Overland Park KS
Tywon@$H_2$HUBB.com
www.$H_2$HUBB.com

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# $H_2$HUBB Official Test Report

## Evaluation Introduction

This report summarizes our analysis of the H2TAB Hydrogen-Producing Tablets, sold by H2TAB LLC. $H_2$HUBB classifies this product as a magnesium-based, open-cup hydrogen-generating tablet. Each tablet contains approximately 80 mg of elemental magnesium, along with simple organic acids and trace amounts of sugar used as a binder. The tablet is designed to be dissolved in 12–16 ounces of water, requiring only 2–3 minutes to fully dissolve, depending on water temperature. We evaluated the tablet's molecular hydrogen concentration performance and its total effective dose delivered through standard oral consumption. The purpose of this investigation was to assess whether the product meets $H_2$HUBB's hydrogen performance standards, which are required for our official approval and recommendation. To learn more about our $H_2$ performance standards for hydrogen water tablets, visit **$H_2$HUBB.**

## $H_2$ Products

- Company: H2TAB LLC
- Product Name: H2TAB, Molecular Hydrogen Tablets
- Type: High-Concentration Hydrogen-generating Tablet
  - Elemental magnesium
  - Open-Cup
- URL Link: https://drinkh2tab.com/

## Method and Procedure

- Distilled water: 6.0 pH
- ΔpH (delta pH): 6.27 → 4.06 (−2.21)
- Water Temperature: 70°F/ 21°C
- Flask Vol Size: 0.50 L or 500 mL
- Reaction Time Frame: 2-3 minutes
- Test Location: 277 meters (909 ft elevation)
- Test Methodology:
  - Gas Evolution
  - Gas Displacement
  - Titration: $H_2$Blue® Test Reagent (Ethanol-based)
- All $H_2$ Concentration Tests Converted to SATP (water temp and pressure)
- All Gas Evolution and Displacement Tests Converted to SATP (water temp and pressure)
- Claimed Dissolved $H_2$ mg/L: 12 mg/L (post 2~3 minutes)

# Test Results

## Maximum $H_2$ Gas Production

To determine the total hydrogen-generating capacity of a single tablet, one tablet was fully reacted in a sealed 500 mL system containing 475 mL of distilled water and 25 mL of 37% hydrochloric acid (HCl). This solution ensured a sufficiently low pH with excess hydrogen ions ($H^+$) to fully react with the elemental magnesium and prevent surface passivation. The reaction took place in a flask connected to a gas displacement apparatus and was allowed to proceed until no further gas evolution was observed. The volume of hydrogen gas collected in the cylinder was recorded, and the remaining water was titrated to confirm any dissolved $H_2$ content. All values were converted to SATP conditions.

| Parameters | Value |
|---|---|
| Collected $H_2$ gas | 82.43 mL |
| Calculated $H_2$ mass | 6.8 mg |
| Estimated Mg required | 82 mg |

The result aligns with the manufacturer's specification of 80 mg of Mg per tablet, confirming the theoretical maximum molecular hydrogen production potential of the product.

## Hydrogen Losses During Real-Use Conditions

To simulate normal consumer use, a tablet was dissolved in 500 mL of distilled water and allowed to react for 2–3 minutes or until it visibly floated. Hydrogen gas lost during this reaction window was captured using a gas displacement system. Immediately after the water was poured out (simulating drinking), 475 mL of distilled water and 25 mL of HCl was added to the same flask to react any Mg residue left in the glass. Hydrogen from this secondary reaction was also captured and measured. These two measurements represent hydrogen losses that are not part of the effective dose delivered to the user.

| Hydrogen Loss Type | Volume (mL) | Mass (mg) |
|---|---|---|
| Pre-consumption gas loss | 19.0 mL | 1.56 mg |
| Mg residue post-drinking | 7.92 mL | 0.66 mg |
| **Total $H_2$ loss** | **26.92 mL** | **2.22 mg** |

## Effective $H_2$ Dose (In-Use Concentration + Stomach Reaction)

To determine the true effective hydrogen dose from one tablet, we measured the dissolved $H_2$ concentration in 500 mL of distilled water after the tablet fully reacted (~2 minutes), using ethanol-based $H_2$Blue reagent. To simulate additional $H_2$ production in the body, we measured gas evolution after adding 25 mL of 37% HCl to the post-reaction flask (containing all residue). Because this measurement includes the $H_2$ from unreacted Mg residue in the glass (already accounted for in Test 2), that amount was subtracted to avoid inflating the effective dose.

| Metric | Average | Peak |
|---|---|---|
| $H_2$ Concentration (mg/L) | 6.8 mg/L | 7.0 mg/L |
| Dissolved $H_2$ in water (mg) | 3.4 mg | 3.5 mg |
| $H_2$ from stomach-like reaction | 2.30 mg | 2.30 mg |
| Subtract $H_2$ from glass residue | -0.66 mg | -0.66 mg |
| **Total Effective $H_2$ Dose** | **5.04 mg** | **5.14 mg** |
| **Effective $H_2$ Concentration (mg/L)** | **10.08 mg/L** | **10.28 mg/L** |

## Tablet Composition and Hydrogen Utilization Summary

To evaluate overall hydrogen utilization, we calculated the amount of $H_2$ delivered (effective dose), lost to air during reaction, and left unused as Mg residue in the glass. Each value was measured in prior tests and converted to estimated Mg usage based on a 12:1 Mg-to-$H_2$ ratio. This breakdown provides a clear account of where the tablet's magnesium is used, ensuring total values align with the manufacturer's stated Mg range.

| Category | $H_2$ (mg) | Mg (mg, est.) | Notes |
|---|---|---|---|
| Effective dose | 5.04 mg | ~60.5 mg | Absorbed dose (water + stomach reaction) |
| $H_2$ loss to air | 1.56 mg | ~18.7 mg | $H_2$ lost to the air before consumption |
| Residue in glass (unused) | 0.66 mg | ~7.9 mg | Mg left in flask post-reaction (not consumed) |
| Total $H_2$ accounted for | 7.26 mg | 87.12 mg | manufacturer claim (80 mg Mg) |

### $H_2$HUBB Hydrogen Assessment

- According to our testing, the H2TAB tablet produced an average dissolved hydrogen concentration of 6.8 mg/L (ppm), with a peak concentration of 7.0 mg/L (ppm) in 500 mL of water. These results align closely with previous third-party testing conducted by $H_2$ Analytics, which reported a concentration of 7.3 mg/L (ppm) under similar conditions. Both our data and $H_2$ Analytics' findings suggest that upon consumption, a user receives approximately 3.4–3.7 mg of dissolved $H_2$ per tablet. However, the final effective dose is not fully realized until the water reaches the stomach, where residual elemental magnesium continues to react. $H_2$ Analytics reported a potential effective dose of up to 12.4 mg/L (ppm) or 6.2 mg of $H_2$, while our results showed an additional 2.30 mg of $H_2$ generated post-consumption in the stomach, resulting in an effective dose range of 10.08–10.28 mg/L or 5.04–5.14 mg of total $H_2$. Our methodology accounted for typical real-use losses during tablet dissolution and consumption, which likely explains the difference between our effective dose values and those of $H_2$ Analytics. Taking both sets of third-party data into consideration, the H2TAB tablet reliably delivers an effective dose of more than 5 mg of hydrogen gas, assuming optimal use and adherence to manufacturer instructions. Based on current human studies, this level of hydrogen gas is considered sufficient to induce therapeutic effects. The H2TAB hydrogen tablet surpassed $H_2$HUBB standards for both **$H_2$ Concentration and Daily Dose of $H_2$,** and we recommend a usage range of 1–3 tablets per day, consistent with the clinical research on this product.

## Product Classification and Specs

**Manufacturer's Rated Specifications**

- **Product Type:** Magnesium-based hydrogen-generating tablet
- **Tablet Form:** Open-cup reaction (dissolves in standard glass/cup)
- **Hydrogen Delivery:** Produces both quasi-dissolved and dissolved molecular hydrogen ($H_2$)
- **Reaction Time:** Fully reacts within 2–3 minutes, depending on water temperature
- **Primary Reactants:** Elemental (metallic) magnesium and $H_2O$
- **Reaction Equation:**
- $Mg + 2H_2O \rightarrow Mg(OH)_2 + H_2$

**Stoichiometric Ratio (Mg:$H_2$):**

- 12 mg of Mg produces 1 mg of $H_2$ (12:1 ratio by mass)

**Hydrogen Production Specifications**

**Tablet Composition (Manufacturer Claim):**

- 80 mg of elemental magnesium
- Produces approximately 6.67 mg of $H_2$
- Equivalent to ~81 mL of $H_2$ gas (SATP)

**$H_2$HUBB Gas Evolution Results:**

- 82 mg of elemental magnesium (calculated based on total $H_2$ yield)
- Produced 6.83 mg of $H_2$
- Equivalent to ~83 mL of $H_2$ gas (SATP)

## Product Assessment

**Functionality:**

- $H_2$ tablets are easy to use and arguably one of the most convenient methods for producing high-concentration hydrogen water within minutes. All that is required is 12–16 oz (350–500 mL) of clean drinking water. To use, simply place a single tablet into a glass containing the appropriate volume of water and allow it to fully react. The tablet will dissolve and float to the surface once the reaction is complete. For optimal results, consume the water immediately after the tablet finishes reacting. During the reaction, a visible cloud of dense hydrogen gas forms near the top of the glass—this is known as quasi-dissolved hydrogen, and it only remains for a few minutes before dissipating. From start to finish, the entire process takes less than 5 minutes, making the open-cup $H_2$ tablet one of the simplest and fastest hydrogen delivery methods available on the market.

**Cost:**

- H2TAB 30 count: $29.95 USD
- $H_2$ Hubb discount: TBA
- $H_2$ Hubb recommendation cost: TBA

## Overall Opinion

The H2TAB Molecular Hydrogen Tablet, offered by H2TAB LLC, is one of the most clinically supported and well-engineered high-concentration hydrogen water products commercially available. Each retail package includes two blister packs containing 15 tablets each, providing a 30-count, one-month supply of hydrogen-generating tablets. Based on prior third-party testing, the company claims the product can deliver up to 12 mg/L (ppm) of molecular hydrogen in 500 mL of water. However, this figure is more accurately understood as the upper limit of the effective hydrogen dose delivered to the body—not the concentration of dissolved $H_2$ in the water prior to consumption. Our evaluation found that the tablet produced an hydrogen concentration of 6.8 mg/L, equating to approximately 3.4 mg of $H_2$ (or 41.3 mL of gas) in 500 mL of water. The product also achieved a peak concentration of 7.0 mg/L.

In addition, our data shows that the tablet continues to generate hydrogen within the body post-consumption, producing an additional 2.30 mg of $H_2$ through reaction with gastric fluids. This confirms that a single tablet can deliver an effective dose exceeding 5 mg of molecular hydrogen—a result that does not exactly match previous testing, but correlates well with earlier findings and supports H2TAB's performance claims. Most importantly, the hydrogen dose delivered from a single tablet exceeds $H_2$HUBB's daily minimum performance standard of 0.8 mg of $H_2$, effectively delivering more than six times our benchmark. This makes the H2TAB tablet one of the most efficient and convenient solutions for producing high-concentration hydrogen water and delivering clinically relevant hydrogen doses to the human body.

Dissolved hydrogen concentration (mg/L (ppm)) is a critical performance metric, as research suggests that 1-3 mg of $H_2$ or more per day appears to be therapeutic for humans. Furthermore, the **IHSA** standard for this type of product is a minimum of 0.5 mg/serving or 0.5 mg/L. $H_2$HUBB's performance standard for hydrogen water devices is slightly higher than IHSA, as we require the device to provide a concentration of 0.8 mg/L (ppm) and 0.8 mg/day consistently. The H2TAB Molecular Hydrogen Tablet surpassed $H_2$HUBB standards for both **$H_2$ Concentration and Daily Dose of $H_2$**. Based on current research data, we believe the device's mg/L (ppm) performance provides adequate levels of hydrogen gas to induce therapeutic effects in humans. **According to our test results, the product will be featured on our website as a Level 4 hydrogen water product**. You can view the meaning of this ranking **here**. We are pleased with the product's hydrogen concentration.

**Quasi-Dissolved vs. Dissolved Hydrogen Gas**

Magnesium-based open-cup hydrogen tablets—such as those evaluated in this report—produce a unique mixture of hydrogen gas states within the water, commonly referred to as quasi-dissolved and dissolved hydrogen. While both contribute to the total available hydrogen dose, they differ in physical behavior, stability, and measurement dynamics. Dissolved hydrogen gas ($H_2$) refers to hydrogen molecules that have entered true solution by occupying molecular spaces—nanocavities—within the hydrogen-bonded network of water. This state adheres to Henry's Law, which sets a solubility limit for hydrogen gas in water at approximately 1.57 mg/L at SATP (Standard Ambient Temperature and Pressure). In this form, hydrogen is immediately bioavailable upon ingestion and is the most well-documented in scientific literature.

Quasi-dissolved hydrogen, on the other hand, describes hydrogen gas that exists in stable nanobubbles or microbubbles suspended within the water column. These bubbles do not technically meet the criteria for being "dissolved" but are temporarily suspended and resistant to immediate dissipation due to their high internal pressure and nanoscale size. This high internal pressure can enable the water to exceed normal hydrogen solubility—sometimes achieving apparent concentrations of 2–3 mg/L, a condition referred to as supersaturation. This dual state is commonly observed with open-cup tablets, where the visible hydrogen gas cloud that forms near the surface of the glass contains quasi-dissolved $H_2$. While these bubbles will eventually escape into the atmosphere, they often linger for several minutes and continue to dissolve into the surrounding water, especially as larger bubbles form and undergo Ostwald ripening—a gas exchange phenomenon where smaller bubbles dissolve and re-deposit onto larger ones, driving continued dissolution over time. In practical terms, quasi-dissolved hydrogen acts as a temporary gas reservoir, maintaining elevated hydrogen levels for several minutes and helping the water stay saturated near or above Henry's Law limits until consumption. For this reason, it's critical that users consume the water immediately after the tablet has fully reacted to maximize intake.

In this report, we refer to both states when describing the hydrogen concentration of the water post-reaction. The 6.8–7.0 mg/L (ppm) concentrations reported include the combined contribution of both dissolved and quasi-dissolved hydrogen. While quasi-dissolved $H_2$ is somewhat less stable, its presence significantly enhances the total available hydrogen dose and contributes to the product's high performance and therapeutic relevance.

**Gas Evolution Test Findings**

According to the manufacturer and the H2TAB product specifications, each hydrogen tablet contains approximately 80 mg of elemental magnesium (Mg). Based on the established molar conversion ratio—12 mg of Mg produces 1 mg of molecular hydrogen ($H_2$)—this equates to a theoretical maximum output of about 6.67 mg of $H_2$, or approximately 81 mL of $H_2$ gas at SATP (Standard Ambient Temperature and Pressure). To validate this claim and gain a clearer understanding of the tablet's total hydrogen production, we performed a series of gas evolution tests designed to assess not only theoretical capacity but also practical delivery, absorption, and losses that occur during real-world use.

To establish a performance baseline, our first gas evolution test measured the maximum hydrogen production capacity of a single tablet. The tablet was reacted in a closed system with 475 mL of distilled water and 25 mL of 37% hydrochloric acid to ensure complete magnesium conversion. This test produced 82.43 mL of hydrogen gas, or 6.83 mg of $H_2$, confirming that the tablet contains at least 82 mg of elemental magnesium. These results are fully consistent with, and slightly exceed, the manufacturer's rated specification of 80 mg per tablet. Subsequent tests evaluated hydrogen losses that occur during typical use. When the tablet is left to dissolve in an open cup of water, an average of 19 mL of hydrogen gas—approximately 1.56 mg of $H_2$—escapes before consumption, representing a measurable loss due to natural outgassing. Additionally, after the water is consumed, a portion of the magnesium (magnesium residue) remains in the glass and does not contribute to the effective dose. We quantified the hydrogen production from this residue at 7.92 mL, or 0.66 mg of $H_2$, further refining the actual amount of hydrogen delivered to the body.

To determine the effective hydrogen dose, we measured the hydrogen concentration in 500 mL of water after the tablet fully reacted. Using ethanol-based $H_2$Blue titration, we recorded an average concentration of 6.8 mg/L (3.4 mg of $H_2$) and a peak of 7.0 mg/L (3.5 mg of $H_2$). When accounting for post-consumption hydrogen generation in the stomach, we measured an additional 2.30 mg of $H_2$. After subtracting the 0.66 mg attributed to unreacted Mg residue, the final effective dose delivered per tablet is 5.04–5.14 mg of hydrogen gas.

**Interpretation**

These tests are critical because most companies that distribute hydrogen tablets focus solely on dissolved hydrogen concentration (typically reported as mg/L or ppm) without clarifying how much molecular hydrogen is actually delivered and absorbed by the body. While hydrogen concentration is important, it does not provide the complete picture—especially for magnesium-based tablets, which continue generating hydrogen after ingestion through reactions with gastric acid.

Additionally, while there is some justification for doing so, many companies highlight the effective dose concentration (e.g., "12.4 mg/L in 500 mL") as a representation of the total hydrogen delivered. However, this can be misleading if interpreted as the actual concentration of hydrogen gas in the water following complete tablet reaction. In reality, independent testing shows that the hydrogen concentration in the water itself typically ranges from 6.8 to 7.3 mg/L after 2–3 minutes of reaction time. This measurement accounts for both quasi-dissolved and fully dissolved molecular hydrogen. The additional 2–3 mg of hydrogen gas is produced inside the body, completing the effective dose.

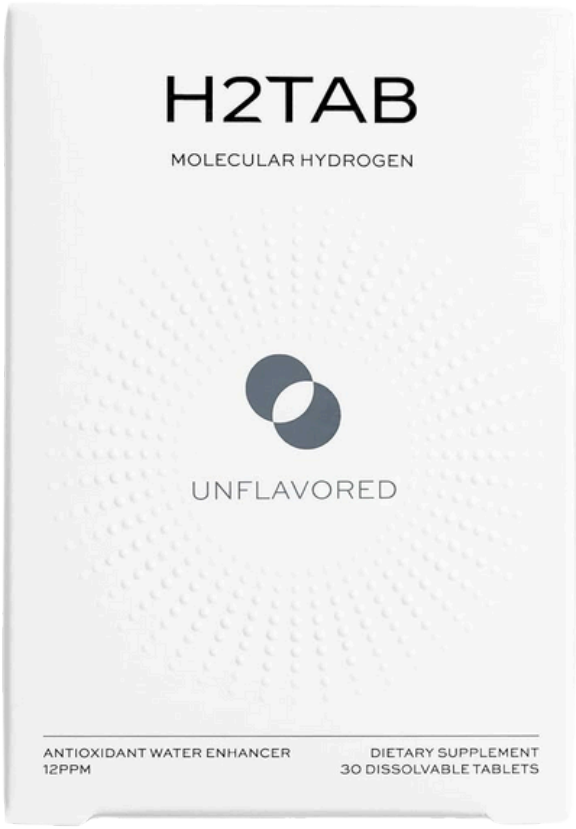
Although an effective concentration value can be calculated from this total dose, it is important to communicate clearly that this number reflects hydrogen delivered to the body—not the concentration of the water itself. Therefore, in our opinion, it is more scientifically transparent and consumer-responsible to report the effective hydrogen dose per tablet in milligrams of $H_2$ rather than presenting it as an H2 water concentration. This approach more accurately reflects the total hydrogen a person receives, whether absorbed directly through drinking or generated afterward in the stomach through unreacted magnesium.

Our findings indicate that the H2TAB hydrogen tablet delivers a highly efficient and therapeutically meaningful dose of molecular hydrogen. With a total hydrogen output of 6.83 mg and an effective dose exceeding 5 mg, the product maintains a dose efficiency of approximately 75 percent—an exceptional result for an open-cup magnesium-based hydrogen tablet. These results confirms the manufacturer's performance claims, reinforcing the reliability of the product. By carefully analyzing how much magnesium is used, how hydrogen is delivered, and where losses occur, $H_2$HUBB's gas evolution testing offers a detailed evaluation of tablet performance. This level of analysis goes beyond marketing claims, providing a transparent and realistic assessment of what consumers can expect when using H2TAB hydrogen tablets.

**Safety Profile and Regulatory Validation**

Safety is a critical consideration for all hydrogen products, including hydrogen tablets. Among the various forms of hydrogen delivery, magnesium-based open-cup hydrogen tablets may be among the most demonstrably safe options currently available. This is supported by third-party testing, FDA recognition, and regulatory compliance. Notably, this specific patented hydrogen tablet is the only hydrogen supplement in the United States that is compliant with FDA regulations as an approved New Dietary Ingredient (NDI) **[1]**. In addition, these tablets have been certified to meet the standards set by the International Hydrogen Standards Association (IHSA) **[2]**, which includes comprehensive water analysis conducted by an EPA-approved laboratory. These certifications further validate the safety and quality of the product for consumer use. Beyond regulatory recognition, hydrogen tablets of this kind have been used in multiple human clinical studies, offering objective evidence of their safety and therapeutic potential **[3][4][5][6]**. Collectively, these credentials demonstrate that $H_2$ tablets are not only safe for regular human consumption but also scientifically supported in their application as a hydrogen health supplement.

Overall, the H2TAB hydrogen tablet is a well-formulated and efficient open-cup hydrogen product, designed to deliver a therapeutically relevant dose of molecular hydrogen in a simple and convenient format. Our independent testing confirmed that the tablet consistently produces high concentrations of hydrogen and delivers an effective hydrogen dose exceeding 5 mg per tablet, which aligns closely with the manufacturer's stated performance claims. The tablet also demonstrated strong hydrogen utilization with minimal losses, validating its practical effectiveness beyond just concentration metrics. Based on our evaluation, the H2TAB tablet exceeds $H_2$HUBB's minimum performance standards and, in our professional opinion, is a safe, reliable, and effective method for hydrogen water supplementation. We are confident in the product's performance and overall utility for everyday use.




**Approved By: Tywon Hubbard**

Tywon Hubbard

CEO, $H_2$HUBB LLC