

Stable Isotope Gas Analyzer

Continuous measurement of ^{13}C and ^{18}O isotopes in exhaled breath

The new Stable Isotope Gas Analyzer is a cutting-edge upgrade to our Sable Classic Line systems, allowing simultaneous measurement of stable isotope tracers synchronously with the system's data stream.

Measure the oxidation of *exogenous* nutrients

Figure A demonstrates the oxidative disposal of IP injected ^{13}C -U-glucose tracer at different doses in control mice. Critical metrics include magnitude and duration of response and Area Under the Curve (AUC) for calculating % dose recovery. Possible experimental manipulations include: age, diet, hormonal treatment, experimental drugs, microbiome manipulations, exercise, thermal exposure, surgical procedures, illness/injury, etc.

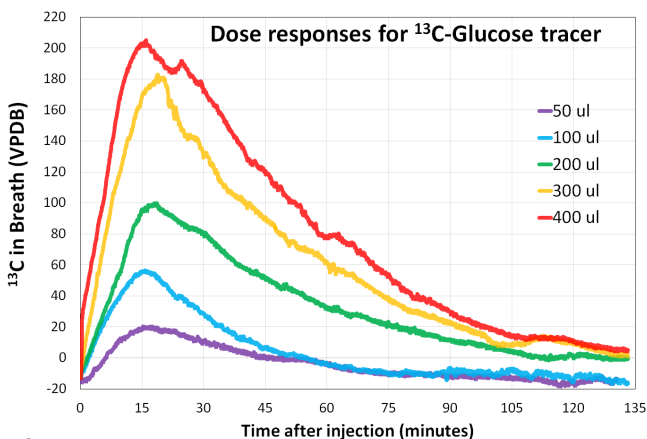


Figure A



FEATURES

Simultaneous measurement of $^{13}\text{CO}_2$, C^{18}O_2 , CO_2 , and H_2O

One analyzer can be multiplexed with up to 8 cages

Fast response time and low power requirement

Wide measurement ranges for $\delta^{13}\text{C}$ (-100‰ to 4000‰) and CO_2 (380 ppm to 25,000 ppm)

High precision for both $\delta^{13}\text{C}$ (0.6‰) and $\delta^{18}\text{O}$ (4.0‰) as well as CO_2 (0.05 ppm) and H_2O (50 ppm)

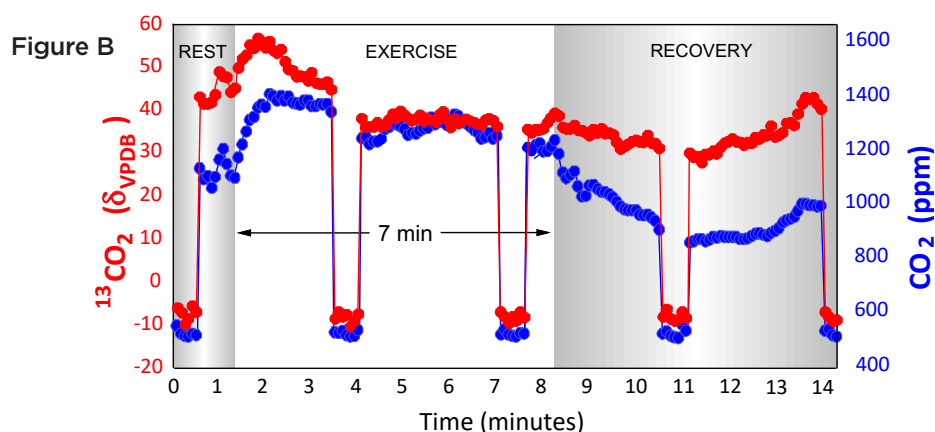
Over 10,000 different isotopically-labeled tracers commercially available

No consumables or external calibration required

Stable Isotope Gas Analyzer

Measure the oxidation of *endogenous* nutrients

Figure B shows the oxidation of a fatty acid tracer (^{13}C -Palmitic acid) infused into rodent diet for 10 days, selectively enriching the body lipids with ^{13}C . The CO_2 and $\delta^{13}\text{C}$ measured during rest, treadmill exercise (15 m/min) and recovery show that total lipid oxidation of a mouse increases during the first minute of exercise, but decreases to resting levels during steady-state exercise. Researchers could also selectively enrich the proteins in the body by feeding rodent diet infused with ^{13}C -L-Leucine, thereby allowing quantitative assessment of endogenous protein oxidation in real-time.



SPECIFICATIONS (air background)

PRECISION (1 SEC/10 SEC/100 SEC)	$\delta^{13}\text{C}$: 6.0‰ / 2.0‰ / 0.6‰
	$\delta^{18}\text{O}$: 32‰ / 10‰ / 4‰
	$^{12}\text{CO}_2$: 1.6 ppm / 0.6 ppm / 0.2 ppm
TOTAL UNCERTAINTY	< 1%
MEASUREMENT RANGE (MEETS ALL SPECS)	CO_2 : 380 – 25,000 ppm
	H_2O : 4000 – 60,000 ppm
OPERATIONAL RANGE	CO_2 : 0 – 50,000 ppm
	H_2O : 0 – 70,000 ppm (non-condensing)
MEASUREMENT RATES	User-selectable rates up to 1 Hz
SAMPLING CONDITIONS	Ambient Humidity: non-condensing (0 – 100% RH)
	Sample Temperature: -20 – 50 °C
	Operating Temperature: 5 – 45 °C
FITTINGS	Outlet (internal pump): 1/4 in.
	Inlet: 3/8 in.
OUTPUTS	Digital (RS-232), Ethernet, USB
POWER REQUIREMENTS	115/230 VAC, 50/60 Hz, 66 W
DIMENSIONS (H x W x D)	18 cm (7") x 47 cm (18.5") x 36 cm (14")
WEIGHT	17 kg (37.5 lbs.)

For more information on stable isotope labeling utilization, see:

McCue, M. D. (2011). "Tracking the oxidative and non-oxidative fates of isotopically labeled nutrients in animals." *BioScience* 61(3): 217-230.

Welch Jr, K. C., et al. (2016). "Combining respirometry with stable isotopes to investigate fuel use in animals." *Annals of the New York Academy of Sciences* 1365(1): 15-32.

McCue, M. D. and K. C. Welch Jr (2016). " ^{13}C -Breath testing in animals: Theory, applications, and future directions." *J Comp Physiol* 186B(3): 265-285.

ABOUT US

Sable Systems International designs and manufactures leading-edge gas, metabolic and behavioral measurement systems for calorimetry, respirometry, metabolic/behavioral phenotyping, and gas analysis. Our products enable the highest precision and resolution, optimum workflow and reliable performance – giving you utmost confidence in your results. By scientists, for scientists, Sable enables results that impact research and industry breakthroughs.



www.sablesys.com

Sable Systems International
3840 N. Commerce Street
North Las Vegas, NV 89032, USA
TELEPHONE:
US: +1 800 330 0465 / +1 702 269 4445
EMAIL: sales@sablesys.com



Sable Systems Europe GmbH
Ostendstr. 25
D-12459 Berlin, Germany
TELEPHONE: +49 30 5304 1002
FAX: +49 30 5304 1003