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Revolutionising BOD Analysis in Wastewater Management with the Gas Endeavour® III

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Introduction

Biochemical Oxygen Demand (BOD) testing is essential for evaluating organic pollution in wastewater. However, due to the narrow dynamic range of traditional methods used to determine BOD, most samples need to be analysed at different dilutions, which is time-consuming and error prone. Furthermore, industrial methods generally involve manometric systems which have a limited capacity for simultaneous sample processing. The Gas Endeavour® III represents a novel, volumetric respirometry-based solution designed to simplify and improve BOD testing.

Results

To validate the novel respirometric method for BOD analysis, we conducted BOD measurement using Gas Endeavour® III. The tests were performed with a standard GGA solution (150 mg/L glucose + 150 mg/L glutamic acid) and OECD synthetic wastewater with theoretical BOD up to 8000 mg/L.

The results were as follows:

- GGA solution: the measured BOD was 199 ± 24 mg/L (n=20), which is in close agreement with the reference BOD_5 value of 198 ± 40 mg/L specified in ISO 5815-1 (2019) for the conventional dilution method.
- OECD synthetic wastewater: the measured BOD was 171 ± 6 mg/L (n=14), aligning well with the reported BOD_5 value of 173 mg/L (OECD 303, corresponding to 65% of the theoretical BOD) and the previously reported 170 ± 10 mg/L (Liu et al., 2000).
- The results demonstrate the high accuracy and reliability of the respirometric method, showing strong linearity across a broad range of BOD concentrations (Figure 1).

Why Gas Endeavour® III?

Enhanced efficiency: Eliminates complex dilution procedures by using direct volumetric measurement, minimising both random and systematic errors.

Fully automated: Continuously monitors oxygen consumption, records data, and generates reports with minimal manual intervention.

High throughput: Allows simultaneous analysis of up to 18 samples using 18 individual reactors for maximum productivity.

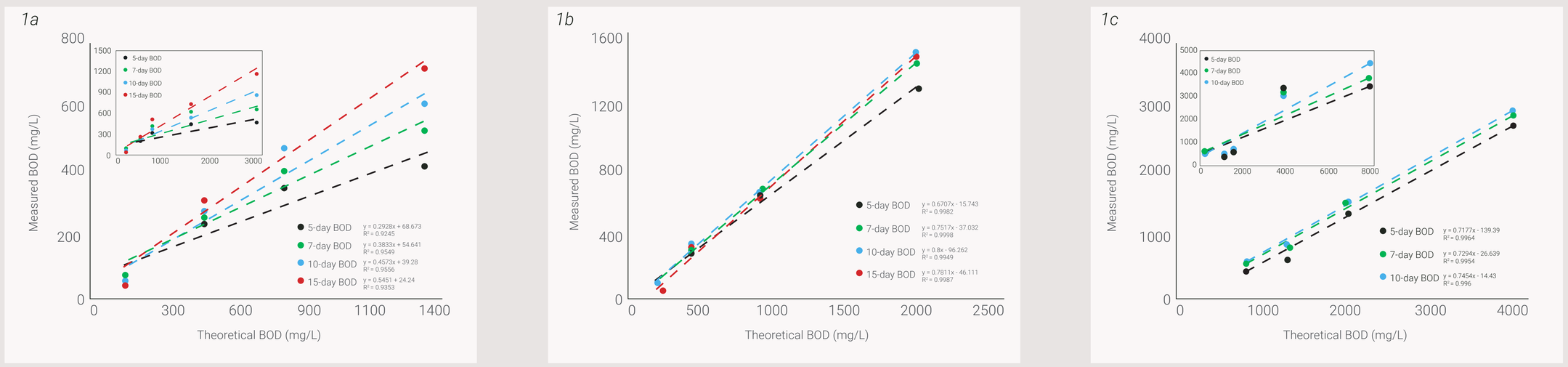

Figure 1. BOD values for different concentrations of GGA solution over a time frame of 15 days. Three inoculum concentrations were tested (a) 0.5 g_{TS}/L; (b) 1.0 g_{TS}/L; (c) 1.5 g_{TS}/L . The concentration of GGA used increased with increasing inoculum concentration.. Linear trendlines and the corresponding R^2 values are plotted.

Conclusion

The Gas Endeavour® III streamlines BOD testing, improving accuracy, reducing workload, and enhancing data quality. Whether in wastewater treatment or scientific research, it sets a new standard for BOD analysis.

Scan to watch the 1-min video presentation by our Senior Sales Scientist!

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