

FreshWater Piëzoelectric Water Ionization: A Simple and Cost-Effective Method for generating High-Quality Water.

Water improvement with nature as a guideline.

Laurens Hanemaaijer, Bachelor of Applied Science, Associate Scientist, Freelance Water Resarcher

Water

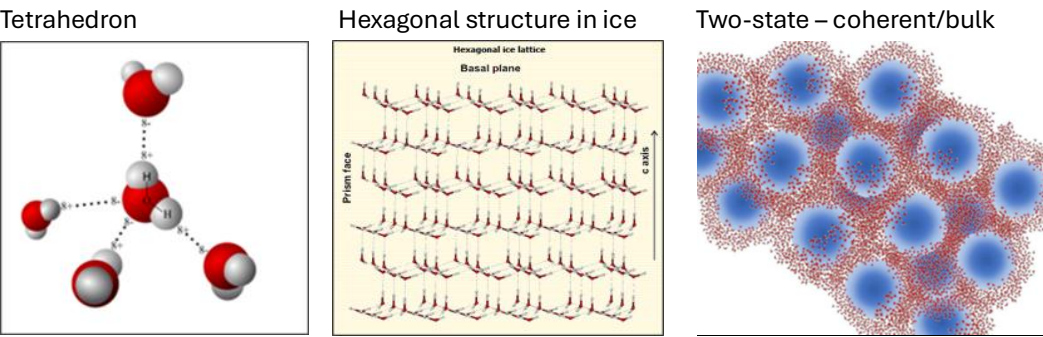
Compared to water in human infrastructure, water in nature moves in natural patterns (meandering) and vortexes: **Fluid dynamics**. Water experiences friction (piezoelectric effect) and implosion: **Ionization**. And molecules oscillate at natural electromagnetic frequencies, including cosmic and geomagnetic: **Information**. These conditions shape water and are vital to its life-sustaining properties.

Water reacts strongly to its environment; therefore, it's important to take this into account. Depending on the treatment conditions and the surrounding environment, water can have life-sustaining or life-threatening properties.

A point of attention for human infrastructure. Water **cannot flow naturally** here. It flows through **sharp bends** or **stands still**, experiences **little to no ionization**, and is exposed to **unnatural** electromagnetic frequencies (information).

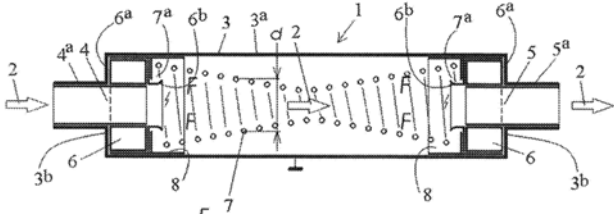
Molecular properties

Dipole: both a hydrogen donor and an acceptor.
Amphoteric: (acting as both an acid and a base) allows for self-ionization ($2\text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+$ and OH^-). Piezoelectrically induced water ionization promotes the dissociation of H_2O molecules.
Structure: Water molecules are "stackable" via dipole interactions (hydrogen bonds).
Two-state: coherent and bulk water.
Coherent domain: group of water molecules that vibrate at electromagnetic frequency.



Water improvement guided by nature. FreshWater - Fluid dynamics, piezoelectricity, and information applied.

Fluid dynamics, a spiral in a double diabolo shape creates cascading fluid dynamics and generates a vortex and piezoelectric effect.
Piezoelectricity is the ability of certain materials (such as quartz crystals, ceramics, polymers, composites, bone, DNA, polysaccharides, and various proteins) to generate an electric charge when subjected to mechanical stress. The piezoelectric effect generates an electric field that allows for piezocatalysis, a process in which electricity drives chemical reactions, and electroporation, high-voltage electrical pulses, which create temporary or permanent pores in cell membranes of microorganisms. Wherever in nature water flows, it experiences friction in relation to, for example, sand (quartz). **In for mation** – as a result of fluid dynamics and piezoelectric treatment, water molecules interact better with life-enhancing information (frequencies).
FreshWater patented technology: WO2021154074



Literature and practice

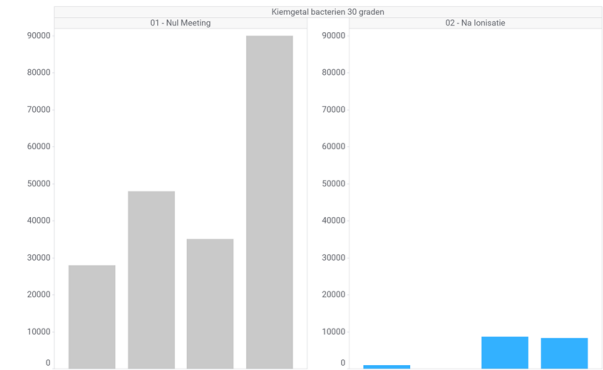
Can you measure if water is of "good" quality? Not necessarily. You can measure all sorts of physical and chemical properties of water, but only when it interacts with a living system in a specific application can you tell if it's good for that purpose.

Piezoelectricity - Optimization of water quality (microbiological/chemical).
Literature studies report: degradation of organic pollutants (e.g. enrofloxacin, rhodamine B, benzothiazole, metronidazole, PFAS) under the influence of piezocatalysis and reduction of microorganisms (e.g. >99% E. coli inactivation).

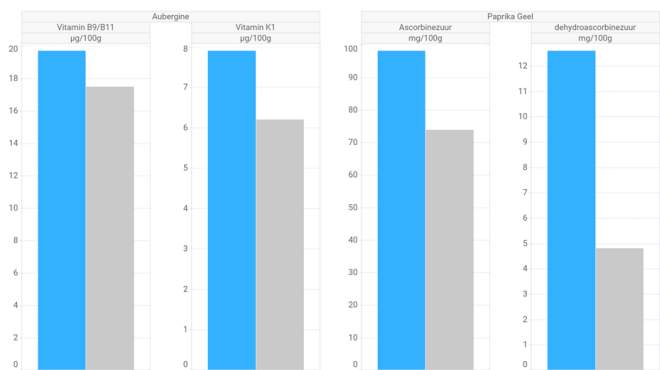
Water improvement with FreshWater in practice



Basin – clear water after 7 days of treatment (left). Right treatment started.



Bacterial count basin water 4 different companies. Significant reduction of germ count compared to T0 (grey).



Ingredients: Eggplant and Yellow Pepper. Increase in ingredients compared to reference (grey).

Various companies are observing **healthier plants or animals**, **cleaner pipes** and a **reduction** in the use of **hydrogen peroxide**, for example.

Conclusion

Water in human infrastructure experiences completely different conditions than water in pristine nature. Both an understanding of water in a natural environment and at the molecular level implies that there are many applications of natural water improvement, based on one or more of three principles: fluid dynamics, the piezoelectric effect, and in for mation. The FreshWater device, including the piezoelectric effect, is a simple and cost-effective method for obtaining high-quality water, widely applicable to modern water challenges. Practical results demonstrate a clear difference between the FreshWater treatment and baselines or references. The treated water results in cleaner water, with for example, an impact on fruit quality. In comparison, traditional disinfection methods often generate harmful disinfection byproducts, require significant amounts of chemicals or energy, or struggle with antibiotic-resistant pathogens. Piezoelectric disinfection avoids many of these disadvantages by converting mechanical energy into an electrical charge.

Stewardship Business case: Simple, cost-effective and energy-free water improvement (reduction of micro-organisms, chemical pollution and pesticide use) resulting in water with better life-supporting and promoting properties.