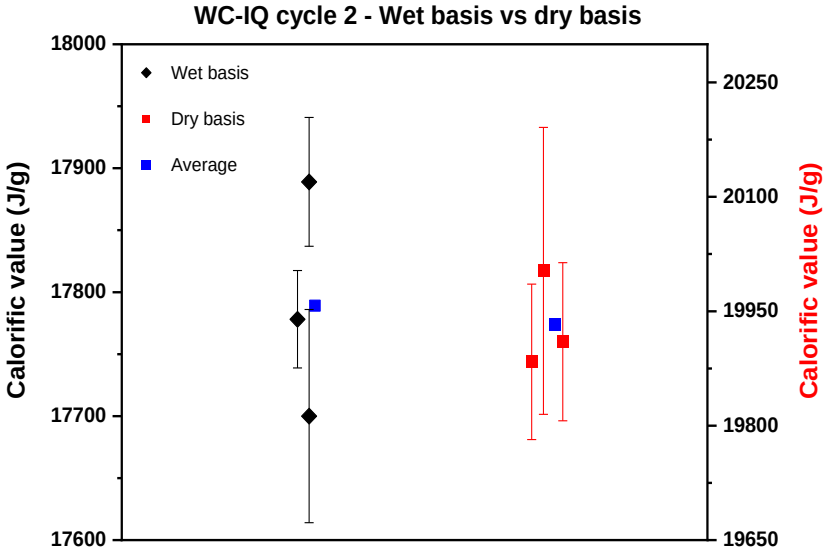
Results – Wood chips Industrial quality (WC-IQ)



ISO 18125:2017



Improved practice

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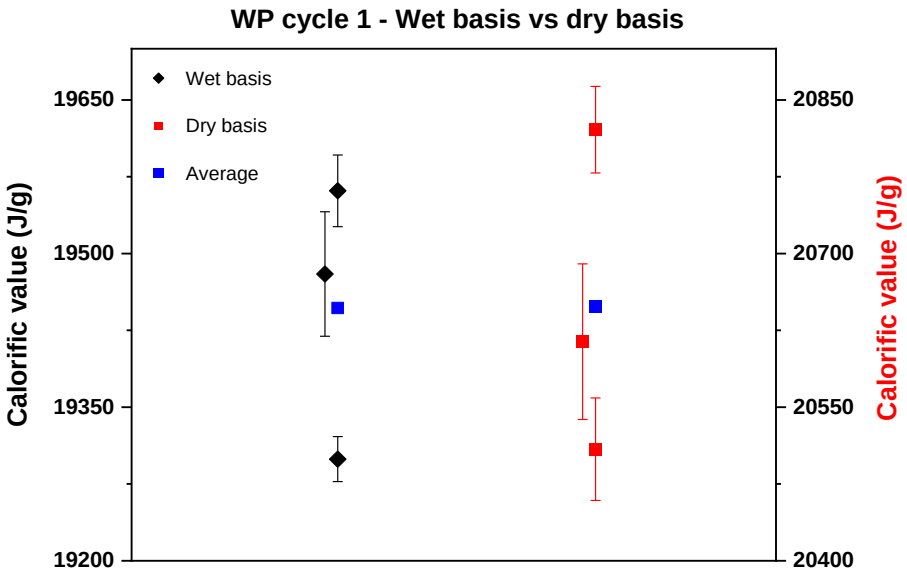
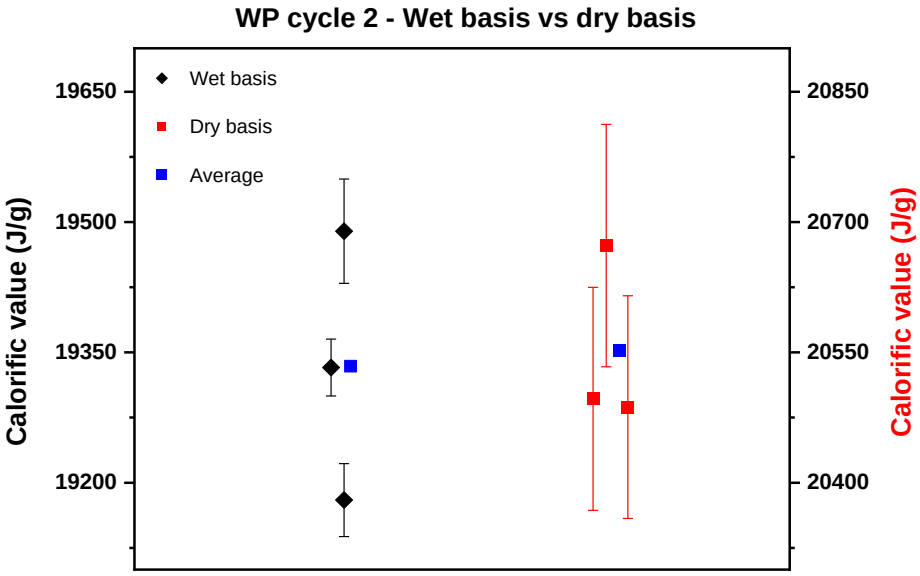
Results – Wood pellet (WP)



ISO 18125:2017



Improved practice

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Improved criteria

Parameter	BIOFMET	ISO 18125-2017
Mass of sample (g)	0.3 – 0.7 (≈ **0.5**)	0.8 – 1.2 (≈ **1**)
Pellet-applied pressure (t)	**0.5** – 3 t	None
Uncertainty budget	Detailed ≈ 1%	None
Ignition corrections	With flushing 2 – 8 J Without flushing 20–40 J	None
Grinder RPM	Up to 3400 rpm	None
EMC	Criteria provided – 16 hrs	4 hrs

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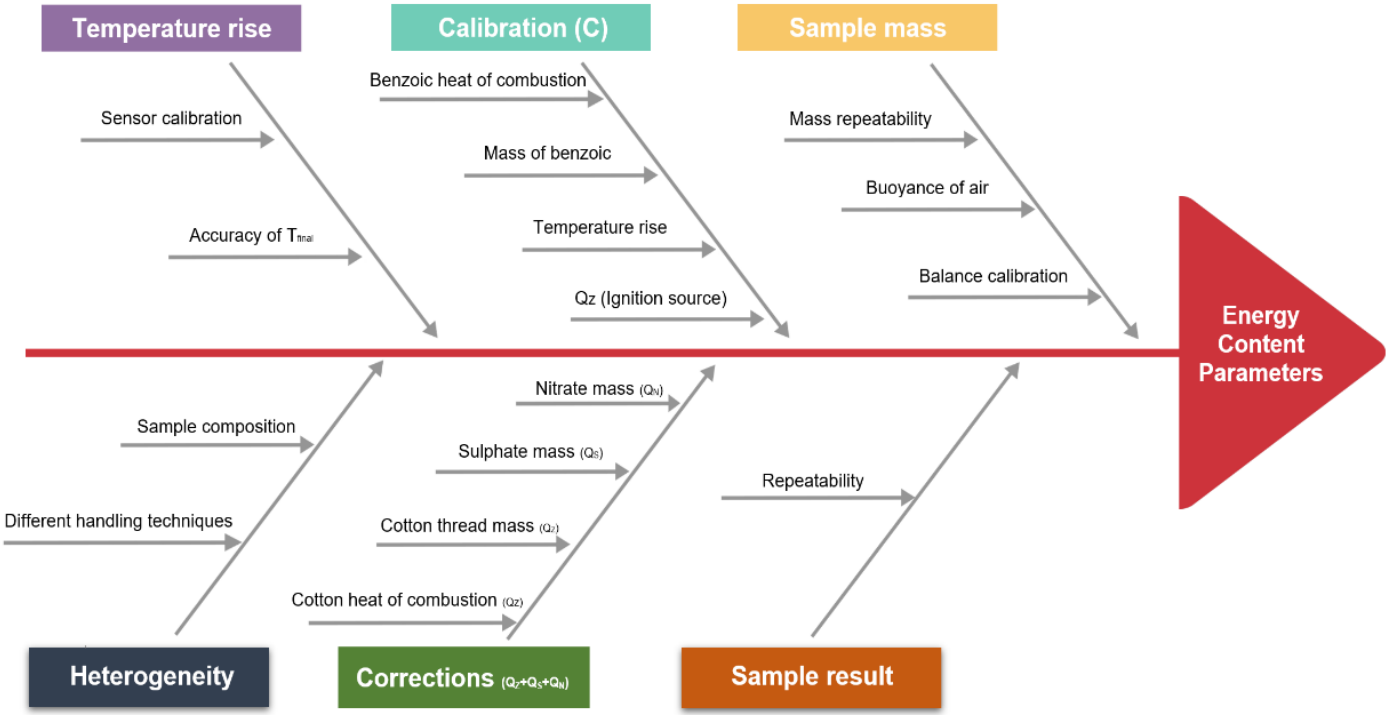
Uncertainty sources



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Unified uncertainty

The coal comparison and the results of cycle 1 from the BIOFMET project proved the need for a unified uncertainty budget. The uncertainty of cycle 2 shows a significant consistency thanks to the improved practice.

COOMET Project - Coal key comparison	Coal Type	Coal uncertainty %	BIOFMET project	Sample Type	Cycle 1 Uncertainty %	Cycle 2 Uncertainty %
	AL-RU	0.13		WC-HQ	0.76	0.38
	AH-RU	0.14		WC-IQ	0.71	0.38
	LC-RU	0.14		WP	0.39	0.34
	AL-RU	0.02		WC-HQ	0.254	0.35
	AH-RU	0.02		WC-IQ	0.29	0.39
	LC-RU	0.02		WP	0.24	0.34
	AL-RU	0.48		WC-HQ	0.68	0.43
	AH-RU	0.41		WC-IQ	4	1.28
	LC-RU	0.42		WP	0.67	0.43

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Thank you!

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