PRI-ECO
普瑞亿科

PRI-8800

Automatic Varying Temperature Incubations and Continuous Soil Respiration Measurements System

PRI-ECO COMPANY LIMITED

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PRI-8800 Automatic Varying Temperature Incubations and Continuous Soil Respiration Measurements System

A reliable and precise estimate of the temperature sensitivity (Q_{10}) of soil organic matter (SOM) decomposition is critical to predict feedbacks between the global carbon cycle and climate change. Traditional methods for estimating Q_{10} includes CDM mode (constant temperature incubation and discontinuous measurements) and VDM mode (varying temperature incubation and discontinuous measurements). Combining rapidly VCM mode (varying temperature incubations and continuous measurements), PRI-8800 (patented) leads a new method for Q_{10} estimation. VCM mode eliminates the underestimated errors by both CDM and VDM modes, provide a more accurate and rapid estimation of the temperature response of SOM decomposition and can be used for large-scale estimation of Q_{10}.

PRI-8800 is a new and exciting solution for continuous soil respiration measurements combining varying temperature incubations in lab. Excellent compatibility and extensibility with other analyzers such as various GHGs and trace gas concentration analyzers, various isotope analyzers and other gas measurements devices. Applications are related to soil respiration, biodegradability of plastics in solid medium, biodegradability of plastics in aqueous medium, organic waste (solid or liquid samples), food industry, compost biological activity, wastewaters, R&D in biotechnology, biology, ecology and pharmacy.

Key Feature

Varying temperature incubations and continuous measurements

Excellent compatibility and extensibility with various analyzers

4, 9 or 16 channels (standard), costomized system is required

Automatic temperature control (-20 ~ 80℃), precision better than 0.1℃

Dual gas circuit to eliminate effect of initial high concentration

Inherent cahnnels for isotope and concentration calibration

Specifications

Parameter	Specifications (standard)	Customized
	Control Module	
System Response time	< 4 s	
Calibration Channels	3	
Power	220 VAC, <350 W	
Dimensions	50 cm × 42 cm × 20 cm	
	Sampling Module	
Flask Capacity	150 mL	●
Precision	±0.05% (Pressure sensor); ±0.15℃ (Temp. sensor)	
Flow Rate	1 L/min (0-4 L/min adjustable)	
Rated Track Length	40 cm × 40 cm ×15 cm	
Gas Tube	1/8" Stainless or Teflon	●
CO_2 Absorption	Soda lime	●
Dimensions	80 cm × 80 cm × 70 cm (Autosampler)	

Water Cabinet		
Temperature Control Range	-20~80℃	●
Temperature Control Precision	±0.1℃	
Heating Rate	60 s/℃	●
Cooling Rate	90 s/℃	●
Circulating Pump	20 L/min（adjustable）	●
Autosampler Precision	0.02 mm	
Power Requirements	100-240VAC，50/60 Hz， 1500 W(warming); 1250 W (cooling)	

8800-1 CO_2 H_2O analzyer (Integrated in PRI-8800)	
CO_2 Accuracy	± 2%
CO_2 Measurement Range	0-5000 ppm
H_2O Precision (Typical)	± 2%
H_2O Measurement Range	0~100% RH
Sampling Temperature	-10 ~ 45 °C
Sampling Pressure	80 ~ 115 kPa
Sampling Humidity	0-100% R.H, non-condensing
Fittings	1/4″ Swagelok

AMBA i3211 CO_2 isotope analyzer	
$\delta^{13}C$ Precision（1σ）	<0.5‰ (1σ) @ 0.25s <0.3‰ (1σ) @ 1s <0.08‰ (1σ) @ 60s <0.05‰ (1σ) @ 300s
CO_2 Measurement Range	0-10000 ppm
Measurement Frequency	4Hz or 1Hz
Sample Flowrate	15 mL/min or 5 mL /min
Cavity Volume	0.1 mL
Sampling Temperature	-10 to ~ 45 °C
Mini Vacuum Pump Flowrate	100 sccm@50 Torr
Sampling Pressure	50 ~ 133 kPa
Sampling Humidity	0-100% R.H, non-condensing
Calibration	Automatic online calibration
Outputs	Digital (RS-232)，Ethernet, USB
Fittings	1/8″ Swagelok
Dimensions	48 cm（W）× 80 cm（D）× 47.5 cm（H）
Weight	25 kg
Power Requirements	100-240VAC，50/60 Hz，<350 W（start-up）, 200 W (stable)

Configuration

PRI-8800 includes water bath with refrigerator and heater system, autosampler, 16 channel tray, 50 flasks, control box.

8800-1: stanard CO_2 H_2O analyzer with 2% CO_2 accuracy.

We recommed AMBA i3211 CO_2 isotope analyzer for isotopic CO_2 analysis, ultra-small cavity, fastest response time and better precison.

Publications

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6. Tian J, He NP#, Hale L, Niu SL, Yu GR, Liu Y, Blagodatskava E, Kuzyakov Y, Zhou JZ. 2018. Soil organic matter availability and climate drive latitudinal patterns in bacterial diversity from tropical to cold-temperate forests. Functional Ecology, 32: 61-70.

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12. He NP, Yu GR. 2016. Stoichiometrical regulation of soil organic matter decomposition and its temperature sensitivity. Ecology and Evolution, 6: 620-627.

13. Shi Y, Sheng LX, Wang ZQ, Zhang XY, He NP, Yu Q. 2016. Responses of soil enzyme activity and microbial community compositions to nitrogen addition in bulk and microaggregate soil in the temperate steppe of Inner Mongolia. Eurasian Soil Science, 49(10): 1149-1160.

14. Wang Q, He NP, Liu Y, Li ML, Xu L. 2016. Strong pulse effects of precipitation event on soil microbial respiration in temperate forests. Geoderma, 275: 67-73.

15. Wang Q, He NP, Yu GR, Gao Y, Wen XF, Wang RF, Koerner SE, Yu Q. 2016. Soil microbial respiration rate and temperature sensitivity along a north-south forest transect in eastern China: Patterns and influencing factors. Journal of Geophysical Research: Biogeosciences, 121: 399-410.

16. Zhang XY, Tang YQ, Shi Y, He NP, Wen XF, Yu Q, Zheng CY, Sun XM, Qiu WW. 2016. Responses of soil hydrolytic enzymes, and ammonia-oxidizing bacteria and archaea to nitrogen applications in a temperate grassland in Inner Mongolia. Scientific Reports, 6: 32791.

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Manufacturer: PRI-ECO