

⊕ ANALYTICAL TEST RESULTS ⊕

Hydration Specialties™ Structured Water

Introduction

The purpose of the testing program was to characterize the unique properties of **Hydration Specialties Structured Water (HS S W)** in contrast with other waters and to explain the potential effects of these characteristics upon human physiology. *There is no standard test to measure the molecular state of water.*

Methods

Hydration Specialties Structured Water, tap, electrolyzed, chemically additive, mineral and other bottled waters were analyzed by accredited laboratories for the measurement of such physical properties as conductivity, boiling point, viscosity, surface tension, and Nuclear Magnetic Resonance signature.

Results

Laboratory analyses indicate that Hydration Specialties Structured Water has a unique combination of consistent boiling point, lower viscosity, and excellent conductivity signature.

NMR signature demonstrated the HS SW has a lower vibrational frequency measured in Hertz (Hz).

These results all indicate a 'wetter', or 'thinner' water, exhibiting the physical characteristics of smaller clusters of water molecules.

Conclusions

Theoretically, these properties enhance rapid cellular absorption, thereby inducing true hydration and creating an effective biological delivery agent.

Smaller clusters of water molecules enhance transport across cell membranes, promoting intracellular hydration, and removal of metabolites.

Testing Sites and Measurements

Surface tension, viscosity & conductivity:

Truesdail Laboratories, Inc., Tustin, CA

Method: Truesdail Laboratories analyzed these waters in accordance with ASTM Method D-445 for viscosity and ASTM Method D-1331 for surface tension, and ASTM Method B-2510 for conductivity.

Boiling point analysis:

West Coast Analytical Service, Inc., Santa Fe Springs, CA

Method: WCAS analyzed these waters in accordance with USP 24 Method 721 for boiling point.

Nuclear Magnetic Resonance spectrometry:

Acorn NMR Laboratory, Livermore, CA

Method: Oxygen Isotope 17 method

All laboratories implemented industrial quality assurance and quality control standards to obtain their results. In all instances only sample number identified test samples, so the test operator had no knowledge of sample identity.

The results and significance of each test are presented below.

The Importance of Water to the Human Body

The basic living unit of the body is the cell. These cells are all 'bathed' inside and outside with water. The body is 70-75 % water by weight. The water inside the cell is called **intracellular water**, whilst that outside is referred to as **extra cellular water**.

The water molecule may seem a simple inorganic molecule, but it plays a critical part in life's functions. Water is an active participant in ALL biochemical and metabolic reactions within the cells. Without an adequate supply of water, these reactions are compromised or simply do not take place.

The hydrogen and oxygen atoms of water are joined by **polarized covalent bonds**. This polarization allows water molecules to form hydrogen bonds with other water and polarized molecules. It is the prevalence of this ability that causes water to become bound in large macromolecules.

These large arrays of bound water are highly restricted from passing through the cellular membrane. Hydration Specialties' process structures water by **breaking a portion of these hydrogen bonds**. This results in **smaller clusters of water molecules with reduced surface tension or cohesion**. This lower surface tension enables HS S W to saturate the intracellular area more rapidly and more efficiently.

Cellular Absorption and Detoxification

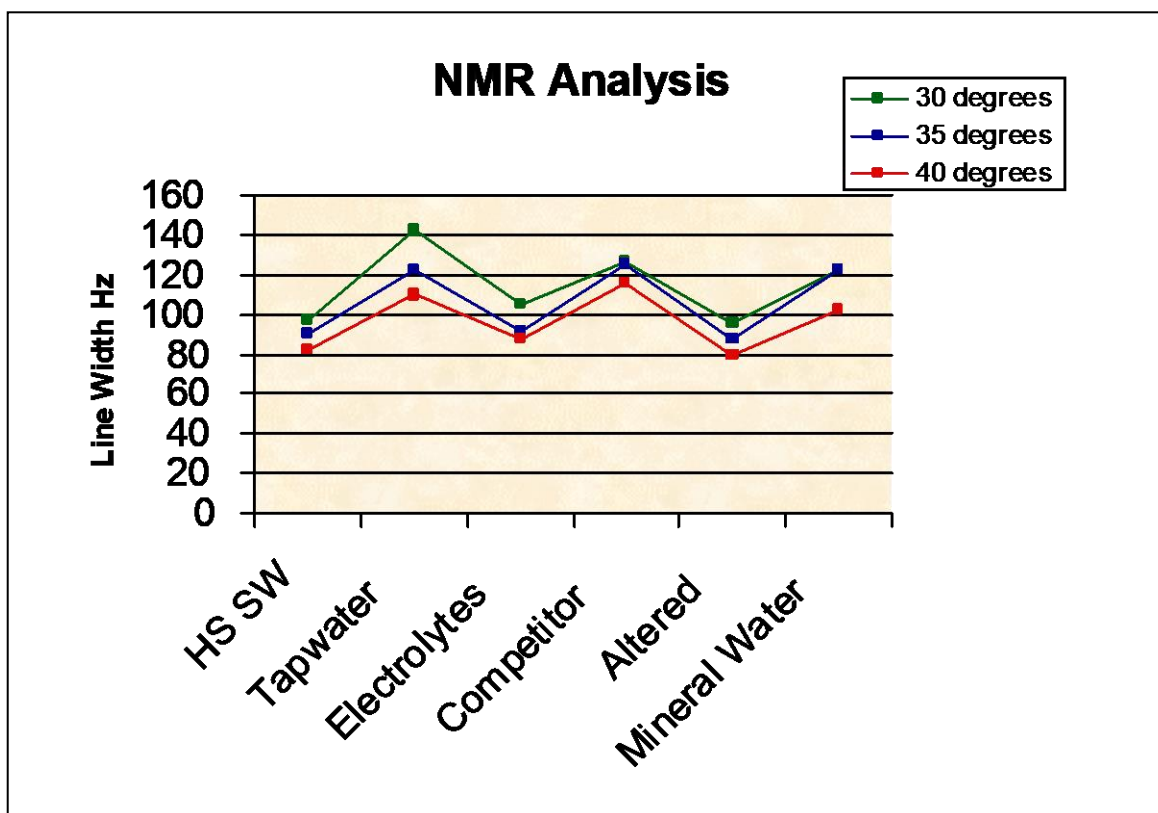
The water that we drink differs substantially from the bound water that surrounds the tissue and cells in the body. It is necessary for the body to reduce the surface tension of water we consume in order for the nutrients to pass through the cell membrane and so metabolites (waste products) can be excreted from the cell. Water molecule cluster size is a relative indication of surface tension. Smaller water clusters have relatively less cohesion as a result of a fewer number of hydrogen bonds between the individual water molecules. The surface tension is decreased because the water clusters are smaller.

NMR

Hydration Specialties Structured Water has the unique physical properties associated with 'smaller water clusters' as measured by nuclear magnetic resonance.

NMR is a spectroscopic technique, which uses **electromagnetic radiation and magnetic fields to determine the structure of molecules**. RF radiation is used to stimulate the nuclei present within the molecule and from the information obtained by this process the location of the hydrogen and carbon atoms can be accurately determined. The principle of NMR is based upon the spin of atomic nuclei in an external magnetic field.

NMR Test results for Hydration Specialties Structured Water is displayed below:



NMR Test Results

Acorn NMR Laboratories in Livermore, CA

NMR studies were performed on:

- HS SW
- Electrolyzed water
- Chemically altered water (using additives)
- Mineral water
- Tap Water
- Miscellaneous bottled water

The NMR signal is displayed graphically by a single peak or line, measured in hertz (Hz), with the width of the peak being the determinant factor. In a solution, the larger the molecular clusters (i.e. the more hydrogen bonds), the rotational diffusion, or spin, is slower. This results in an NMR signature with broader peak or line width. **The smaller the clusters of molecules then the narrower the peak or line width.**

Therefore, the significance of the line width is as a determinant of relative size of molecular clusters in the respective samples. As the graph so vividly illustrates, the peak or line width for HS SW suggest reduced cluster sizes relative to all other samples save for the two with chemical additives. The additives in these two sample waters were primarily metasilicates, known for their ability to act as a catalyst to chemically enforce the reduction in hydrogen bonding, thereby inducing the property of smaller aggregate clusters.

HS SW uses neither chemicals nor additives of any kind to achieve their unique physical properties of smaller water clusters as measured by NMR 17o. The smaller clusters of Hydration Specialties water are able to saturate the cell more rapidly and thereby enhance the absorption and detoxification of the cells' fluid volume.

CONDUCTIVITY

Truesdail Laboratories, Irvine CA

Conductivity is the **ability of an electrical current to pass through a medium**. Electrical conductivity in water is a measure of the ion facilitated electron flow through the water. The concentration of these ions is the factor that dictates the level of conductivity.

Every function occurring in the body requires communication from one cell to another. These messages are conducted by the passage of electrons through our extra-cellular fluids. **An optimal level of conductivity in these fluids is essential to life and cellular activity.**

The standard method ASTM 2510-B procedures specify conductivity measurements as criteria for characterizing water. In addition to defining the test protocol, ASTM 2510-B sets performance standards for the conductivity measurement system, as well as validation and calibration requirements for the meter and conductivity.

Conductivity Test Results

The conductivity of Hydration Specialties Structured Water is as expected from a non-electrolyte fortified water. The Conductivity measurement of 365 ($\mu\text{mhos/cm}$) indicates an excellent level of physiological conductivity.

BOILING POINT ANALYSIS

West Coast Analytical Service, Inc. Santa Fe Springs, CA

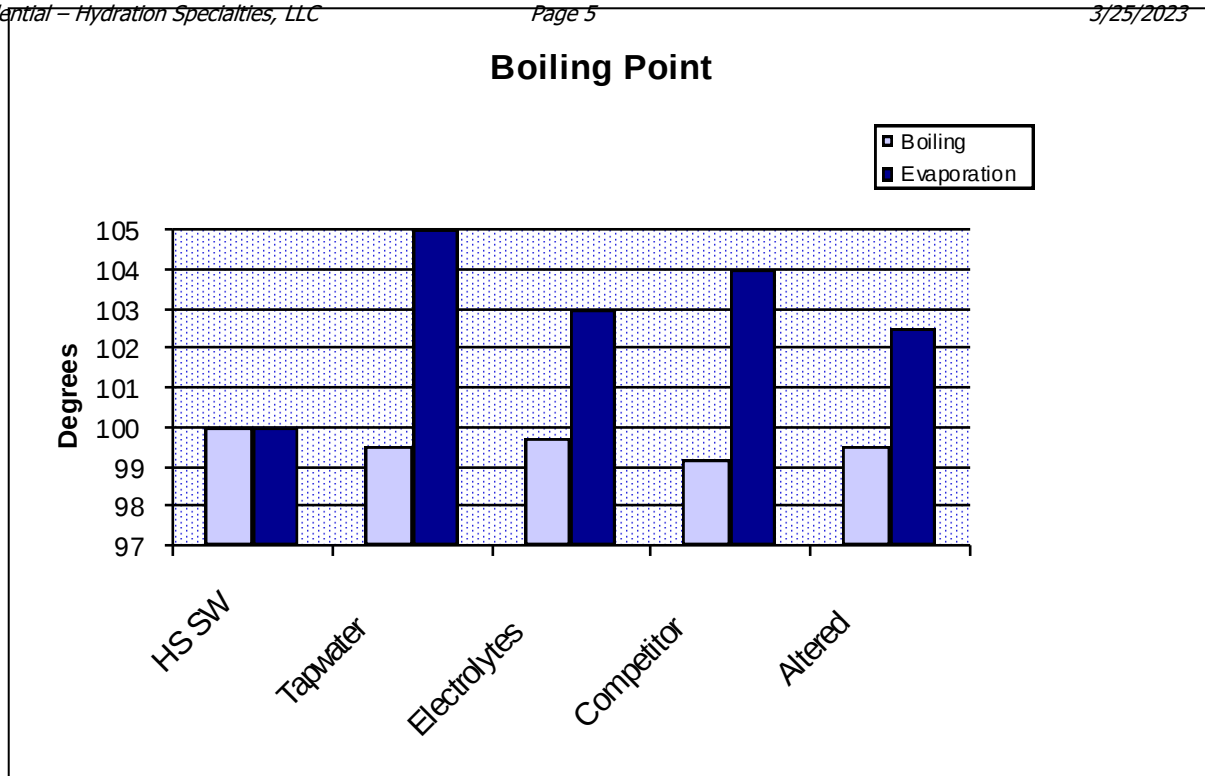
Distillations were carried out on

- HS SW
- Chemically altered water (using additives)
- Electrolyzed water
- Mineral water
- Miscellaneous bottled water

Distillation is a classical method of evaporation through applied heat to determine the range of temperatures within which a liquid distills.

Boiling Point Test Results

The test results, expressed in degrees Centigrade as a distillation range, are graphically displayed below and show a marked difference in the characteristics of these waters.



The lower limit of the range, or the initial boiling point, is the temperature indicated by the thermometer when the first drop of condensate leaves the tip of the condenser. The upper limit of the range is the Dry Point, the temperature at which the last drop of liquid evaporates from the distillation flask.

The wider the range of distillation directly correlates to more substances in the solution. The higher the upper limit, or Dry Point, in the range is indicative that some component(s) is present that is preventing the liquid from complete evaporation.

HS Structured Water was unique in that it began boiling and completely evaporated immediately at the same temperature. **These boiling characteristics indicate an extremely pure substance, with uniformity in the internal composition of materials.** This is intuitively the distillation profile one would expect from a material that has a consistent, uniform structure. **This data strongly suggests the presence of the smaller, well ordered, cluster of water molecules.**

These test results are highly significant and indicates that the HS SW exhibits substantially different behavior from the other waters tested.

The data illustrates that the Hydration Specialties structured water possess characteristics and physical properties substantially different relative to the other waters. **The boiling point profile for HS SW strongly suggests the presence of a consistent cluster size.** This also suggests that the structured water process has changed the compositional make-up of the molecular structure.

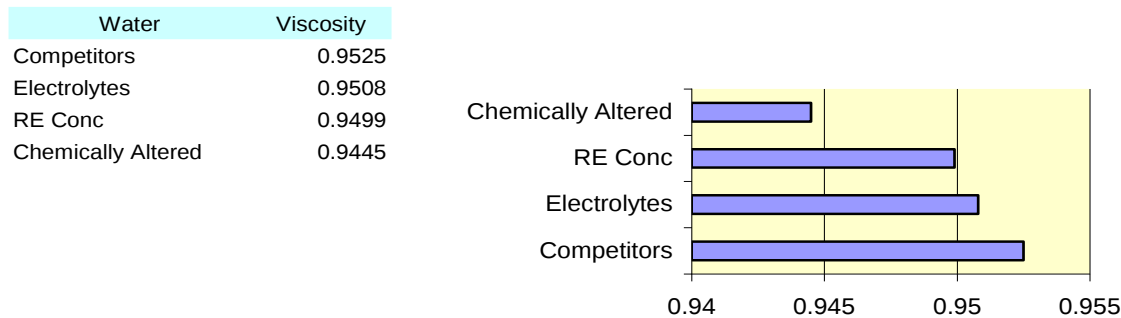
VISCOSITY

Truesdail Laboratories, Inc. Tustin, CA

Tested in accordance with ASTM Method D-445. In this method the time is measured in seconds for a fixed volume of liquid to flow under gravity through the capillary of a calibrated viscometer under closely controlled temperature. The kinematical viscosity is the product of the time and the calibration constant of the viscometer. The calibration constant of the viscometer is determined by running certified standard solutions of known viscosity.

Viscosity Test Result

The results of the viscosity test are presented graphically below. Again, the results indicate a necessary marked difference in composition between HS SW and the other waters tested. The behavior of the Hydration Specialties Structured water is so significantly varied as to again demonstrate that it has unique physical properties.



Viscosity is a measure of the resistance to flow in a fluid. In the analysis performed, the higher the number, the greater the viscosity. The more viscous the fluid, the more resistance to flow and hence, the slower the flow.

Water is a means of transportation in the body; a vehicle by which nutrients are carried to the cells throughout the body and waste is carried away. Ideally, the less viscous the water, or the 'thinner' or 'wetter' the water is, the more rapidly it can perform its biological functions. This comparison indicates that HS SW exhibits the characteristics of 'thinner or wetter' water, which is consistent for water with a structure of smaller molecular clusters.

Two other samples also showed reduced viscosity, but both contain chemical additives, which enforce a modified structure onto the solution. HS SW contains no chemicals or additives of any kind.

SURFACE TENSION ANALYSIS

Truesdail Laboratories, Inc. Tustin, CA

The surface tension measurements are run according to ASTM Method D-1331. This method employs the use of a CSC-Du Nouy Tensiometer. The tensiometer uses a fine torsion wire to apply the necessary force to withdraw a platinum-iridium ring from the surface of the liquid under test. The torsion wire is connected to a graduated dial with a vernier scale that permits reading the applied force directly to 0.1 dyne.

Hydration Specialties Structured Water has been specifically engineered to rapidly restore intracellular fluids to their optimum state by taking advantage of the process Nature uses, the phenomenon of osmosis. Solutions that have identical osmotic pressure are said to be isotonic solutions. For optimal and rapid replenishment of intracellular fluids, the replenishing fluid must be isotonic with intracellular fluids.

For example, if cells are bathed in a hyper tonic solution, which is a solution having osmotic pressure higher than that of intracellular fluids, the cell will shrivel and because of a net transfer of water out of the cell. The opposite situation occurs when cells are bathed in a solution with an osmotic pressure lower

than that of the intracellular fluids. In this case the cells rupture because of the net flow of water into the cell.

As we age, there is a definite predisposition for the composition of body water to shift from intracellular to extra cellular. The ratio of intra to extra water content changes from approximately 1.1 to almost 0.8 between the ages of 20 to 70. The realization is that as we age, we become chronically dehydrated with a decreased ability to re-hydrate. The body then loses its reserve capacity of protein and diminishes its enzyme function. Enzyme functions are optimum only with proper hydration.

The major determinants of intracellular and extra cellular fluid volume homeostasis are separate. Sodium balance regulates extra cellular fluid volume while sufficient hydration regulates intracellular fluid volume. This suggests that the loss of intracellular water accompanying the aging process may be minimized or totally negated by an individual's conscious decision to maintain proper hydration before thirst is perceived.

Surface Tension Analysis Results

Hydration Specialties Structured Water - 67.8 dynes @ 25° C

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This Technical document has been reviewed by:



Dr. Lawrence R. Stowe, Ph. D. is actively involved in scientific and clinical research with structured water and has reviewed this document.

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