

## Laboratory Report

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Report#: H2A-24031001

### Introduction

This report summarizes our analysis of the CellPower hydrogen water bottle designed by and manufactured for LumiVitae Inc., Funchal Madeira, Portugal. The product produces hydrogen water using electrolysis and was tested for dissolved hydrogen concentration (H<sub>2</sub>).

### Product Description

Name: LumiVitae Portable Hydrogen Water Bottle; Model #: CellPower; Serial #: CPWB1-002-0590; Volume: 320 mL

The product was received for testing on 3/4/2024 in factory-new packaging and included a base unit, bottle, cap, USB interface cable, wireless charging pad, and user manual. The opening to the electrode chamber was sealed with a shipping cap to prevent the membrane from drying out which must be removed before operating the bottle. The base has a digital display and an internal rechargeable battery which can be charged using either a cable or the supplied wireless adapter, and uses a proton exchange membrane (PEM) and platinum electrodes to produce hydrogen gas via electrolysis. The bottle material is Tritan with a volume of approximately 320 mL. The cap has a separate USB charging port to charge the battery that supplies the power to operate a three-function LED. When the cap is tightly secured and power is turned on, the H<sub>2</sub> gas is produced and introduced into the water. As this occurs, the internal pressure will rise, which, according to Henry's law, also raises the maximum level of dissolved H<sub>2</sub> in the water above the sea level saturation point of 1.57 mg/L (1570 ppb). The PEM allows the bottle to produce hydrogen water using any type of drinking water, even distilled, without changing the water's pH. The manual recommends only using the 9-minute cycle with the 500 mL bottle. Oxygen gas (O<sub>2</sub>) produced at the anode is vented through a hole in the bottom of the base unit.

### Test Method

Requested tests: Dissolved H<sub>2</sub> on the 3, 6, & 9-minute cycles

Test water: Distilled (generic); temperature: 25.2°C ± 1.0°; ec: 5 us/cm; pH: 5.61

Laboratory elevation: 864 meters (0.91 atm); all measurements adjusted to SATP

Test Equipment: SRI 8610C gas chromatograph, Torrance, CA USA

Column: Hayesep-D 6M; temp: 60°C; Detector: TCD; Carrier gas: Nitrogen (99.999%) @20 PSI, 20 mL/min

Calibration: Three-point, performed on the day of testing using H<sub>2</sub>-saturated water standard

GC Test Method: Static headspace analysis

Before testing, the unit's internal battery was charged overnight and the membrane was wetted using warm distilled water (70°C). On the day of testing, the GC was permitted to warm up for two hours before calibrating. For each test, the unit was connected to the power transformer via the USB-C cable, filled with distilled water to the lower edge of the aluminum rim (≈ 250 mL), and the cap securely tightened. To start electrolysis, the power button was pressed one, two, or three times (depending on the cycle time being tested). After completion of each cycle, the cap was removed and a 200 mL sample was poured into a 250 mL borosilicate beaker. A 2000 uL sample was then drawn using a gas-tight syringe, injected into the headspace vial, and placed in a 2400 rpm centrifuge for three minutes to permit the dissolved H<sub>2</sub> to equilibrate with the headspace. After equilibration, a 1000 uL sample of the vial's headspace was drawn using a gas-tight syringe and injected into the gas chromatograph for analysis. Three tests were conducted for each cycle, the results recorded, and the mean and standard deviations calculated. The amount of H<sub>2</sub> that would be ingested when drinking the contents was reported as "Available H<sub>2</sub>".

**Results** 3 min: Mean Dissolved H<sub>2</sub>: 1.06 mg/L (1060 ppb); SD: 0.06; Available H<sub>2</sub>: 0.27 mg  
6 min: Mean Dissolved H<sub>2</sub>: 1.51 mg/L (1510 ppb); SD: 0.02; Available H<sub>2</sub>: 0.38 mg  
9 min: Mean Dissolved H<sub>2</sub>: 1.89 mg/L (1890 ppb); SD: 0.12; Available H<sub>2</sub>: 0.47 mg

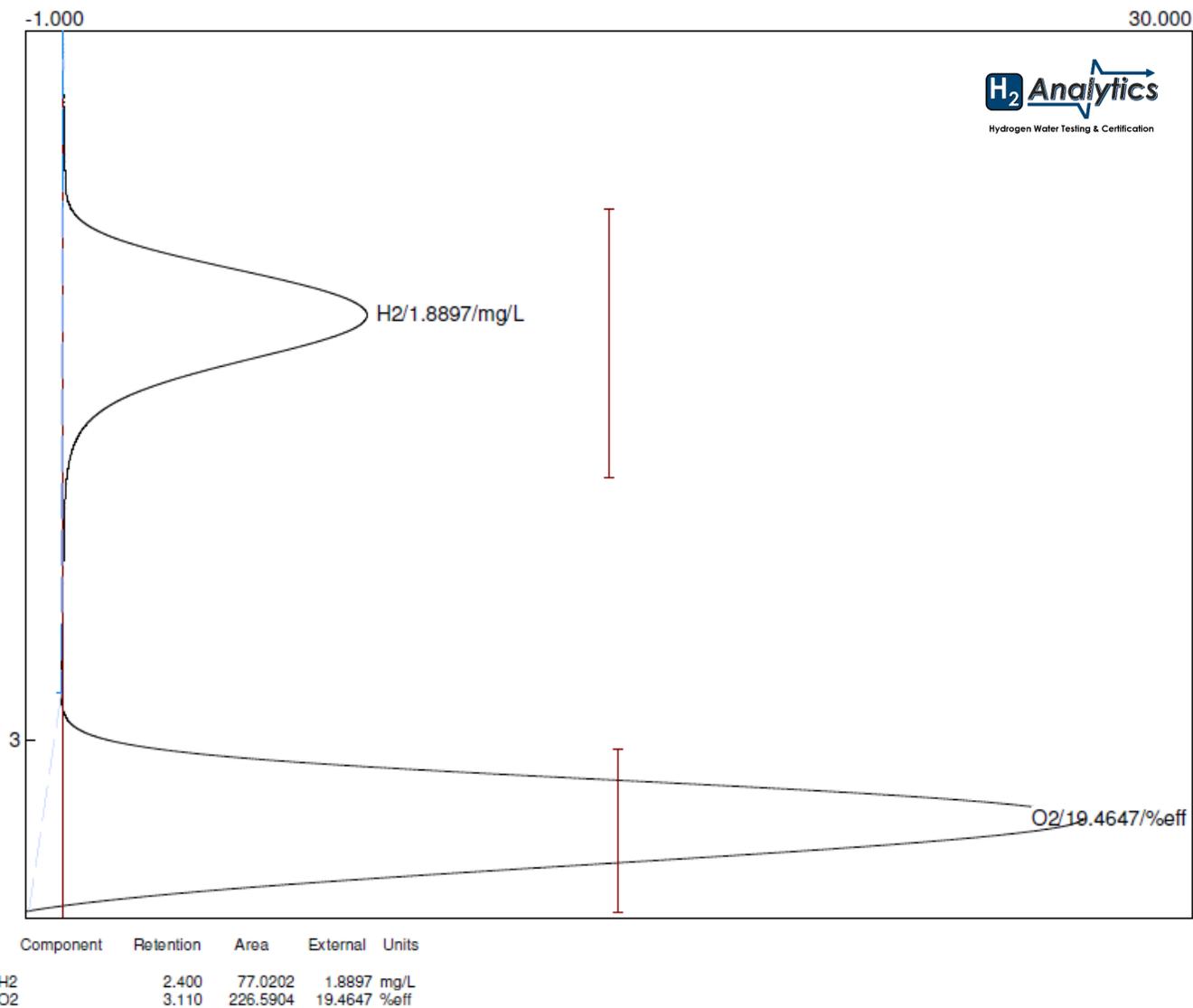
*RSSharpe*

Approved By: Randy Sharpe, Director of Testing



Report Date: 3/10/2024

Lab name: H2 Analytics  
 Client: LumiVitae  
 Client ID: H2A-1024  
 Collected: 3-6-24  
 Holding time: 300  
 Analysis date: 03/06/2024 10:22:54  
 Method: Static HS Analysis (GCHS)  
 Lab ID: HNV  
 Description: TCD CH1 60C  
 Column: Hayesep-D 6 meters 60C  
 Carrier: N2 @ 20psi (20 mL/min)  
 Components: AqH2O2.cpt  
 Integration: Peak sens=90.0 Base sens=40.0 Min area= 15.00 Standard= 1.000 Sample= 1.000 Tangents=off  
 Control filename: E:\peak454-64bitWin10\LumiVitae.CON  
 Data file: LVCellPower10..CHR ()  
 Sample: Cell Power  
 Operator: rss  
 Comments: H2 Test Run



CellPower Sample Chromatogram (9-min cycle)