



# ELECTROLYSIS

Production of electrolytically reduced hydrogen-rich deuterium depleted water

Facilitated by Water Ionisers

Telluricaquarian™ - TDW™

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The Brand of water "Kangen Water™" coined by the private company Enagic® is not commonly recognised for having the property of deuterium being partially depleted.

In Chemistry, electrolysis is quite literally used to both separate isolate and also concentrate deuterium.

Alkaline Water Electrolysis is the form of water electrolysis that is occurring within a water ioniser.

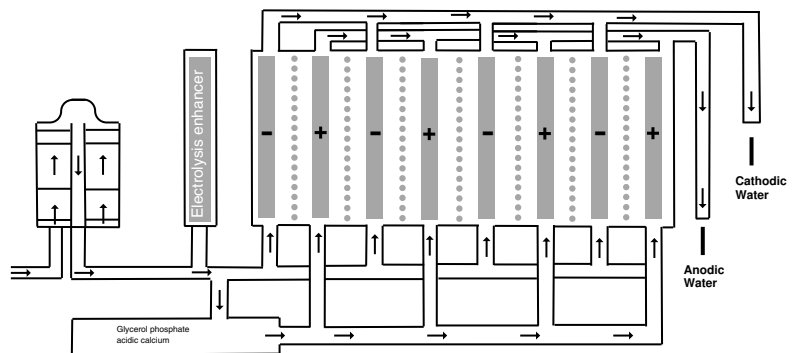
The Particular Water Ioniser range of concern that is discussed and recommended is that provided by Enagic®, namely the "Level UK" Range.

(Information) 2025.

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Contact on Instagram

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## Schematic E.g of Water ioniser with 8 electrodes

4 Cathodes & 4 Anodes

Medical Device: Level UK Kangen 8

There are two streams in which the post electrolytic waters are separately flowed into.

The products of which can be referred to as "Cathodic Water" i.e Catholyte and "Anodic Water" i.e Anolyte.

(Prof. Ignat Ivanov Ignatov et. al)

Cathodic Water in a water ioniser can indeed be partially depleted of deuterium as a byproduct of electrolysis, where protium is preferentially reduced and released as hydrogen gas.

However, the level of deuterium depletion in this process is relatively modest compared to industrial methods designed specifically for this purpose.

On the following page we will cite some evidence as to different texts and professionals giving credence to the fact that electrolysis partially depletes deuterium.



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# Deuterium Depletion Via Water Electrolysis

## Water Electrolysis for Deuterium Depletion

Creating Electrolytically Induced Hydrogen-Rich Deuterium Depleted Water

As highlighted below from the book “Let’s Defeat Cancer! The Biological Effect of Deuterium Depletion” by Gabor Somlyai

### HOW TO PRODUCE DEUTERIUM DEPLETED WATER AND HOW TO MEASURE ITS D-CONTENT?

The production of water of a decreased deuterium content is based on the differences between the physical and chemical characteristics of normal water ( $H_2O$ ) and heavy water ( $D_2O$ ). When producing Dd-water, we made use of the fact that as a consequence of the difference in volatility, at the boiling point of normal water, the steam in equilibrium with the liquid contains approximately 2.5 percent less deuterium than the liquid phase. Repeating this evaporation – which in industrial quantities happens in distilling towers – the deuterium content of water may be decreased to preference.

Using this method we produce water of a deuterium content anywhere between 25 and 110 ppm. **The other frequently used method is based on the fact that in the hydrogen gas developing during the electrolysis of water, deuterium concentration is 1/3 to 1/9 of that of water.** Hydrogen thus gained oxidised (with oxygen) makes water with a depleted deuterium content. With this more expensive method, by repeated electrolysis, any D-content can be reached relatively easily.

The definition of the deuterium content of Dd-water was carried out in an infrared domain corresponding to the O–D oscillation of the HDO molecule containing a D-atom, by measuring the intensity of the adsorption summit at 4  $\mu m$  wave length. After calibrating, using standard patterns of known D-content with the Foxboro Miran 1A CUV spectrophotometer, deuterium content can be defined with an exactness of  $\pm 3$  ppm. Using the mass spectrometric technique an even greater exactness can be achieved.

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Excerpt from Let's Defeat Cancer! The Biological Effect of Deuterium Depletion

In the Book Mr. Somlyai expands on how to deplete deuterium citing electrolysis as a method of depletion

**“The other frequently used method is based on the fact that hydrogen gas developing during the electrolysis of water deuterium concentrations 1/3 to 1/9 of that of water..”**

The significant part mentioned here is that the hydrogen gas that forms contains much less deuterium compared to form water it was electrolysed from.

This difference in concentration is useful for separating deuterium from normal hydrogen.

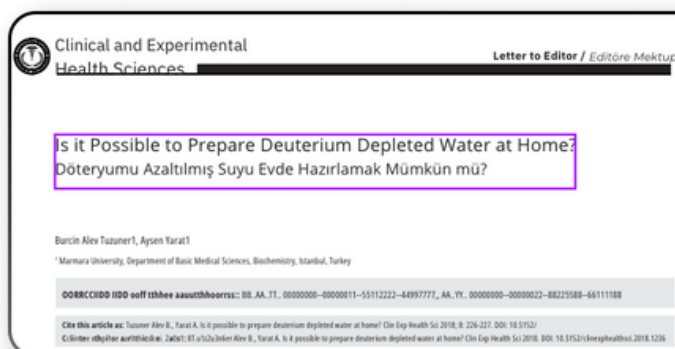
### 2.8.3. Electrolysis

Electrolysis of water produces hydrogen gas at the cathode, which contains a lower proportion of deuterium than the original water. The isotope effect stems from the

Excerpt from Radiochemistry and Nuclear Chemistry

When water undergoes electrolysis, hydrogen gas forms at the cathode (the negatively charged side). This hydrogen gas has less deuterium (a heavier form of hydrogen) compared to the original water. The reason for this is called the “isotope effect.” It happens because normal hydrogen ( $H^+$ ) and deuterium ( $D^+$ ) separate from water at different speeds. They also react at different speeds. They also react at different rates when they turn back into neutral hydrogen atoms. So, this process is based on how quickly these two types of hydrogen behave during electrolysis.

Below is a paper that was written specifically on the use of electrolysis for the intents and purposes of depleting deuterium



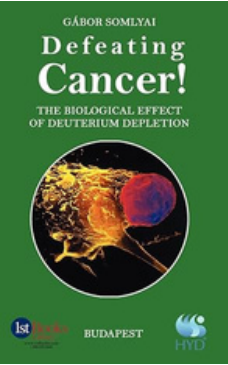
Excerpt from article written by Burcin Alev Tuzuner & Aysen Yarat membes of Medical Science & Biochem Faculty marmara university

Amongst the mention of using temperature, isotopic vacuum distillation technique the electrolytic process is mentioned - of which lowers the ppm of deuterium concentration the most out of the listed techniques in this article.



# Deuterium Depletion Via Water Electrolysis

## PPM Content of Deuterium in Kangen Water



Using this method we produce water of a deuterium content anywhere between 25 and 110 ppm. The other frequently used method is based on the fact that in the hydrogen gas, developing during the electrolysis of water, deuterium concentration is 1/3 to 1/9 of that of water. Hydrogen thus gained oxidised (with oxygen) makes water with a depleted deuterium content. With this more expensive method, by repeated electrolysis, any D-content can be reached relatively easily.

Using the above ratio postulated by Gabor Somlyai i applied this ratio to an electrolyzer with 8 platinum coated electrodes and asked thet below question:

Written by Dr. Gábor Somlyai  
Published 2002

I asked ChatGPT how much deuterium would be depleted if and when an electrolyzer with 8 electrodes ( the amount had in the device i recommend ) using the ratios outlined by Dr. Gabor Somlyai (1/3 to 1/9 of deuterium being depleted) and what the resulting ppm would be hypothetically according to these guidelines.

According to Gábor Somlyai's findings, during the electrolysis process, the deuterium concentration in the hydrogen gas produced is significantly reduced —ranging from 1/3 to 1/9 of the original deuterium content in water. This implies that the resulting deuterium concentration in the water being electrolyzed decreases significantly after each cycle.

Key Details:

- Starting Deuterium Concentration in Water:
- Natural water typically contains about 150 ppm deuterium.
- Deuterium Fractionation Ratio:
- Gábor Somlyai's work indicates that the hydrogen gas produced via electrolysis has a deuterium concentration reduced to 1/3 to 1/9 of that in the water. This implies that the water remaining after electrolysis becomes increasingly deuterium-depleted.

Implications for Deuterium Concentration in Water:

- If the hydrogen gas produced during electrolysis is depleted by a factor of 1/3 to 1/9, the water's deuterium content will decline as electrolysis progresses.
- The exact resulting deuterium concentration in the remaining water depends on:
  - The total volume of water processed.
  - The efficiency of deuterium removal per cycle.
  - Whether repeated electrolysis is performed.

Estimated Resulting Deuterium Content:

Using Somlyai's range:

- If deuterium content reduces by 1/3 of the original 150 ppm per cycle:
  - New Deuterium Content= $150 \times (1 - \frac{1}{3}) = 100 \text{ ppm}$ . \text{New Deuterium Content} = 150 \times \left(1 - \frac{1}{3}\right) = 100 \text{ , } \text{ppm}.
- If deuterium content reduces by 1/9 of the original 150 ppm per cycle:
  - New Deuterium Content= $150 \times (1 - \frac{1}{9}) = 133.3 \text{ ppm}$ . \text{New Deuterium Content} = 150 \times \left(1 - \frac{1}{9}\right) = 133.3 \text{ , } \text{ppm}.

For a single electrolysis cycle, the deuterium content is expected to drop to 100–133 ppm.

Impact of Using 8 Electrodes:

Using multiple electrodes (e.g., 8 platinum-coated titanium electrodes) primarily speeds up the process of electrolysis and ensures uniform water processing. However, it does not fundamentally change the fractionation efficiency or deuterium separation ratio. The resulting deuterium concentration would still be in the 100–133 ppm range after a single cycle.

Further Depletion via Repeated Electrolysis:

Repeated electrolysis cycles can further reduce the deuterium concentration, potentially bringing it down to the 25–50 ppm range, depending on the setup and processing time.

Conclusion:

Based on Gábor Somlyai's findings, the electrolyzed water after one cycle with 8 electrodes will likely have a deuterium concentration between 100 and 133 ppm. With additional cycles, the concentration can be reduced further.



# Deuterium Depletion Via Water Electrolysis

## Biological Effects of Deuterium

Sourced: Jaemoon Yang



**FIGURE 5.1** Effect of  $D_2O$  concentration on plant growth. Reprinted with permission from AAAS: Katz JJ, Crespi HL. *Science* 1966;151:1187.

As indicated in the left figure -

“Increasing the deuterium concentration inhibited the growth; at concentrations up to 50% flowering and berry formation occurred, but in the more highly deuterated plants, the berries were smaller and contained fewer seeds. At a concentration 60% no flowering occurred..”

Interestingly enough - the rapid and potential reached in plant growth from the water with lesser amounts of deuterium can also give credence to a fringe field known as “electroculture” specifically the use of electrolysis water to foster better horticultural & agricultural results.

## “Functions of Heavy Water in Living Organisms

Sourced: Jaemoon Yang

Heavy Water has been shown to markedly curtail the growth of biological organisms - “tobacco seeds did not germinate at all in heavy water, half of the seeds weakly sprouted when returned to normal water (light water). The germination time was twice as long as in 50% heavy water than in pure light water. It was also reported that the growth rate of yeast in heavy water was approximately 1/10th of that in light water.

“Heavy water is difficult for the kidneys to filter and discharge, therefore, it accumulates in the body. Its physiological effects became evident when the heavy water concentration was raised to 20-25%. the mice became extremely agitated and suffered convulsions, and tumor was formed all over the body.”

“Reproductive function was also markedly curtailed. The fetal survival rate when heavy water was administered to female mice for 7 days before mating was dependent upon the concentration of heavy water administered.





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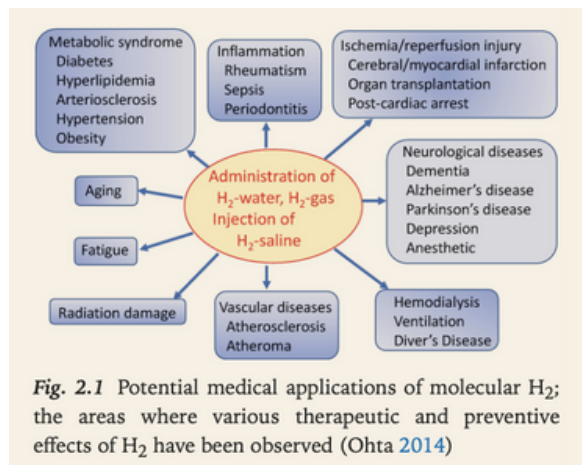
## PPM Content of Hydrogen in Kangen Water

How much hydrogen is produced and thus saturated into the cathodic water from an electrolyzer with 8 platinum coated titanium electrodes?

Approximately, the cathodic water from an electrolyzer with 8 platinum-coated titanium electrodes can reach a maximum saturation of about 17 ppm (mg/L) of dissolved hydrogen under standard conditions (1 atm pressure, 25°C, and enough time for saturation to occur). However, the actual amount may vary slightly based on:

- Current and time of electrolysis (higher current or longer time can increase dissolved hydrogen temporarily).
- Water temperature (colder water holds more hydrogen).
- Water flow rate (static water allows more hydrogen to saturate).
- Excess gas escaping (not all hydrogen dissolves; most forms bubbles and escapes).

In most practical setups, the dissolved hydrogen will range between 10-17 ppm, with 17 ppm being the upper limit.



What is the therapeutic ppm dosage of hydrogen according to studies and references support therapeutic dosages of dissolved hydrogen in water

Studies and References Supporting Therapeutic Dosages of Dissolved Hydrogen in Water

1. Nakashima-Kamimura et al. (2009): "Molecular hydrogen alleviates nephrotoxicity induced by an anti-cancer drug cisplatin without compromising anti-tumor activity in mice."

- Summary: This study showed that drinking water containing dissolved hydrogen at **0.8 ppm reduced nephrotoxicity in mice treated with cisplatin.**
- Reference: Nakashima-Kamimura, N., Mori, T., Ohsawa, I., Asoh, S., & Ohta, S. (2009). "Molecular hydrogen alleviates nephrotoxicity induced by an anti-cancer drug cisplatin without compromising anti-tumor activity in mice." *Cancer Chemotherapy and Pharmacology*, 64(4), 753-761. [Link](#)

2. Ohsawa et al. (2007): "Hydrogen acts as a therapeutic antioxidant by selectively reducing cytotoxic oxygen radicals."

- Summary: The researchers demonstrated that inhaling hydrogen gas (1-4%) or consuming hydrogen-dissolved water at 0.8 ppm reduced oxidative stress in rat models.
- Reference: Ohsawa, L., Ishikawa, M., Takahashi, K., Watanabe, M., Nishimaki, K., Yamagata, K., ... & Ohta, S. (2007). "Hydrogen acts as a therapeutic antioxidant by selectively reducing cytotoxic oxygen radicals." *Nature Medicine*, 13(6), 688-694. [Link](#)

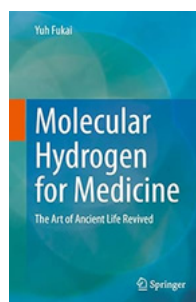
3. Nakao et al. (2010): "Hydrogen-rich water intake may have an antioxidative effect in individuals with potential metabolic syndrome."

- Summary: This clinical study found that drinking hydrogen-rich water at 1.2 ppm for 8 weeks improved metabolic syndrome parameters in humans.
- Reference: Nakao, A., Toyoda, Y., Sharma, P., Evans, M., Guthrie, N. (2010). "Effectiveness of Hydrogen Rich Water on Antioxidant Status of Subjects with Potential Metabolic Syndrome—An Open Label Pilot Study." *Journal of Clinical Biochemistry and Nutrition*, 46(2), 140-149. [Link](#)

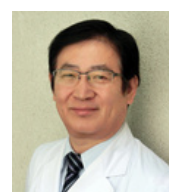
4. Nakao et al. (2012): "Effects of hydrogen-rich water on aging periodontal tissues in rats."

- Summary: The study found that daily consumption of hydrogen-rich water at 1.6 ppm reduced oxidative stress and inflammation in periodontal tissues of aged rats.
- Reference: Nakao, A., Toyoda, Y., Sharma, P., Evans, M., Guthrie, N. (2012). "Effects of hydrogen-rich water on aging periodontal tissues in rats." *Scientific Reports*, 2, 360. [Link](#)

the 17 ppm of dissolved hydrogen that could be achieved in cathodic water using an electrolyzer with 8 platinum-coated titanium electrodes would substantially surpass the 0.8 ppm concentration of dissolved hydrogen used in the cited study by Nakashima-Kamimura et al. (2009).



sourced from this book  
by Dr Yuh Fukai



Dr. Shigeo Ohta



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