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Report #: H2AR-241010-1

## Laboratory Report

### Introduction

This report summarizes the testing of a hydrogen water bottle distributed by Micro Research Institute, Inc., New Taipei City, Taiwan. The product is a battery-operated portable bottle that produces hydrogen water using electrolysis. The bottle is a sealed system that allows the internal gas pressure to build resulting in a higher concentration of molecular hydrogen gas (H<sub>2</sub>) than can be attained under conditions of normal atmospheric pressure. This testing was requested by Micro Research Institute, Inc. The bottle was received for testing on 10/5/2024 in a factory-new box and included a USB wall transformer, USB-C charging cable, a water bottle thread adapter, an extra silicone seal, and a user manual.

Tests requested: Dissolved H<sub>2</sub> (5-min & 10-min cycle times)

### Product Description

Class: Electrolytic Bottle      Name: Qlife      Brand: Qcup Max Portable Hydrogen Water Generator  
Model: WPI-8003      S/N: 8003240925

The bottle is a battery-operated device that uses electrolysis to produce and infuse hydrogen gas (H<sub>2</sub>) into the drinking water. The bottle material is Tritan with an approximate volume of 250 mL. Because the design allows for pressure to build during electrolysis, it is capable of dissolving hydrogen at concentrations higher than the maximum concentration at sea level, 1.57 mg/L (1570 ppb). To prevent an unsafe buildup of pressure, the cap includes an internal pressure relief valve. The unit has a 5-minute pre-programmed cycle time, with the option to run a second cycle by pressing the power button again after the completion of the first cycle. It uses a rechargeable lithium-ion battery to permit portable use. Because the design utilizes a proton-exchange membrane sandwiched between two platinum electrodes, this unit will work with any type of drinking water, including distilled, without having a significant impact on the water's pH.

### Materials & Methods

Water: distilled, generic, pH 5.78 ± 0.25; starting temperature 24.1°C ± 1.5; EC: 1 us/cm  
Laboratory elevation: 883 meters (0.90 atm); all measurements adjusted to SATP  
Gas Chromatograph: SRI 8610C; column: Hayesep-D 6M; column/oven temp: 60°C; detector: tungsten-rhenium TCD; carrier gas: N<sub>2</sub>  
GC Test Method: Static headspace analysis (HS-GC)  
GC Calibration: performed on the day of testing using H<sub>2</sub>-saturated water  
The battery was fully charged and the membrane was wetted overnight using warm water (60°C) before testing. All tests were conducted with the USB charging cable connected.

**Dissolved H<sub>2</sub>:** For each dissolved H<sub>2</sub> test, the bottle was filled with distilled water just below the first cap thread, the cap was securely tightened, and the power button was pressed once to start the 5-minute cycle. For the 10-minute tests, the power button was pressed a second time without opening the cap. After each test cycle was completed, the cap was removed and a 2000 uL aliquot was immediately drawn using a gas-tight syringe and injected into the headspace vial. The test sample was then placed into a 2400 rpm centrifuge for 3 minutes to permit the dissolved H<sub>2</sub> in the water sample to equilibrate with the headspace. After equilibration, a 1000 uL aliquot of the headspace was drawn using a gas-tight syringe and injected into the GC for analysis. After completing three tests for each cycle time, the results were recorded, and the mean and standard deviations for the three dissolved H<sub>2</sub> concentrations were calculated. Based on the mean dissolved H<sub>2</sub> concentration and the volume of water in the bottle, the average amount of H<sub>2</sub> that would be ingested when drinking the entire contents was calculated and reported as "H<sub>2</sub> Ingested Dose". Attachment 1 shows a sample chromatogram (10-minute test).

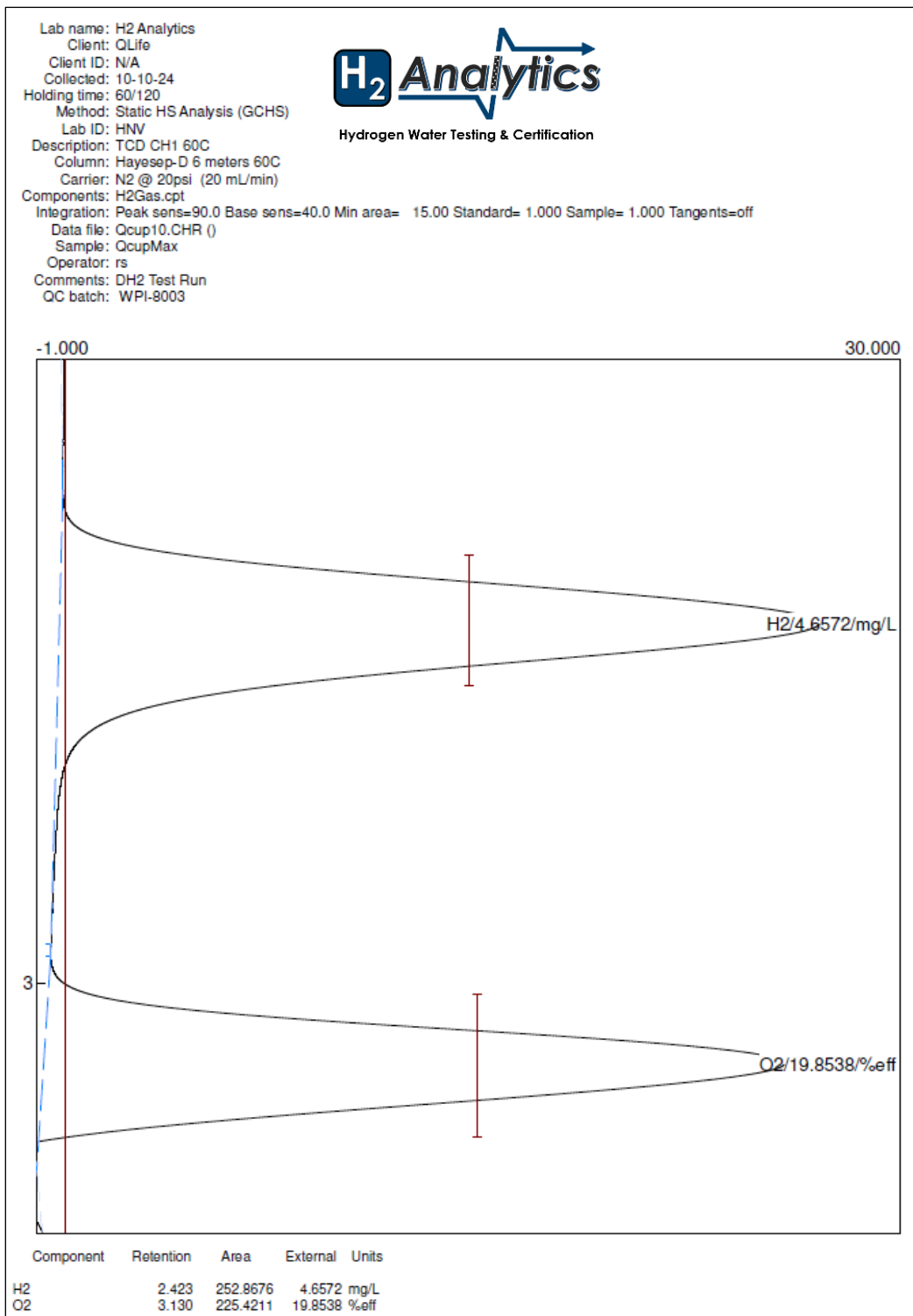
### Results

Mean dissolved H<sub>2</sub>, 5-min: 3.07 mg/L (3070 ppb); SD: 0.30; H<sub>2</sub> Ingested Dose: 0.77 mg  
Mean dissolved H<sub>2</sub>, 10-min: 4.73 mg/L (4730 ppb); SD: 0.16; H<sub>2</sub> Ingested Dose: 1.18 mg

Approved By: Randy Sharpe      Title: Director of Testing



Report Date: 10/10/2024



Qlife Qcup Sample Chromatogram (10-min cycle)