WATER ENHANCING TECHNOLOGY (WET) INDUSTRY BRIEF & BACKGROUND WATER INFORMATION

ALKALINE WATER &WET

WET GLOBAL

SUMMARY

- Water Quality Explained
- ALKALINE Water
- Reverse Osmosis
- Mimicking Alkalinity IONISATION.
- Importance of the 2003 Nobel Prize for Chemistry
- HYDROGEN AND ANTIOXIDANTS
- Academic Papers
- Scientific Advisory Board

WATER QUALITY EXPLAINED

IS OUR MOST PRECIOUS NATURAL RESOURCE CONTAMINATED

About water

Water is a truly remarkable chemical substance, which is arguably our single most important natural resource. We die if we don't consume water after a few days, whilst we can survive weeks without food.

Water appears to be unique when compared with the 15 million or so chemicals we know something about. It is its unique and anomalous properties that are probably more than anything else responsible for life on our planet. One aspect of its uniqueness that we so often take for granted without giving it thought is that the solid form (ice) is less dense than the liquid form (water). Another unique feature is that given its very low molecular weight, water would be expected to boil at around –90°C, but it doesn't! We all know that water is comprised, as its formula H_2O suggests, of two hydrogen and one oxygen atoms — but there is so much more to it than that.

WATER QUALITY EXPLAINED

Water molecule clusters

In the H_2O molecule, the single electron of each H is shared with one of the six outer-shell electrons of the oxygen (creating two covalent bonds), leaving four electrons which form two non-bonding pairs. It is the way in which the size and nuclear charge of the oxygen atom works to distort the electronic charge clouds of the atoms of other elements, when these are chemically bonded to the oxygen that gives water so many of its unique properties.

Liquid water is much more than millions of discrete H_2O molecules. It is actually a highly mobile, vibrating and forever changing cluster of water molecules where the hydrogen bonds between individual water molecules are continuously breaking and reforming.

We know that water structure, or the arrangement of the molecules in a given volume of water, varies according to many factors including temperature and pressure. We also know that the structure and properties of water within cells, particularly adjacent to membranes in cells or organelles (sometimes referred to as *vicinal water*), is very different to the structure of bulk water. The key point here is that the unique structure of water within cells is purely a result of the geometry of the surrounding hydrogen bonding sites.

WATER QUALITY EXPLAINED

Water molecule clusters

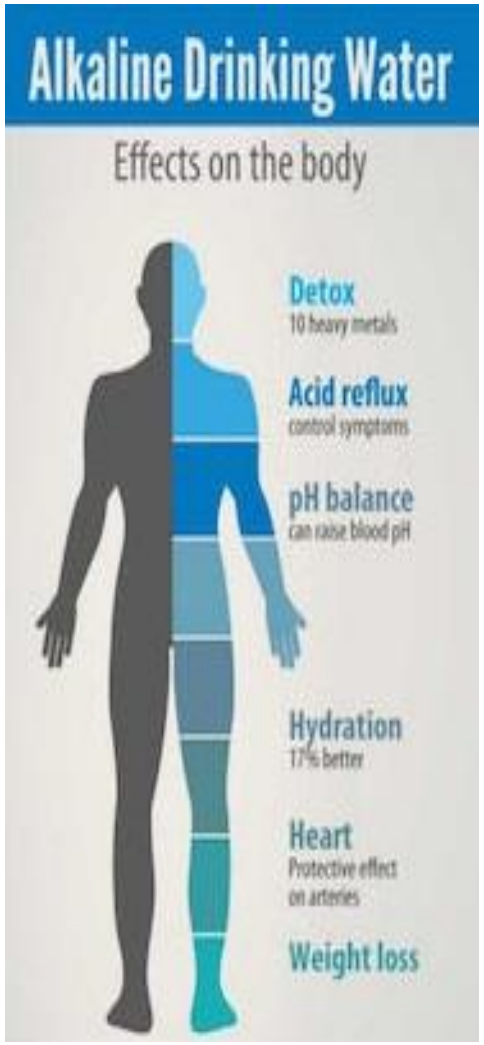
We also know that to get water into cells (*cellular hydration*); the main purpose of water consumption, there can be advantages in having smaller (via NATURAL ACTIVATION) rather than larger clusters of water. Some scientists argue that a hydrogen-bonded cluster in which four H_2Os are located at the corners of an imaginary tetrahedron is an especially favourable (low-potential energy) configuration, but the lifetime of such clusters will be incredibly brief (theoretically measurable in a picoseconds [10^{-12} second] time scale).

The bottom line is that although there are hundreds of products available which purport to provide us – often with no scientific evidence - with the right form of structured water, we should not deviate from the primary object of water in health: water should be delivered to the body to optimise its flow into the body's cells.

In addition to this, the body is almost certainly more able to deal with water in its pure state, rather than water that is loaded with contaminants, some of which have only become commonplace in our diets or water sources within the last 20 to 50 years.

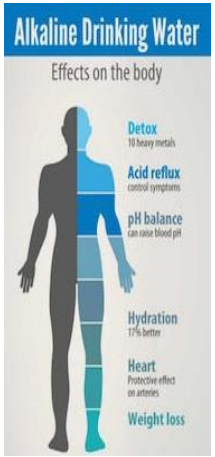
WET GLOBAL

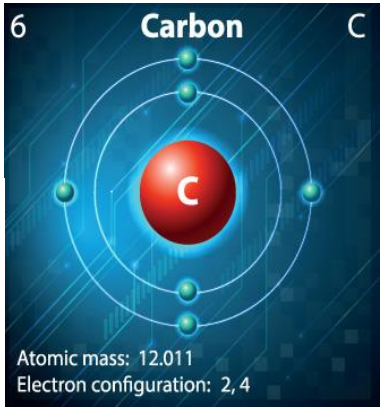
ALKALINE WATER

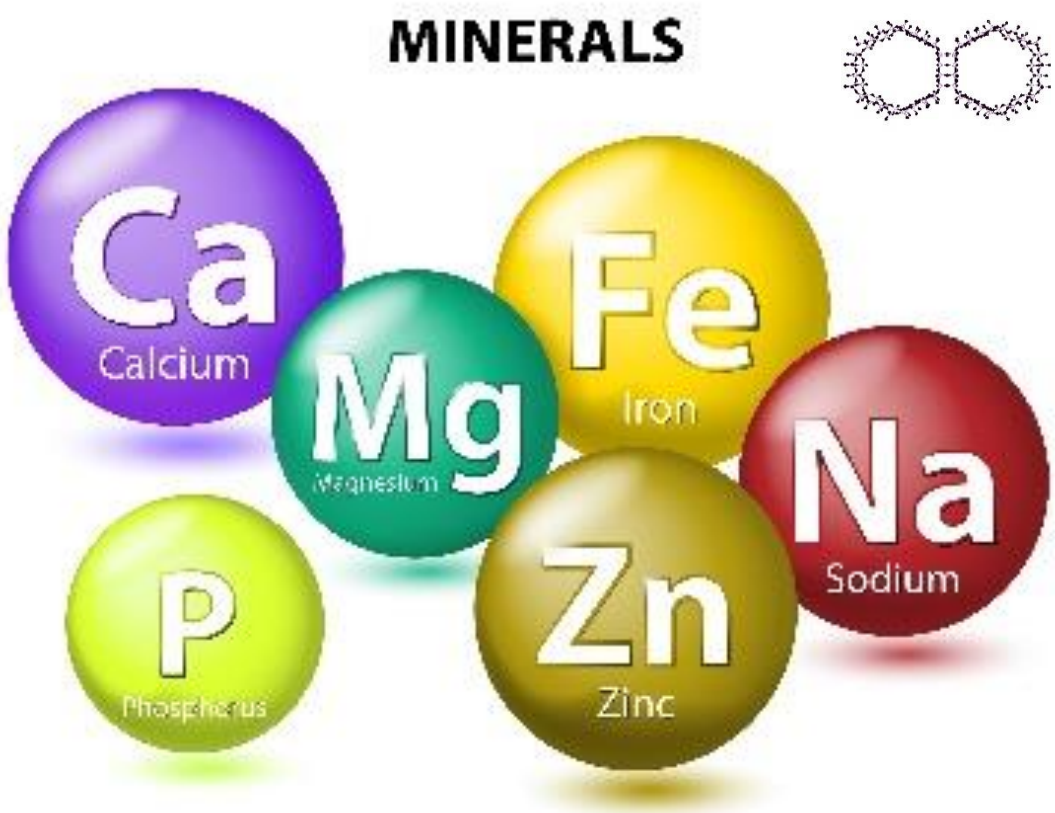


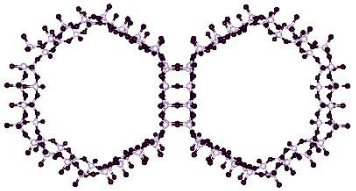
PURE IONIC WATER™

ALKALINE MINERALS









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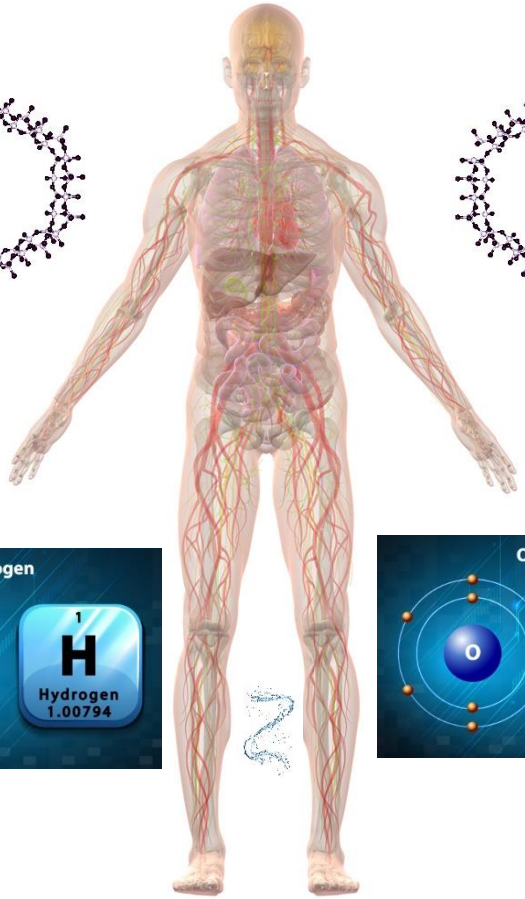

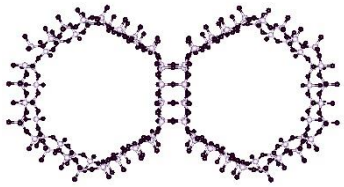

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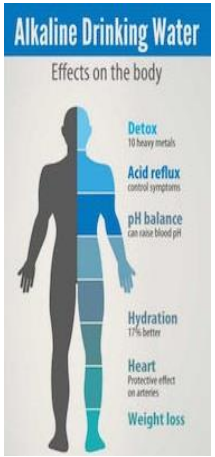
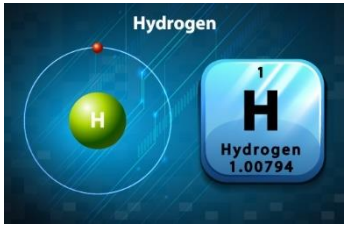
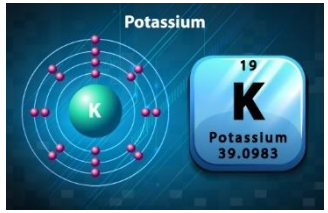
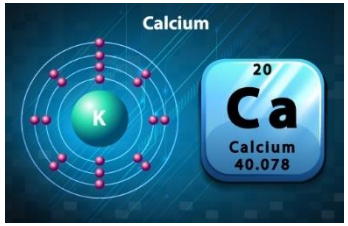








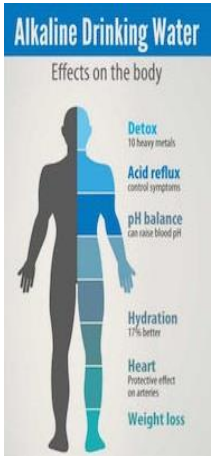
PIW HYDROGEN-RICH, NUTRACEUTICAL WATER

your body breaks down the hydrogen (using enzymes called hydrogenases) into single hydrogen ions, which seek out free radicals in your body's 37.2 trillion cells.

On the left side of the equation is magnesium and regular water. When they're combined in a certain way, the magnesium atoms will attract some of the oxygen atoms, and they will pair together. Because of this, the hydrogen atoms will split from the oxygen.
This allows them to act as bodyguards, throwing themselves into the line of fire and stopping the oxidative and aging process in trillion of your cells.
And finally, the water goes through a WET PATENTED additional stage to activate higher levels of free hydrogen

WATER QUALITY EXPLAINED

THE BENEFITS OF ALKALINE WATER

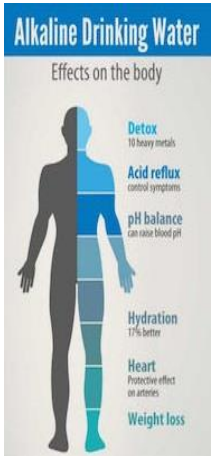


HELP KEEP YOUR BODY HEALTHY

- pH is the abbreviation for potential hydrogen. The term pH balance is used to describe the balance between alkaline and acid content in the cells and fluid in the human body. Human blood stays in a very narrow pH range, between pH7.35 - 7.45. Below or above this range means symptoms and disease. If blood pH moves to much below pH6.8 or above pH7.8, cells stop functioning and ultimately the patient dies. The ideal pH for blood is 7.4 in our bodies in order to stay healthy.
- What we eat and drink on a daily basis determines the proper maintenance of body's pH levels. A healthy pH balance is maintained by eating a balanced, natural diet.
- The typical English diet today includes many acid-supporting and toxic foods including refined grains, processed sugars, instant coffee, alcohol, carbonated drinks etc. Such a diet usually results in harmful acidic values to your core pH. pH levels that are not balanced can disrupt the working function of cells.
- Any decreasing or increasing in the pH value causes an improper enzyme work which leads to stopping some of the most important metabolic processes. An acidic core pH can result in the occurrence of many different health issues such as heart disease, cancer, osteoporosis, diabetes and heartburn.

WATER QUALITY EXPLAINED

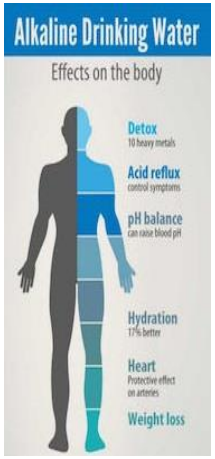
THE BENEFITS OF ALKALINE WATER



PREVENTING AN ACIDIC STATE OF DEHYDRATION

- In cases where your body spends a lot of time in an acidic state it is likely to speed up the aging process. (This partly answers why alcoholics age early). Dehydration speeds up acidic
- Dr. O H. Warburg gives the best answer for how to add nutraceutical alkalization hydration in your body naturally by using lemon and baking soda, which can be bitter and uncomfortable.
- Dr. Otto H. Warburg was a Nobel Prize winner, famous for his breakthrough in the field of medicine. He managed to find the true cause of cancer. According to Dr. Warburg, oxygen deficiency is the main factor that contributes to emergence of cancer.
- This deficiency results in an acidic state in our bodies. In addition, Dr. Warburg discovered that cancer cells are actually anaerobic and can’t live when they are exposed to high amount of oxygen which is one of the characteristics of alkaline state.

WATER QUALITY EXPLAINED



ALKALINE Drinking Water : Industry Briefing Note

ALKALINE Water is an exciting, innovative product described as a "revolutionary, a world first"[1] and "the best drinking water in the world"[2] by leading authorities on drinking water.

AES TECHNOLOGY PRODUCING PROBABLY THE HEALTHIEST DRINKING WATER AVAILABLE;

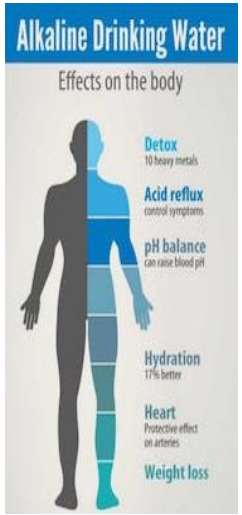
- The RO Water is free from contaminants found in most drinking water, mains supplied.
- it contains the perfect mineral profile for human consumption,
- it has optimum alkali pH for health. **WET AES** water is pH 8 to 10.5. This alkaline water helps the body maintain a healthy pH balance.
- it contains a high level of anti-oxidants and has a high negative ORP reading
- it is a natural and organic product.

SUSTAINABLE : NO WASTE, NO POWER

WET AES Water ™ is 100% drinkable, no waste is created as with the reverse osmosis or as with electrolysis 'ionisation' processes.

1 UK Government Technical Strategy Board
2 L'Italiana Aromi beverage laboratory

WATER QUALITY EXPLAINED



THE WET AE System is A 'UNIQUE WATER ENHANCEMENT activated' SYSTEM

- It is natural requiring **NO electricity** and produces **NO waste**:
- The **minerals are naturally 'infused'** into the water.
- These minerals infuse the water with **antioxidants.**
- The **mineral balance is bespoke for specific purposes,** e.g., beverages, sport & equine.
- These perfectly balanced minerals are also known as electrolytes. Common electrolytes include Calcium, Chloride, Magnesium, Phosphorus, Potassium and Sodium, many of which are low in modern diets. These electrolytes help regulate fluid balance, assist the performance of the nervous system, assist muscle recovery and support the health of joints & tendons. In summary they **maintain the healthy function of your body and assist recovery from sports**.
- Alkaline water assists your body to **maintain its pH balance**. Your core pH should be about 7.4.
- Acid reflux is prevented

BACKGROUND WATER INFORMATION ON REVERSE OSMOSIS CLEANING

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REVERSE OSMOSIS CLEANING WATER

Reverse Osmosis is a technology that is used to remove a large majority of contaminants from water by pushing the water under pressure through a semi-permeable membrane. A reverse osmosis membrane is a semi-permeable membrane that allows the passage of water molecules but not the majority of dissolved salts, organics, bacteria and pyrogens. To achieve this you need to 'push' the water through the reverse osmosis membrane by applying pressure that is greater than the naturally occurring osmotic pressure in order to desalinate (demineralize or deionize) water in the process, allowing pure water through, while holding back a majority of contaminants.

The good water that comes out of an RO system has the majority of contaminants removed and is called permeate. Between 95% & 99% of the dissolved salts are removed. The 'bad' water is the water that contains all of the contaminants that were unable to pass through the RO membrane and is known as the concentrate, reject, or brine.

An RO machine uses a considerable amount of power to operate and wastes as brine as much as 50% of the processed water, (two or more gallons of water for every gallon of purified water it produces).

BACKGROUND WATER INFORMATION

WATER IONISING MIMICKING ALKALINITY

WATER IONISERS ARE NOT ALKALINE WATER

HIGH WASTE IONISING OF WATER MIMICKING ALKALINITY

Water Ionisers are not filtration. They are also not an alkaline enhancer or as they claim a medical approved health enhancing water system.

Pure water consists almost entirely of H_2O molecules loosely bound in a network-like structure in which individual molecules are constantly changing partners. Water molecules exhibit a very slight tendency to dissociate ("ionize") into hydrogen ions and hydroxide ions:

$$H_2O \rightarrow H^+ + OH^-$$

but the extent of this reaction is severely limited by the fact that the reverse of this reaction is much more rapid, so that on the average, only about two out of every billion H_2O molecules are dissociated. No electrical device or chemical additive is capable of increasing these ion concentrations in pure water above this very minute level which is so small that for most practical purposes pure water can be considered to be ion-free, as evidenced by the fact that it will not conduct an electric current.

HIGH WASTE FORMS OF WATER FILTRATION & CONDITIONING

WATER IONISERS

Water ionisers must use pre filtration technologies and Alkaline minerals to produce any clean alkaline water. But you will lose 50% of the water as acidic waste. (it is advised that you capture this waste as the acidic water will soon revert back to its original pH form within hours. However so will the Alkaline 50%. The ORP is also only stable whilst running through the electrolysis plates.

They will raise/lower a temporary pH of water by using electrolysis to separate the incoming water stream into acidic and alkaline components. Such claims are not generally accepted in chemistry and physiology. This is an electrochemical process in which water is split to form hydrogen and oxygen by an electric current.

During this process the water near the anode is acidic while the water near the cathode is alkaline.

Water ionizers work by simply siphoning off the water near the cathode. This contains increased levels of hydroxide (OH^-) and would be expected to have a more alkaline pH.

HIGH WASTE FORMS OF WATER FILTRATION & CONDITIONING

WET GLOBAL

WATER IONISERS

Ionization is changing an atom or molecule into an “ion” by adding or removing electrons. Some hydrogen atoms are “freed” from the water. This is a natural process that will be provide a stable pH. Electrolysis is a temporary solution.

It is a temporary unnatural state and there is no empirical evidence to support the health claims made. "Ionized"/alkaline water is falsely claimed to be an anti-oxidant. It is actually an oxidizing agent, as can be seen by its ability to decolorize iodine

- The machines originally became popular in Japan and other Far Eastern countries before becoming available in the U.S. and Europe. **Electrolysis devices are generally worthless** for treating water for health enhancement, removal of common impurities, disinfection, and scale control. Claims that "ionized" waters are antioxidants are untrue; hypochlorites (present in most such waters) are in fact oxidizing agents.
- Claims that "water ionizers are approved for use in Japanese hospitals" are misleading: these "approvals" merely attest to the machines' safety — that they will not electrocute you! My understanding is that the Japanese Health Ministry is highly critical of therapeutic claims made for IONIZED water.

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WATER IONISERS

Many "water ionizer" devices depend on the addition of ordinary salt to make the water more conductive.

Electrolysis of a dilute sodium chloride solution liberates hydrogen gas and hydroxide ions at the cathode, producing an alkaline solution that consists essentially of sodium hydroxide NaOH which can be drawn off as “alkaline water”.

At the anode, chloride ions are oxidized to elemental chlorine. If some of this chlorine is allowed to combine with some of the hydroxide ions produced at the cathode, it disproportionates into hypochlorous acid HOCl, a weak acid and an oxidizing agent.

Some ionizer devices allow the user to draw off this solution for use as a disinfecting agent. In many cases the two streams can be combined to form a mixture consisting of both HOCl and sodium hypochlorite (equivalent to diluted ordinary laundry bleach), depending on the pH desired.

HIGH WASTE FORMS OF WATER FILTRATION & CONDITIONING

WATER IONISERS

But if you are drinking electrolytic ally-produced "ionized" water, and really believe that you are feeling a short term benefit there is another plausible physiological explanation.

The hypochlorite ions present in most such waters may make their way through the digestive tract and end up in the large intestine, where it comes into contact with the hundreds of species of [mostly] bacterial organisms that colonize everyone's colon. It is now believed that these so-called gut flora can actively alter the nature of many food and metabolic products that enter the colon, and they vary greatly between individuals.

HIGH WASTE FORMS OF WATER FILTRATION & CONDITIONING

WATER IONISERS

Hypochlorous acid **HOCl** (always present even in hypochorite solutions) is now known to trigger a number of cellular processes connected with cancer, either through inducing mutations in DNA sequences, or by making epigenetic changes to certain DNA bases. It is known, for example that HOCl leads to the formation of 5-chlorocytosine, **which is believed to suppress some genes that normally act to inhibit cell proliferation and tumor growth**. (C&EN, 2011.03.14, p 40)

This is certainly not to say that "ionized water causes cancer", but there is far more evidence for this than for the patently false claims by Kangen and others that it prevents cancer.

WATER IONISERS

Dr. David Wheeler

Dr. David Wheeler has spent many years researching and developing an optimum healing program, which involves the foundation of hydration and immune system support. In Dr Wheeler's book about water, Water Empowerment for Life, and on his website at www.0disease.com/0mwater_altered.html **you can find detailed information about the ten categories of water that cause dehydration, with ionized water being one of these categories.**

Even though Dr Wheeler is financed by a commercial product that actually promotes adding minerals to water manually (expensive and not eco-friendly) his research is very condemning of inorganic expensive ionising water machines.

The one area we all agree on with the commercial ionising companies is on the benefit of a regular alkaline water.

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WATER IONISERS

Importance of the 2003 Nobel Prize for Chemistry proves that ionising can dehydrate

The 2003 Nobel Prize for Chemistry reveals that the aquaporin, the water channel in the cell membrane, requires that there are no added substances or extra electrical charge for water molecules to pass easily one at a time to the interior of the cell.

The bottom line is that only one molecule at a time will pass through the aquaporin. Other research has proven that high (10.7 plus or low pH 6.5 less) water will hydrate less successful into the cell, which is related the way in which the artificial addition of substances or electrons will imbalance pH as too high or way too low away from a range closer to a neutral pH of 7.0.

WET GLOBAL

Importance of the 2003 Nobel Prize for Chemistry

WATER IONISATION DEHYDRATES

The aquaporin discovery

The aquaporin discovery gets to the crux of the issue as to why ionized water is extremely unhealthy. The extra electrons added to water and its pH imbalance created with ionization will need to be neutralized by the cell membrane to allow for single water molecules to pass through the aquaporin channel to the interior of the cell. For Humans and Animals alike.

This added work by the cell to correct electrolysis ionized water to become closer to the natural, pure water in the fluid matrix not only slows down hydration and therefore creates dehydration, but also drains the body of energy.

It takes extra cellular energy to normalized altered water, including ionized water. The irony about ionized water is that the added electrons (energy) are not usable and as a biochemical backlash actually causes a decrease in cellular energy in the long run! **People think that drinking INORGANIC electron loaded water will add to the body's energy, but in reality it deadens energy by creating severe pH and electrical imbalance.**

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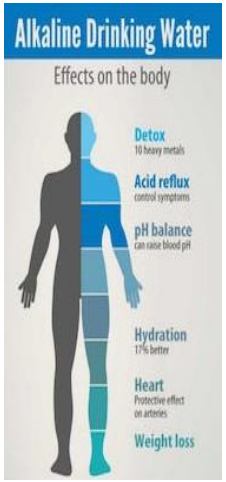
Importance of the 2003 Nobel Prize for Chemistry

Also, out of balance pH in water creates extreme chemical and electrical imbalance in body fluids, both inside and outside the cells. The body is very pH sensitive.
Trying to force a pH change based on a pre conceived notion about what it should be through an artificial approach (ionisation), rather than to get at the underlying cause of toxin build up in the cells, can create biochemical havoc. This will further increase dehydration instead of hydration and cause body fluids to become very sluggish based on out of balance pizo-electrical effect, and therefore increase inflammation, cell mutation and plaque build up.

WET AES WATER

Only optimum hydration with NATURALLY ACTIVATED ALKALINE MINERALIZED C WATER can resolve the underlying cause of cellular toxins unbalancing body pH.

Activated Enhancement System
PRODUCES TRUE ALKALINE WATER



The healthiest natural spring water is pure and infused with trace minerals which affect the waters pH, resulting in an alkaline water.

WET AES Water is completely different from an ionisation process because it mimics natures process for producing pure, healthy drinking water.

It's alkaline PH develops naturally from the minerals that are infused and bonded to it's molecules.

The water is transformed at a molecular level modifying the PH and creating naturally occurring anti oxidants. The unwanted contaminants are removed from the water by attaching themselves to the organic recyclable material.

Therefore, the WET AES Process is completely natural, healthy, economical and produces no waste.

It is the only system we know of that mimics nature and creates a fresh tasting drinking water, with a perfect trace mineral profile, true alkalinity and naturally occurring anti ageing antioxidants.

BACKGROUND WATER INFORMATION

HYDROGEN AND ANTIOXIDANTS

WATER QUALITY EXPLAINED

HYDROGEN AND ANTIOXIDANTS

Description
The antioxidant power of hydrogen was investigated by Hungarian Albert Szent-Györgyi, who later won the Nobel Prize for discovering the antioxidant activity of vitamin C.

In fact, in his December 11th, 1937, Nobel lecture, Albert Szent-Györgyi declared:

"...our body really only knows one fuel, hydrogen."
...Quite an amazing revelation considering free hydrogen is found in the plasma of our very own sun, helping it glow.

So what makes it so powerful?

WATER QUALITY EXPLAINED

ORAC READINGS ON RATS

Foods/Drinks that score high in an antioxidant analysis called ORAC may protect cells and their components from oxidative damage, according to studies of animals and human blood at the Agricultural Research Services

ORAC, short for oxygen radical absorbance capacity, is a test tube analysis that measures the total antioxidant power of foods and other chemical and liquid substances. Early findings suggest that eating plenty of high-ORAC fruits and vegetables, such as spinach and blueberries, may help slow the processes associated with aging in both body and brain. Young and middle-aged people may be able to reduce risk of diseases of aging (including senility) simply by adding high-ORAC foods/water to their diets, said ARS Administrator Floyd P Horn

Study of High-ORAC foods/drinks on Rats:

Prevented some loss of long-term memory and learning ability in middle-aged rats

- Maintained the ability of brain cells in middle-aged rats to respond to a chemical stimulus-a function that normally decreases with age.
- Protected rats' tiny blood vessels (capillaries) against oxygen damage.

WATER QUALITY EXPLAINED

HYDROGEN ANTIOXIDANT

Now, some doctors and scientists have realized the scope of the problem, and decided the solution was to include more antioxidants in our DIET.

In a small study published in the Journal of Clinical Biochemistry and Nutrition, scientists found eight weeks of drinking hydrogen-rich water lowered the oxidative stress of the volunteers. Another human study in Japan confirmed these antioxidant benefits. (SEE ACADEMIC PAPERS)

A randomized, double-blind, placebo-controlled, crossover study performed by the Kajiyama Clinic in Japan found the free hydrogen-rich water reduced oxidative stress and lead to other surprising changes associated with youth. Pure Ionic Anti-Oxidant Water can be installed to enhance you own tap water.

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WATER QUALITY EXPLAINED

THE FIVE REASONS WHY HYDROGEN IS THE ULTIMATE ANTIOXIDANT

It's been proven to fight the strongest oxidizing chemical of all: the Hydroxyl radical, which is a major villain in DNA damage.
But more than just sheer power, hydrogen's health benefits are also quite delicate: It doesn't react with other oxidizing agents, which are actually beneficial to your body.
It also doesn't disturb necessary metabolic reactions or disrupt cell signalling.
Because it's so small, hydrogen can penetrate the important parts of your body that need revitalizing the most, like your mitochondria (the powerhouse of your cells) and nucleus. Without a powerful antioxidant like hydrogen, dangerous free radicals can flourish here.
Hydrogen is able to pass through the blood-brain barrier, and may improve your brain health with its antioxidant power

WATER QUALITY EXPLAINED

O.R.P. or OXIDATION REDUCTION POTENTIAL READINGS

All atoms, have a electrical field with varying numbers of electrons in its orbit, some fields are more complete with electrons than others. In an effort to reach a state of stability, substances that are lacking electrons are desperately seeking out electrons wherever they can: these substances are referred to as oxidizing agents and will cause the reductant (with a surplus of electrons) to oxidise. On the contrary, substances which have a surplus of electrons are capable of donating their extra electrons: these substances are referred to as reducing agents, or anti-oxidizing agents

ORP is a measurement that indicates the degree to which a substance is capable of oxidizing or reducing another substance. ORP is measured in millivolts (mv) using an ORP meter. Therefore ORP or Redox Potential, is a measurement of water's ability to oxidize contaminants. The higher the ORP the greater the number of oxidizing agents.

- A positive ORP reading indicates that a substance is an oxidizing agent. The higher the reading, the more oxidizing it is. As such, a substance with an ORP reading of +400 mv is 4 times more oxidizing than a substance with an ORP reading of +100 mv.
- A negative ORP reading indicates that a substance is a reducing agent. The lower the reading, the more anti-oxidizing it is. As such, a substance with an ORP reading of -400 mv is 4 times more anti-oxidizing than a substance with an ORP reading of -100 mv.

WATER QUALITY EXPLAINED

O.R.P. or OXIDATION REDUCTION POTENTIAL READINGS

Checking ORP is a simple method to monitor the effectiveness of a sanitizer or the quantity of anti-oxidants in a liquid. **In generalized terms for humans, a higher ORP is better for outside of the body, while a lower ORP is preferred for consumption due to the high anti-oxidant value**. This is because it they are able to donate extra electrons to neutralize the harmful effects of free radicals on the body.

From a water treatment perspective, ORP measurements are used often to control disinfection with chlorine or chlorine dioxide in cooling towers, swimming pools, potable water supplies, and other water analysis applications. For example, studies have shown that the life span of bacteria in water is strongly dependent on the ORP value.

In wastewater, ORP measurement is used frequently to control treatment processes that employ biological treatment solutions for removing contaminants. In simple terms, from a microbial perspective, an oxidizing chemical pulls electrons away from the cell membrane, causing it to become destabilized. Destroying the integrity of the cell membrane leads to rapid death.

WATER QUALITY EXPLAINED

FREE RADICALS AND OXIDATION

Oxidation is a chemical reaction where a molecule or atom losses an electron. After an electron is lost, the molecule becomes unstable, and turns into an electron-hungry, free radical, which causes a chain-reaction:

The free radical steals an electron from another stable molecule, turning that molecule into an unstable, free radical and so on, which can eventually cause cellular damage. Free radicals are behind just about every disease and also cause pre-mature aging.

Whilst oxidation occurs everywhere and all of the time in every part of life, the negative effects of free radicals in the body should be avoided. This is done with the help of antioxidants.

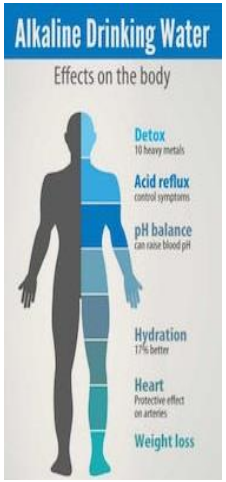
An antioxidant has extra electrons that can be donated without itself becoming unstable and therefore donates an electron to the free radicals, thus bringing the free radicals back to a stable and harmless molecule.

WATER QUALITY EXPLAINED

FREE RADICAL theory of oxidation aging”?

It states that (barring an accident or serious illness) your aging is caused by electrons getting ripped out of the molecules within your cells. This is called oxidative damage.

Versions of this oxidative damage are happening all around us, all the time. If you’ve ever bitten into an apple, put it down for a while, and saw the inner parts begin to turn brown and mushy...that’s oxidative damage.
Same with a car’s exterior rusting out.
This same oxidative damage is going on inside your body constantly, 24 hours a day, 365 days a year.
And this is a major reason why fruits and vegetables are so good for you: They’re rich in anti-oxidants to block this damage.
Oxidative damage is the process of electrons getting ripped out of the molecules of your cells?



ACADEMIC PAPERS

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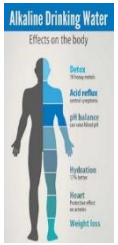

Potential benefits of pH 8.8 alkaline drinking water as an adjunct in the treatment of reflux disease.

Koufman JA, Johnston N.

OBJECTIVES:

At the cellular level, tissue-bound pepsin is fundamental to the pathophysiologic mechanism of reflux disease, and although the thresholds for laryngeal damage in laryngopharyngeal reflux and for esophageal damage in gastroesophageal reflux disease differ, both forms of damage are due to pepsin, which requires acid for its activation. In addition, human pepsin remains stable at pH 7.4 and may be reactivated by hydrogen ions from any source. Thus, most tap and bottled waters (typically pH 6.7 to 7.4) would not be expected to affect pepsin stability. The purposes of these in vitro studies were to investigate whether artesian well water containing natural bicarbonate (pH 8.8) might irreversibly denature (inactivate) human pepsin, and to establish its potential acid-buffering capacity.

METHODS:

Laboratory studies were performed to determine whether human pepsin was inactivated by pH 8.8 alkaline water. In addition, the buffering capacity of the alkaline water was measured and compared to that of the two most popular commercially available bottled waters.

RESULTS:

The pH 8.8 alkaline water irreversibly inactivated human pepsin (in vitro), and its hydrochloric acid-buffering capacity far exceeded that of the conventional-pH waters.

CONCLUSIONS:

Unlike conventional drinking water, pH 8.8 alkaline water instantly denatures pepsin, rendering it permanently inactive. In addition, it has good acid-buffering capacity. Thus, the consumption of alkaline water may have therapeutic benefits for patients with reflux disease.

Ann Otol Rhinol Laryngol. 2012 Jul;121(7):431-4.

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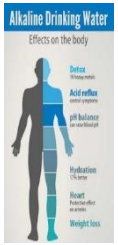

Acid-base balance and hydration status following consumption of mineral-based alkaline bottled water

Daniel P Heil - Heil Journal of the International Society of Sports Nutrition 2010, 7:29

BACKGROUND: The present study sought to determine whether the consumption of a mineral-rich alkalizing (AK) bottled water could improve both acid-base balance and hydration status in young healthy adults under free-living conditions. The AK water contains a naturally high mineral content along with Alka-PlexLiquid, a dissolved supplement that increases the mineral content and gives the water an alkalizing pH of 10.0.

METHODS: Thirty-eight subjects were matched by gender and self-reported physical activity (SRPA, hrs/week) and then split into Control (12 women, 7 men; Mean +/- SD: 23 +/- 2 yrs; 7.2 +/- 3.6 hrs/week SRPA) and Experimental (13 women, 6 men; 22 +/- 2 yrs; 6.4 +/- 4.0 hrs/week SRPA) groups. The Control group consumed non-mineralized placebo bottled water over a 4-week period while the Experimental group consumed the placebo water during the 1st and 4th weeks and the AK water during the middle 2-week treatment period. Fingertip blood and 24-hour urine samples were collected three times each week for subsequent measures of blood and urine osmolality and pH, as well as total urine volume. Dependent variables were analyzed using multivariate repeated measures ANOVA with post-hoc focused on evaluating changes over time within Control and Experimental groups (alpha = 0.05).

RESULTS: There were no significant changes in any of the dependent variables for the Control group. The Experimental group, however, showed significant increases in both the blood and urine pH (6.23 to 7.07 and 7.52 to 7.69, respectively), a decreased blood and increased urine osmolality, and a decreased urine output (2.51 to 2.05 L/day), all during the second week of the treatment period ($P < 0.05$). Further, these changes reversed for the Experimental group once subjects switched to the placebo water during the 4th week.

CONCLUSIONS: Consumption of AK water was associated with improved acid-base balance (i.e., an alkalization of the blood and urine) and hydration status when consumed under free-living conditions. In contrast, subjects who consumed the placebo bottled water showed no changes over the same period of time. These results indicate that the habitual consumption of AK water may be a valuable nutritional vector for influencing both acid-base balance and hydration status in healthy adults.

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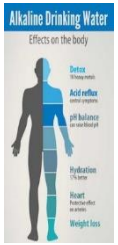

The Effect of the Alkali Load of Mineral Water on Bone Metabolism: Interventional Studies1,2

Peter Burckhardt, Clinique Bois-Cerf, Lausanne, Switzerland

Alkali supplements decrease bone resorption and increase bone mineral density. Alkali diets also lower bone resorption. Mineral waters alone could have such an effect. In several subsequent studies in humans, bicarbonate-rich alkali mineral waters with low potential renal acid load values were shown to decrease bone resorption markers and even parathyroid hormone levels. This effect seems to be stronger than that of acidic calcium-rich mineral waters and could also be demonstrated in calcium sufficiency.

J. Nutr. 138: 435S–437S, 2008

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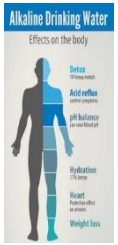

Effects of mineral composition of drinking water on risk for stone formation and bone metabolism in idiopathic calcium nephrolithiasis.

Marangella M[1], Vitale C, Petrarulo M, Rovera L, Dutto F.

To assess whether the mineral content of drinking water influences both risk of stone formation and bone metabolism in idiopathic calcium nephrolithiasis, 21 patients were switched from their usual home diets to a 10 mmol calcium, low-oxalate, protein-controlled diet, supplemented with 21 of three different types of mineral water. Drinking water added 1, 6 and 20 mmol of calcium and 0.5, 10 and 50 mmol of bicarbonate respectively to the controlled diet.

1. The three controlled study periods lasted 1 month each and were separated by a 20 day washout interval. Blood and urine chemistries, including intact parathyroid hormone, calcitriol and two markers of bone resorption, were performed at the end of each study period. The stone-forming risk was assessed by calculating urine saturation with calcium oxalate (beta CaOx), calcium phosphate (beta bsh) and uric acid (beta UA).
2. The addition of any mineral water produced the expected increase in urine output and was associated with similar decreases in beta CaOx and beta UA, whereas beta bsh varied marginally. These equal decreases in beta CaOx, however, resulted from peculiar changes in calcium, oxalate and citrate excretion during each study period. The increase in overall calcium intake due to different drinking water induced modest increases in calcium excretion, whereas oxalate excretion tended to decrease. The changes in oxalate excretion during any one study period compared with another were significantly related to those in calcium intake. Citrate excretion was significantly higher with the high-calcium, alkaline water.
3. Parathyroid hormone, calcitriol and markers of bone resorption increased when patients were changed from the high-calcium, alkaline to the low-calcium drinking water.
4. We suggest that overall calcium intake may be tailored by supplying calcium in drinking water. Adverse effects on bone turnover with low-calcium diets can be prevented by giving high-calcium, alkaline drinking water, and the stone-forming risk can be decreased as effectively as with low-calcium drinking water.

Clin Sci (Lond). 1996 Sep;91(3):313-8.

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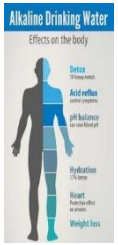

Mineral water as a source of dietary calcium: acute effects on parathyroid function and Bone resorption in young men

Josette Guillemant, Huyen-Tran Le, Chantal Accarie, Sophie Tézenas du Montcel, Anne-Marie Delabroise, Maurice J Arnaud, & Serge Guillemant

Background: Calcium is a major component of mineralized tissues and is required for normal growth and maintenance of bone. Epidemiologic studies showed that a large percentage of the population fails to meet the currently recommended guidelines for optimal calcium intake.

Objective: The present study was designed to determine whether high-calcium mineral water is an efficient additional source of dietary calcium.

Design: Twelve healthy young men (mean ± SD age: 21.1 ± 1.2 y) ingested in a randomized order either 0.5 L of a mineral water containing 344 mg Ca/L or 0.5 L of a mineral water with a very low concentration of calcium (<10 mg/L) as a control. Blood samples were drawn before and 1, 2, 3, and 4 h after intake of the water. Urine was collected for 2 h before and every 2 h for 4 h after ingestion of the water. Serum concentrations of intact parathyroid hormone (iPTH) and serum concentrations and urinary excretion of a recently developed biochemical marker of bone resorption, type 1 collagen cross-linked *C*-telopeptide (CTx), were measured.

Results: Serum iPTH was significantly ($P < 0.002$) lower after ingestion of high-calcium water than after ingestion of the control. There was a significant ($P = 0.01$) progressive decrease in urinary CTx after ingestion of the high-calcium water, whereas after ingestion of low-calcium water the changes were modest and not significant. The fall in serum CTx concentrations was 34.7% 3 h after ingestion of high-calcium water, compared with 17.6% with the control. The decreases in serum CTx concentrations were significantly ($P < 0.05$) lower 1, 2, 3, and 4 h after ingestion of high-calcium water than after ingestion of the control.

Conclusion: The present study showed that one oral intake of water containing a very moderate dose of calcium (172 mg) acutely inhibited iPTH secretion and bone resorption.

Am J Clin Nutr. 2000 Apr;71(4):999-1002.

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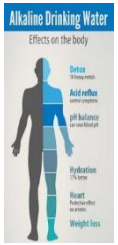

Extracellular pH Regulates Bone Cell Function1–3

Timothy R. Arnett

Abstract The skeletons of land vertebrates contain a massive reserve of alkaline mineral (hydroxyapatite), which is ultimately available to buffer metabolic H1 if acid-base balance is not maintained within narrow limits. The negative impact of acidosis on the skeleton has long been known but was thought to result from passive, physicochemical dissolution of bone mineral. This brief, selective review summarizes what is now known of the direct functional responses of bone cells to extracellular pH. We discovered that bone resorption by cultured osteoclasts is stimulated directly by acid. The stimulatory effect is near-maximal at pH 7.0, whereas above pH 7.4, resorption is switched off. In bone organ cultures, H1-stimulated bone mineral release is almost entirely osteoclast-mediated, with a negligible physicochemical component. Acidification is the key requirement for osteoclasts to excavate resorption pits in all species studied to date, and extracellular H1 may thus be regarded as the long-sought osteoclast activation factor. Acid-activated osteoclasts can be stimulated further by agents such as parathyroid hormone, 1,25-dihydroxycholecalciferol, and receptor activator of nuclear factor kB ligand. Osteoclasts may respond to pH changes via H1-sensing ion channels such as transient receptor potential vanilloid 1, a nociceptor that is also activated by capsaicin. Acidosis also exerts a powerful, reciprocal inhibitory effect on the mineralization of bone matrix by cultured osteoblasts. This is caused by increased hydroxyapatite solubility at low pH, together with selective inhibition of alkaline phosphatase, which is required for mineralization. Diets or drugs that shift acid-base balance in the alkaline direction may provide useful treatments for bone loss disorders.

J. Nutr. 138: 415S– 418S, 2008.

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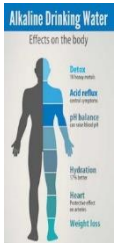

Absorption and effect of the magnesium content of a mineral water in the human body.

Kiss SA[1], Forster T, Dongó A. Author information

OBJECTIVE:

The kinetics of magnesium (Mg) absorption, after drinking Magnesia mineral water (204 mg Mg/L), was investigated in healthy humans aged (23-60 yrs).

METHODS:

Serum Mg, calcium (Ca), potassium (K) and sodium (Na) content, blood hemoglobin, erythrocyte and white blood cell counts as well as urinary volume and urine Mg content were evaluated. Subjects drank 1.5 liters of Magnesia in 30 minutes; blood and the other tests were taken at 0, 2, 6, 24 and 48 hours, and after 1, 2, 3 and 4 weeks. Serum ion quotient was calculated. Serum Mg levels increased in all cases, and returned to individual normal values after 48 hrs. Subjects drank copious amounts of the mineral water only on the first two days, later they consumed one glass of mineral water at a time, totalling 1-1.5 liters daily.

RESULTS:

Urinary volume and its Mg content significantly increased, with individual differences in urine Mg content depending on degrees of tissue Mg deficiency. For example, two subjects, who had the same initial serum Mg levels (79 m/M/L), responded to consumption of Magnesia mineral water similarly, with comparable rise of serum Mg but with different urinary Mg excretion, one rapidly excreting Mg, while the other lost less Mg over a longer period of time. The retention of more Mg in one than the other suggests that she had a "hidden" tissue Mg deficiency, despite a serum Mg level within normal limits. No subject experienced ECG or rhythm disturbance, and blood pressure remained unchanged during the study. One patient developed diarrhea.

CONCLUSION:

Magnesia's high Mg (204 mg/M) and low Na (5.4 mg/L) content makes it an excellent source of Mg for patients suffering from heart problems and/or high blood pressure.

J Am Coll Nutr. 2004 Dec;23(6):758S-62S.

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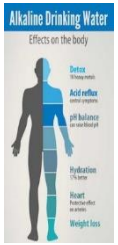

Activated alkaline water: new strategy for management of metabolic acidosis in experimental animals.

Abol-Enein H[1], Gheith OA, Barakat N, Nour E, Sharaf AE.

Abstract

Metabolic acidosis can occur as a result of either the accumulation of endogenous acids or loss of bicarbonate from the gastrointestinal tract or the kidney, which represent common causes of metabolic acidosis. The appropriate treatment of acute metabolic acidosis has been very controversial. Ionized alkaline water was not evaluated in such groups of patients in spite of its safety and reported benefits. So, we aimed to assess its efficacy in the management of metabolic acidosis in animal models. Two models of metabolic acidosis were created in dogs and rats. The first model of renal failure was induced by ligation of both ureters; and the second model was induced by urinary diversion to gut (gastrointestinal bicarbonate loss model). Both models were subjected to activated alkaline water (orally and by hemodialysis). Dogs with renal failure were assigned to two groups according to the type of dialysate utilized during hemodialysis sessions, the first was utilizing alkaline water and the second was utilizing conventional water. Another two groups of animals with urinary diversion were arranged to receive oral alkaline water and tap water. In renal failure animal models, acid-base parameters improved significantly after hemodialysis with activated alkaline water compared with the conventional water treated with reverse osmosis (RO). Similar results were observed in urinary diversion models as there was significant improvement of both the partial pressure of carbon dioxide and serum bicarbonate (P = 0.007 and 0.001 respectively) after utilizing alkaline water orally. Alkaline activated water can be considered as a major safe strategy in the management of metabolic acidosis secondary to renal failure or dialysis or urinary diversion. Human studies are indicated in the near future to confirm this issue in humans.

Ther Apher Dial. 2009 Jun;13(3):220-4. doi: 10.1111/j.1744-9987.2009.00659.x.

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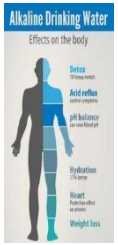

Effects of a bicarbonate-alkaline mineral water on gastric functions and functional dyspepsia: a preclinical and clinical study.

Bertoni M[1], Olivieri F, manghetti M, Boccolini E, Bellomini MG, Blandizzi C, Bonino F, Del Tacca M.

The present study was performed in order to evaluate: (1) the influence of a bicarbonate-alkaline mineral water (Uliveto) on digestive symptoms in patients with functional dyspepsia; (2) the effects of Uliveto on preclinical models of gastric functions. Selected patients complained of dyspeptic symptoms in the absence of digestive lesions or Helicobacter pylori infection within the previous 3 months. They were treated with Uliveto water (1.5 l day(-1)) for 30 days. Frequency and severity of symptoms were assessed at baseline and day 30 by a score system. Preclinical experiments were carried out on rats, allowed to drink Uliveto or oligomineral water for 30 days. Animals then underwent pylorus ligation to evaluate gastric secretion of acid, pepsinogen, and mucus. In separate experiments, gastric emptying was assessed. Crenotherapy was associated with a relief of epigastric pain, retrosternal pyrosis, postprandial fullness and gastric distention. At preclinical level, Uliveto water increased acid and pepsinogen secretions as well as gastric emptying, without changes in bound mucus. The enhancing actions of Uliveto on gastric secretions and emptying were prevented by L-365,260, an antagonist of gastrin/CCK-2 receptors. These findings indicate that a regular intake of Uliveto favors an improvement of dyspeptic symptoms. The preclinical study suggests that the clinical actions of Uliveto water depend mainly on its ability to enhance gastric motor and secretory functions.

Pharmacol Res. 2002 Dec;46(6):525-31.

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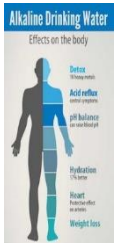

Effects of a bicarbonate-alkaline mineral water on digestive motility in experimental models of functional and inflammatory gastrointestinal disorders.

Fornai M[1], Colucci R, Antonioli L, Ghisu N, Tuccori M, Gori G, Blandizzi C, Del Tacca M.

This study investigates the effects of Uliveto, a bicarbonate-alkaline mineral water, in experimental models of diarrhea, constipation and colitis. Rats were allowed to drink Uliveto or oligomineral water (control) for 30 days. Diarrhea and constipation were evoked by 16,16-dimethyl-prostaglandin E(2) (dmPGE(2)) or loperamide, respectively. Colitis was induced by 2,4-dinitrobenzenesulfonic acid (DNBS) or acetic acid. Gastric emptying, small-intestinal and colonic transit were evaluated. dmPGE(2)-induced diarrhea reduced gastric emptying and increased small-intestinal and colonic transit. In this setting, Uliveto water enhanced gastric emptying, and this effect was prevented by L-365,260 (gastrin receptor antagonist). Loperamide-induced constipation reduced gastric emptying, small-intestinal and colonic transit, and these effects were prevented by Uliveto water. L-365,260 counteracted the effects of Uliveto on gastric emptying, while alosetron (serotonin 5-HT(3) receptor antagonist) blunted the effect of Uliveto on colonic transit. Gastric emptying, small-intestinal and colonic transit were reduced in DNBS-induced colitis, and Uliveto water enhanced gastric emptying and normalized small-intestinal and colonic transit. Gastric emptying, small-intestinal and colonic transit were also reduced in acetic acid-induced colitis, and Uliveto increased both gastric emptying and small-intestinal transit. In conclusion, Uliveto water exerts beneficial effects on gastrointestinal motility in the presence of bowel motor dysfunctions. The effects of Uliveto water on gastric emptying depend on gastrin-mediated mechanisms, whereas the activation of serotonergic pathways accounts for the modulation of colonic functions.

Methods Find Exp Clin Pharmacol. 2008 May;30(4):261-9. doi: 10.1358/mf.2008.30.4.1159650.

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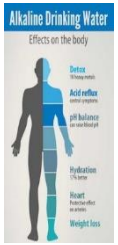

Influences of alkaline activated water on milk yield, body weight of offspring and perinatal dam in rats.

Watanabe T[1], Pan I, Fukuda Y, Murasugi E, Kamata H, Uwatoko K.

The authors previously reported that male offspring of mothers rats given alkaline activated water (AKW) showed a significantly higher body weight by day 14 after birth than did offspring of mother rats given tap water (TPW); furthermore, marked myocardial necrosis and fibrosis were observed particularly in the former male offspring at the age of 15 weeks. In the present experiment we looked for differences in bio parameters, namely the milk yield of mothers and suckled milk volume of the offspring, between the AKW- and the TPW-treated groups in order to reveal the factors which cause the unusual body weight gain in the offspring. Even though we were able to repeat our previous observation (the body weight of the male offspring of the AKW group increased significantly more by day 14 and 20 after birth and of the female by day 20 after birth than did that of the TPW group ($p < 0.05$), no significant difference was noted in any of the bio parameters, including those related to milk production and consumption. It is thus suspected that the water-hydrated cation, which was transferred either to the foetus through the placenta or to the offspring through the milk, might be the cause of the unusual body weight increase. Since calcium plays an important role in skeletal formation, it is tentatively concluded that the higher calcium concentration of AKW enriched the mother, serum calcium which was transferred to the foetus through the placenta and to the offspring through the milk.

J Toxicol Sci. 1998 Dec;23(5):365-71.

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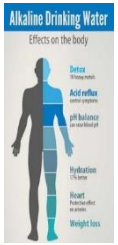

The World Health Organization details the benefits for drinking water with magnesium concentrations. There is also evidence of benefit for drinking water with calcium. Studies have shown magnesium's protective action on the cardiac system. Hard water, defined as water that contains mineral salts (as calcium and magnesium ions) that limit the formation of lather with soap, can be a source of needed calcium and magnesium. The reintroduction of calcium and magnesium into demineralized water may provide health benefits to consumers. There are no known harmful human health effects associated with the addition of calcium and magnesium and the nutritional benefits are well known. In addition, some evidence exists for benefits associated with other diseases (stroke, renal stone formation, cognitive impairment in elderly, very low birth weight, bone fractures among children, pregnancy complications, hypertension, and possibly some cancers). Adding calcium and magnesium to the demineralized water would be a relatively inexpensive preventive intervention that does not require individual behavioural change. The intervention could not only provide health benefits but also help reduce medical care costs. It has been suggested that reduced cardiovascular mortality and other health benefits would be associated with minimum levels of approximately 20 to 30 mg/l calcium and 10 mg/l magnesium in drinking water.

- Calcium – important in bone health
- Magnesium – important in bone and cardiovascular health
- Fluoride – effective in preventing dental caries
- Sodium – an important extracellular electrolyte, lost under conditions of excess sweat
- Copper – important in antioxidant function, iron utilization and cardiovascular health
- Selenium – important in general antioxidant function and in immune system 8
- Potassium is important for a variety of biochemical effects but it is usually not found in natural drinking waters at significant levels.

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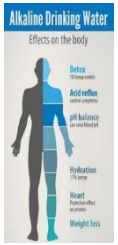

Postgraduate Symposium: Positive influence of nutritional alkalinity on bone health.

Wynn E[1], Krieg MA, Lanham-New SA, Burckhardt P.

There is growing evidence that consumption of a Western diet is a risk factor for osteoporosis through excess acid supply, while fruits and vegetables balance the excess acidity, mostly by providing K-rich bicarbonate-rich foods. Western diets consumed by adults generate approximately 50-100 mEq acid/d; therefore, healthy adults consuming such a diet are at risk of chronic low-grade metabolic acidosis, which worsens with age as a result of declining kidney function. Bone buffers the excess acid by delivering cations and it is considered that with time an overstimulation of this process will lead to the dissolution of the bone mineral content and hence to reduced bone mass. Intakes of K, Mg and fruit and vegetables have been associated with a higher alkaline status and a subsequent beneficial effect on bone health. In healthy male volunteers an acid-forming diet increases urinary Ca excretion by 74% and urinary C-terminal telopeptide of type I collagen (C-telopeptide) excretion by 19% when compared with an alkali (base-forming) diet. Cross-sectional studies have shown that there is a correlation between the nutritional acid load and bone health measured by bone ultrasound or dual-energy X-ray absorptiometry. Few studies have been undertaken in very elderly women (>75 years), whose osteoporosis risk is very pertinent. The Evaluation of Nutrients Intakes and Bone Ultra Sound Study has developed and validated (n 51) an FFQ for use in a very elderly Swiss population (mean age 80.4 (sd 2.99) years), which has shown intakes of key nutrients (energy, fat, carbohydrate, Ca, Mg, vitamin C, D and E) to be low in 401 subjects. A subsequent study to assess net endogenous acid production (NEAP) and bone ultrasound results in 256 women aged > or = 75 years has shown that lower NEAP (P=0.023) and higher K intake (P=0.033) are correlated with higher bone ultrasound results. High acid load may be an important additional risk factor that may be particularly relevant in very elderly patients with an already-high fracture risk. The latter study adds to knowledge by confirming a positive link between dietary alkalinity and bone health indices in the very elderly. In a further study to complement these findings it has also been shown in a group of thirty young women that in Ca sufficiency an acid Ca-rich water has no effect on bone resorption, while an alkaline bicarbonate-rich water leads to a decrease in both serum parathyroid hormone and serum C-telopeptide. Further investigations need to be undertaken to study whether these positive effects on bone loss are maintained over long-term treatment. Mineral-water consumption could be an easy and inexpensive way of helping to prevent osteoporosis and could be of major interest for long-term prevention of bone loss.

Proc Nutr Soc. 2010 Feb;69(1):166-73. doi: 10.1017/S002966510999173X. Epub 2009 Dec 3.

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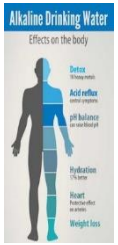

Eczema

Professor T Tatsuji, Keifuku Rehabilitatation Centre.

"Eczema is used to describe several varieties of skin conditions, which have a number of common features. The exact causes of eczema are not fully understood. I many cases, eczema can be attributed to external irritants.

Let me introduce a patient who recovered from skin disease after consuming the Alkaline antioxidant water. This patient suffered 10 years of eczema and could not be cured effectively even under specialist treatment. This patient, who is 70 years of age, is the president of a vehicle parts company. After the war, his lower limbs suffered acute eczema, which later became chronic. He was repeatedly treated in a specialist skin hospital.

The left limb responded well to treatment, but not so on the right limb. He suffered severe itchiness, which, when scratched led to bleeding. During the last 10 years, he was seen and treated by many doctors. When I first examined him, his lower limb around the joints was covered with vesicles. Weeping occurred owing to serum exuding from the vesicles.

I advised him to try consuming Alkaline antioxidant water. After 2 weeks of treatment the vesicles dried up. The eczema was completely cleared without any relapse after 1½ month."

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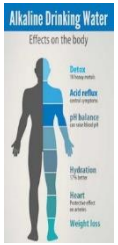

Vormann J, Worlitschek M, Goedecke T, Silver B, Supplementation with Alkaline minerals reduces symptoms of patients with chronic low back pain, J Trace Elem. Med. Biol. Vol. 15, pp. 179-183, 2001

Abstract: The cause of low back pain is heterogeneous, it has been hypothesized that a latent chronic acidosis might contribute to these symptoms. It was tested whether a supplementation with **alkaline minerals** would influence symptoms in patients with low back pain symptoms.
In an open prospective study 82 patients with chronic low back pain received daily 30 g of a lactose based **alkaline multi mineral** supplement (Basica) over a period of 4 weeks in addition to their usual medication.
Pain symptoms were quantified with the "Arhus low back pain rating scale" (ARS). Mean ARS dropped highly significant by 49% from 41 to 21 points after 4 weeks supplementation. In 76 out of 82 patients a reduction in ARS was achieved by the supplementation. Total blood buffering capacity was significantly increased from 77.69 ± 6.79 to 80.16 ± 5.24 mmol/L (mean ± SEM, n=82, $p < 0.001$) and also blood pH rose from 7.456 ± 0.007 to 7.470 ± 0.007 (mean ± SEM, n=75, $p < 0.05$).

Only intracellular magnesium increased by 11% while other intracellular minerals were not significantly changed in sublingual tissue as measured with the EXA-test. Plasma concentrations of potassium, calcium, iron, copper, and zinc were within the normal range and not significantly influenced by the supplementation. Plasma magnesium was slightly reduced after the supplementation (-3%, $p < 0.05$).
The results show that a disturbed acid-base balance may contribute to the symptoms of low back

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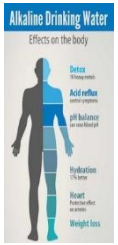

Magnesium and calcium in drinking water and cardiovascular mortality

Excerpt from Scand J Work Environ Health 1991;17:91-4
Ragnar Rylander MD,Håkan Bonevik, MD, EvaRubenowitz, MD.
Department of Environmental Hygiene, University of Göteborg, Göteborg, Sweden.

Data on the hardness of drinking water were collected from 27 municipalities in Sweden where the drinking water quality had remained unchanged for more than 20 years. Analyses were made of the levels of lead, cadmium, calcium, and magnesium.
These water-quality data were compared with the age-adjusted mortality rate from ischemic heart and cerebrovascular disease for the period 1969-1978. Lead and cadmium were not present in detectable amounts except in one water sample. A statistically significant inverse relationship was present between hardness and mortality from cardiovascular disease for both sexes. Mortality caused by ischemic heart disease was inversely related to the magnesium content, particularly for the men (P.

Key terms: cerebrovascular disease, ischemic heart disease, magnesium, water hardness.
Several epidemiologic investigations performed during recent decades have demonstrated an inverse relationship between water hardness and death from cardiovascular disease. The first observation was made in 1957 (1) and was subsequently elaborated upon in investigations in many other countries (2-4). A particularly relevant study was reported by Crawford et al (5), who followed the mortality rate in 11 English cities where the water hardness had changed between 1950 and 1960. Hardness had increased in five cities and decreased in six. Mortality from cardiovascular disease increased about 10% in the general population during the period of study. In the cities where hardness had decreased, mortality had increased by 20%.

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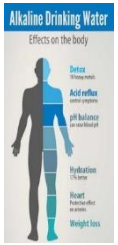

CALCIUM AND MAGNESIUM IN DRINKING WATER
& The risk of death from cerebrovascular disease.

Author: Yang CY Author Affiliation: School of Public Health,
KaohsiungMedicalCollege,Taiwan,RepublicofChina.chunyuh*cc.kmc.edu.tw
Source: Stroke 1998 Feb; 29(2):411-4

BACKGROUND AND PURPOSE: Many studies have demonstrated a negative association between mortality from cardiovascular or cerebrovascular diseases and water hardness. This report examines whether calcium and magnesium in drinking water are protective against cerebrovascular disease.

METHODS: All eligible cerebrovascular deaths (17133 cases) of Taiwan residents from 1989 through 1993 were compared with deaths from other causes (17133 controls), and the levels of calcium and magnesium in drinking water of these residents were determined. Data on calcium and magnesium levels in drinking water throughout Taiwan were obtained from the Taiwan Water Supply Corporation. The control group consisted of people who died from other causes, and the controls were pair matched to the cases by sex, year of birth, and year of death.
RESULTS: The adjusted odds ratios (95% confidence interval) were 0.75 (0.65 to 0.85) for the group with water magnesium levels between 7.4 and 13.4 mg/L and 0.60 (0.52 to 0.70) for the group with magnesium levels of 13.5 mg/L or more. After adjustment for magnesium levels in drinking water, there was no difference between the
groups with different levels of calcium.

CONCLUSIONS: The results of the present study show that there is a significant protective effect of

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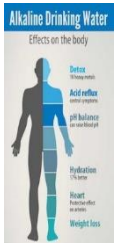

Supplementation of hydrogen-rich water improves lipid and glucose metabolism in patients with type 2 diabetes or impaired glucose tolerance.

Randomized controlled trial

Kajiyama S, et al. Nutr Res. 2008.

Abstract

Oxidative stress is recognized widely as being associated with various disorders including diabetes, hypertension, and atherosclerosis. It is well established that hydrogen has a reducing action. We therefore investigated the effects of hydrogen-rich water intake on lipid and glucose metabolism in patients with either type 2 diabetes mellitus (T2DM) or impaired glucose tolerance (IGT). We performed a randomized, double-blind, placebo-controlled, crossover study in 30 patients with T2DM controlled by diet and exercise therapy and 6 patients with IGT. The patients consumed either 900 mL/d of hydrogen-rich pure water or 900 mL of placebo pure water for 8 weeks, with a 12-week washout period. Several biomarkers of oxidative stress, insulin resistance, and glucose metabolism, assessed by an oral glucose tolerance test, were evaluated at baseline and at 8 weeks. Intake of hydrogen-rich water was associated with significant decreases in the levels of modified low-density lipoprotein (LDL) cholesterol (ie, modifications that increase the net negative charge of LDL), small dense LDL, and urinary 8-isoprostanes by 15.5% ($P < .01$), 5.7% ($P < .05$), and 6.6% ($P < .05$), respectively. Hydrogen-rich water intake was also associated with a trend of decreased serum concentrations of oxidized LDL and free fatty acids, and increased plasma levels of adiponectin and extracellular-superoxide dismutase. In 4 of 6 patients with IGT, intake of hydrogen-rich water normalized the oral glucose tolerance test. In conclusion, these results suggest that supplementation with hydrogen-rich water may have a beneficial role in prevention of T2DM and insulin resistance.

PMID 19083400 [PubMed - indexed for MEDLINE]

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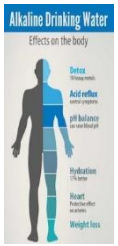

Use of Alkali Water on Dairy Farms

Two studies follow: one in Japan, one in Pennsylvania, US.

Japanese Study

Alkali water was introduced into dairy farms. Knowing the positive health benefits and results that were acquired through human consumption, **alkaline water was used in place of tap water as the sole source of water for dairy cows.** The results are reported in the subsequent findings. The findings were obtained from 27 dairy farms, along with a report from a group of veterinarians.

The source of each report is identified at the beginning.

In general, the following measurable conditions were noted:

1. An increase in milk output by 18% - 28%.
2. A notable improvement in the quality of milk.
3. Elimination of strong faeces and urine odours.
4. Healthier skin condition.
5. Minimized injury to the udder.
6. Decrease in diarrhoea cases
7. Strengthening of the legs.
8. Increased appetite
9. Able to reduce minerals supplements normally added to the feed.
10. Due to an improved health condition coupled with stronger legs, the productive life span of the cows was extended.
11. Improved the fertility rate and reduced still-births.

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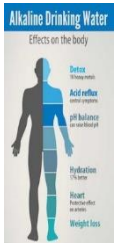

The following are individual findings noted by each dairy farmer who replaced tap water with alkali water.

A. **Dairy Farm: Kasahara Ranch**
Location: Nomura, Hokkaido
Spokesperson: Mr. G. Kasahara

1. The milk output increased from 7,000kg to 8,900kg, an increase of 27%.

2. The use of the alkali water instilled a preventive approach to the overall health condition of the dairy cow in lieu of reactive medical means. The overall health condition of the herd improved dramatically.

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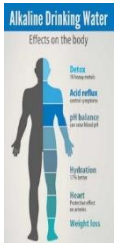

B. Dairy Farm: Shikawa Ranch
Location: Momembetsu, Hokkaido
Spokesperson: Mr. T. Shikawa
1. There was a noticeable improvement in the quality of the milk.
2. Despite the high temperature during the summer months, milk output had increased dramatically. During the previous ummer months, milk output had declined.

C. **Dairy Farm: Takahashi Ranch**
Location: Notsuke, Hokkaido
Spokesperson: Mr. Takahashi.
1. The sickness rate was considerably reduced.

D. **Dairy Farm: Hamanasu Ranch**
Location: Mombetsu, Hokkaido
Spokesperson: Mr. S. Nakagawa.
1. The coloring of the udder became extremely healthy.
2. Due to the alkali consumption and it's natural healing ability, the amount of injury to the udder had diminished.
3. The milk output has increased by 800 kg per cow. (NOTE: since there was no "before and after" numbers provided, the percentage increase could not be determined.)

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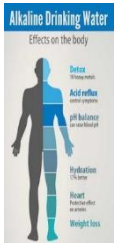

E. **Dairy Farm: Karita Ranch**
Location: Notsuke, Hokkaido
Spokesperson: Mr. H. Karita

1. The results were excellent in every manner. Milk production was considerably higher, the sickness rate was down, problems associated with diarrhea were minimized, the foul odor from the excrement was gone, the cow's appetite was up, the sheen on the cow's hair was considerably higher and the overall quality of the milk was up.

F. **Dairy Farm: Sunnydale Ranch**
Location: Hyotsu, Hokkaido
Spokesperson: Mr. M. Danshora

1. In prior years, in an effort to increase milk production, increased feed was given to cows. With the use of alkali water, the need for increased feed was minimized.
2. Despite the pregnancy of the cow, the amount of milk production has not decreased. In prior pregnancies, the amount of milk production had decreased. This was noted in 9 out of 10 cows.
3. The improved health condition of the cows along with the stronger legs have reduced the turnover of cows. This has considerably improved the productive life span of each cow.

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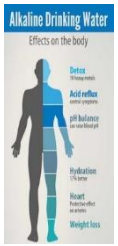

G. **Dairy Farm: No Name Given**
Location: Mombetsu, Hokkaido
Spokesperson: Mr. T. Yamaguchi

1. The overall skin condition of each cow had improved dramatically.
2. The foul odors associated with excrements and urine were eliminated with the consumption of alkali water.
3. The farm was able to reduce the amount of mineral supplements that were being added to the diet on account of the alkali water.
4. The newly born calves experienced no diarrhea.

H. **Dairy Farm: Koizumi Ranch**
Location: Kamikawa, Hokkaido
Spokesperson: Mr. T. Koizumi

1. The recovery period for cows giving birth had improved noticeably with the consumption of alkali water.
2. The cows have experienced increased appetite.
3. Despite the higher temperature during the ummer months, the milk output had increased dramatically.
4. The consumption of alkali water had stabilized the pH factor for each cow

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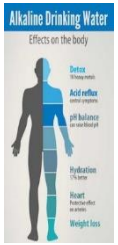

Aside from the above, the following observations were noted by the veterinarians:

1. A noticeably increased appetite; no new supplements were added to their diet. Increase in appetite noted in older cows as well.
2. Food well digested.
3. A beautiful sheen on the cow's hair.
4. Higher fertility rate; higher pregnancy rate.
5. New-born calves fed with alkaline water matured quicker.
6. A dramatic increase in milk production.
7. Improved liver condition.
8. Strengthened legs.
9. Minimizing of sicknesses; tremendously improved health condition. Fewer visits by vets.
10. No adverse conditions noted from consumption of alkaline water.

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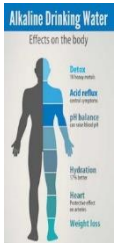

I. **Dairy Farm: Honami MBB Ranch**
Location: Joro, Hokkaido
Spokesperson: Mr. Y. Takigawa

1. There was a remarkable improvement in the quality of milk.
2. The cows increased their water intake which resulted in increased milk production
3. The cows experienced reduced diarrhea.
4. There was a remarkable improvement in the hair and skin texture of every cow.

J. **Dairy Farm: Aneshi Ranch**
Location: Esachi, Hokkaido
Spokesperson: Mr. K. Aneshi

1. Due to the consumption of alkali water and the improved immunity levels, there were fewer injuries to the cow's udder during the milking process.
2. The milk output had increased from 282 tons to 360 tons or a 28% increase.
3. It was a financially and economically-wise decision to use electrolysis alkali water.

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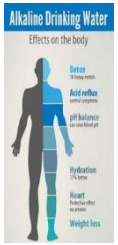

K. **Dairy Farm: Royal Farm**
Location: Kamikawa, Hokkaido
Spokesperson: Mr. T. Sawamoto

1. The milk output had increased from a range of 7,000 to 7,300 kg to a higher output of 9,000 kg or a 28% increase.
2. Due to the unstable water condition, the farm had gone to Alkali water. This decision ended up being a financially-wise decision.

L. **Dairy Farm: Nogyo Kyosai Dairy Association**
Location: Kushiro, Hokkaido
Spokesperson: Mr. M. Sugiyama

1. The use of alkali water has considerably reduced the number of sick cows and dramatically improved the overall health condition.
2. The farm has not measured all the positive effects brought about by the alkali water but on the other hand have not experienced any negative effects.
3. One noticeable difference was their improved digestion.

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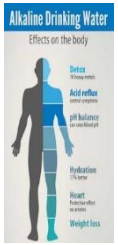

M. **Dairy Farm: Okura Ranch**
Location: Asahi-kawa, Hokkaido
Spokesperson: Mr. Y. Okura

1. The alkali water has produced healthier cows. There were no changes to the diet or the environment but the cows became healthier.
2. Increased their monthly sales by $20,000.00 through increased milk output. (NOTE: There were no other comparative numbers provided to determine the actual increase in productivity levels.)

N. **Dairy Farm: Aikawa Ranch**
Location: Akan, Hokkaido
Spokesperson: Mr. M. Aikawa

1. The odours that are normally present in the urine and excrements were dramatically reduced.
2. The birth-rate was considerably increased by the increase in fertility rate and the minimizing of stillborn calves.
3. There was a dramatic increase in milk production.
4. This farm is utilized as a model ranch in the use of alkali water.

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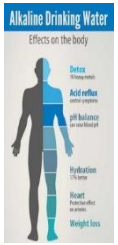

O. **Dairy Farm: Mitani Ranch**
Location: Yubari, Hokkaido
Spokesperson: Mr. K. Mitani

1. Experienced 100% fertility and birth rates through artificial insemination.

P. **Dairy Farm: Ueda Ranch**
Location: Akan, Hokkaido
Spokesperson: Mr. T. Ueda

1. The fortified calcium through the electrolysis water has strengthened the legs of the cows.
2. Due to the dramatically-improved health conditions, the quality of the milk has improved.
3. In the long run, the use of alkali water is a totally economical approach to the dairy industry.

Q. **Dairy Farm: Yamatani Ranch Location: Kamikawa, Hokkaido Spokesperson: Mr. M. Yamatani**

1. The quality and quantity of the milk has improved considerably.
2. Considerably minimized the sickness rate of each cow.
3. Minimized diarrhea conditions.
4. An overall improvement was noted in every aspect of the dairy cow equating to better economic conditions.

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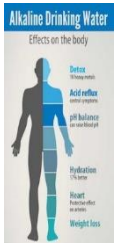

R. **Dairy Farm: Yamamoto Ranch Location: Amashio, Hokkaido Spokesperson: Mr.M. Yamatani**

1. The milk output had increased from 317 tons to 393 tons or an increase of 24.0%
2. The cow became fertile with one month of giving birth.
3. There was a substantial reduction in the number of veterinary visits.
4. There was a noticeable increase in their appetites.

S. **Dairy Farm: Saida Ranch Location: Shirahata, Hokkaido Spokesperson: Mr. K. Saida**

1. The milk output had increased from 8,641 kg to 10,177kg, an increase of 17.8%

T. **Dairy Farm: Fukagawa Ranch Location: Joro, Hokkaido Spokesperson: Mr. E. Fukagawa**

1. There was a substantial reduction to the number of veterinary visits.
2. Reduced the swelling rate of the cow's legs.
3. Reduced the rate of external wounds caused by suction cups.

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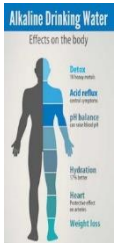

Dairy Farm: Sudo Ranch
Location: Munetani, Hokkaido
Spokesperson: Mr. M. Sudo

NOTE: Unlike other dairy farms, this farmer had discontinued the use of alkali water to measure the effects of returning to normal tap water. The following were the effects noted:

1. The strong odours of the excrement returned after a period of time; (the foul odor had been eliminated through the consumption of alkali water.

2. The sheen that was once present on the cows had disappeared and the hair returned to a lackluster condition.

3. The frequency of diarrhoea had increased.
4. Weakness was noticed in the cows legs as opposed to the strengthening of the cows legs during the use of alkali water.

THE SCIENTIFIC ADVISORY BOARD

CHAIRMAN OF THE SCIENTIFIC ADVISORY BOARD

Professor Edward Lynch (University of Warwick) PhD, Lond, MA, BDentSc, TCD, FDSRCSEd, FIADFE, FDSRCSLond, FASDA

Edward Lynch has been the Head of Dentistry since 2010 in Warwick Dentistry at the University of Warwick, which has been ranked the third best University in the UK after Oxford and Cambridge.
Warwick Dentistry aims to be the best provider of postgraduate dental education in the UK within 3 years and one of the best in the World within 10 years.

He has been elected the most influential person in UK Dentistry in 2010 by his peers (Google dentistry top 50 2010) and has held the position of Professor of Restorative Dentistry and Gerodontology of the Queen's University Belfast as well as Consultant in Restorative Dentistry to the Royal Hospitals from 2000 – 2010.

He has served as Senior Lecturer in Conservative Dentistry and Hon. Consultant in Restorative Dentistry and Postgraduate Course Organizer for the University of London where he was full time for 20 years (1980 – 2000).
Edward will be instrumental in many future IP and patents filed for WET.
EDWARD will also be a trustee on the WATER SMART FOUNDATION BOARD.

HEAD OF SCIENTIFIC RESEARCH and THE WET SCIENTIFIC ADVISORY BOARD. Dr Ahmed Mohamed

WET ENGINEERING

With more than 10 years of experience in medical and stem cell research, Dr Ahmed Mohamed is currently a Head Scientific Research Officer at WET Engineering Ltd. After graduating with a degree in dentistry from the United Arab Emirates, Dr Mohamed obtained a PhD degree on stem cell biology from King's College London and also worked there as part of the team that developed a pioneering technology for creating teeth in the laboratory by using stem cells. Dr Mohamed also worked for the University of Warwick for the last 6 years as a course director for 2 medical masters programmes and also as the lead for medical postgraduate research at Warwick Medical School. Dr Mohamed's research profile includes a plethora of clinical, medical and laboratory research as well as systematic reviewing and meta-analyses with publications and participations in national and international journals and conferences. Dr Mohamed is also an expert solutions provider and currently working on our Oil &Water project and our Medical Water solutions for Dental rinse and Stem cell application.

Professor Martin Grootveld (DMU) Advisory Board Member.

This is one of the UK's most established schools, with >100 years of teaching experience; renowned for academic expertise, professional development training and world-leading research. They provide a diverse range of undergraduate, postgraduate and research opportunities that have been developed for traditional undergraduates as well as experienced practitioners looking to up-skill.

Role in Project: They will head up WP 5 Validation Trials and Nutrition. DMU will be responsible for performing all chemical, physical and microbiological tests on the resulting water, gas characterization, drinks validation trials, and will be providing support to several WP's indirectly.

Facilities: Photometry, Titration, microbiology swab tests, high-resolution NMR spectroscopy (Bruker Avance 400 MHz facility), LC-MS, LC-MS/MS, MALDI-TOF mass spectrometry, GC-MS, electron spin resonance (ESR) spectroscopy, ICP-MS for trace metal ion determinations, flame atomic absorption spectrometry, emission spectrometry, HPLC, GLC, FTIR, spectrophotometry and scanning electron microscopy (SEM). General lab support and full access to scientific literature and lectures on any topic that be relevant to the project.

Key staff: *Professor Martin Grootveld*. He is a Professor of Bioanalytical Chemistry and Chemical Pathology & Head of the Medicinal Chemistry Group. Msc in Chemistry/Statistical Analysis, PhD in Bioanalytical Chemistry and metallodrugs, post-doctorate on the analysis of 'markers' of free radical activity in biofluids. >35 years of experience in research Director and Head of departments in the following: Clinical Chemistry, Chemical Pathology and Biomedical Materials, Forensic Science, Medical & Healthcare. Author of 108 research publications,17 reviews and more than 200 refereed conference contributions

Dr Hajime Kinoshita
Advisory Board Member

The University Of Sheffield.

The MSE is one of the national leaders in the research and development in materials science: it was rated in the top 5 in REF 2014, accounting for profile and volume of research; nationally is 2nd in research income; currently has 40 academic staff (17 Professors, 6 Readers, 9 Senior Lecturers and 8 Lecturers); and has 58 postdoctoral research staff, 222 PhD students.

- Role in Project: Media surface characterisation - the physical and chemical evolution of materials surface upon reaction with the flowing water will be studied, including alteration of microstructure, formation / dissolution of Oxide layers, and the effects of flow rate on these aspects. Surface regeneration for media recycling. Main input is in WP1, Media Development.
- Facilities: Thermogravimetric, mass spectrometer, infrared spectrometer, X-ray diffract gram, X-ray fluorescence spectrometer, scanning electron microscope, transmission electron microscope, mercury intrusion porosimeter, BET surface area analyser, Ion chromatography, Inductively coupled plasma optical emission spectrometry
- Key staff: Dr Hajime Kinoshita is a Lecturer in Materials Chemistry and Geochemistry. One of his key research areas is the noble technology for Mg(OH)2 synthesis from natural minerals and industrial waste products, and their carbonation for carbon capture and storage. He is a Board Member of Materials Chemistry Committee at IOM3, academic member of UKCCSRC. Finalist for Best University Technology in UK Energy Innovation Awards 2014.

Professor Callum Hill

Advisory Board Member.

Organisation Description: JCH Industrial Ecology Ltd is an environmental consultancy primarily concerned with developing new products from sustainable and renewable resources. JCH Industrial Ecology Limited has performed consultancy services for Akzo Nobel, Knauf Insulation, UPM, BSW Timber, the Building Research Establishment, Kemira oy, SiOO Wood Protection AB and the BioComposites Centre.
Role in Project: Will perform Life Cycle Analysis of the final cartridge and drinks. Will also provide ongoing advice and consultancy throughout the project duration.
Facilities: Consultancy services. Life Cycle analysis Software and expertise,
Key staff: *Professor Callum Hill FIMMM* is director of JCH Industrial Ecology Limited with over thirty years' experience of working in research and development. First Class Honours Degree in Chemistry, Doctor of Philosophy (CNAA). He is also senior Consultant for Renuables (www.renuables.co.uk) working on life cycle assessment, environmental product declarations, carbon foot-printing and other environmental impact methodologies. He is a senior visiting research fellow at the School of Architecture and Civil Engineering, University of Bath and a consultant for the Norwegian Institute for bio-economy research

Scientific Advisory Board Members.

Dr Roberto Torelli

Roberto is the joint owner and head technician of L'italiana Aromi. He is the 4th generation at the helm of the family business with a lifetime of acquired knowledge within the global food and beverage, and neutraceutical industries. His knowledge and perfection of application has earned him recognition as an expert in his field. He has developed a deep understanding of the behaviour of raw materials as flavourings in products ensuring full traceability through to the finished product.

Professor Michael P. Lisanti BA in Chemistry, Magna Cum Laude (New York University) MD-PhD, Tri-Institutional MD-PhD.
Founder and Director of Manchester Centre for Cellular Metabolism (MCCM), University of Manchester, Director of Breast Cancer Now Research Unit, Institute of Cancer Sciences, University of Manchester, Professor and Chair of Cancer Biology at Muriel Edith Rickman Chair of Breast Oncology, University of Manchester. Professor Lisanti has over 500 publications in peer-reviewed journals. His H-index is 132, with more than 63,000 citations

Tony Lesowiec – over 19 years' experience in the innovation and development of disruptive technologies in waste water treatment sector. Idealization of new product concepts, accessing R&D grants (in excess of £25M) plus the technical experts to build these new products, and partnering with robust supply-chain companies to ensure market penetration and commercialization. Started as a Chemist at 3M, and has worked for Fuchs Lubricants as a Development Chemist, he then joined Pera, works as a Business Manager at University of Sheffield, runs his own business consultancy Keystone Innovation Ltd. Worked in developing several cutting-edge waste water treatment technologies including: microfiltration, ultrafiltration, nano-filtration, reverse osmosis, bioremediation, ozone treatment, plus novel UV/TiO2 photo-catalytic oxidation and in-situ carbon regenerative adsorption for water polishing (removing low-level soluble organics in water), rainwater harvesting projects, and re-use and recycling of water-soluble metalworking fluids.

Scientific Advisory Board Member

George Leon

an expert on metabolic Physical and Nutritional Biochemistry,

FOUNDER OF EUCRASIA AND LEADER OF THE ELITE SPORTS SCIENTIFIC TEAM

George studied Physical Sciences in National University of Athens (Greece) and he is specialized in the Food Biochemistry and the Human Metabolic Biophysics' (England). Also he is a Certified Consultant of Kinesiology and Peritoneal Structure of Human Body (Germany). Having 10 years of professional experience at Pharmaceutical Manufacturing, from 1999 till today, he is the co-founder and Sr. Managing Director of the Ergo-measure and Nutritional Center "RSTS S.A." specializing in Metabolic Rehabilitation in Greece. From 2004 till today, he is the co-founder and Sr. Manager of the Diet Center "Omoiostasis S.A." specializing in identifying the link between weight loss, auto-immune ailments and DNA structure. From 2006 till today, he is the co-founder and Sr. Manager of the Standard Biometric Center "Xartografoi Ygeias L.P.". George Leon has more than 20 years of experience as a Molecular Nutritionist (Metabolism) and more than 15 years of experience as a scientific partner of athletic unions and sports federations worldwide* regarding athlete's nutrition & performance. Currently, he partners with reputable clinics and large hospitals in Greece** along with diagnostic scientific and health centers in Europe*** in an effort to perform scientific research for metabolism. He publishes numerous scientific journal papers . From 2009 till today , he has participated in a scientific research on Human Metabolism with the University of Thessaly (Greece).

* Greek National Basketball Team (2003-2014), Greek National Football Team (2003 – 2005), China National Basketball Team, (2013), Olympiakos Basketball Team (Greece) (2003-2005,2008 -2014), Aris Basketball Team (Greece) (2002-2004), Panathinaikos Basketball Team (Greece) (1997-2000), Hraklis Basketball Team (Greece) (2004-2005), CSKA Moscow Basketball Team (Russia) (2003 -2006), Dynamo Moscow Basketball Team (Russia) (2006-2008), Valencia Basketball Team (Spain) (2005-2006), Athletes Of National Team Of Field And Track Federation Of Jamaica (2012)

** GREECE : METROPOLITAN CLINIC, IATRIKO FALIROU ETC.

*** EUROPE : "PRAXIS" HOLISTIC CENTER IN BERLIN

INNOVATION VARIFICATION

LEADING AUTHORITIES ON PURE IONIC DRINKING WATER

AUTHENTICATED BY UK INNOVATE. BRITISH GOVERNMENT BACKED AWARDS AND THE EUROPEAN COMMISSION SEAL OF EXCELLENCE

AUTHENTICATED BY LITALIANA AROMI LABORATORIES FOR PRODUCING FLAVOURED ALKALINE WATER

- WET AES Water has been tried and tested by the labs based at their head quarters in Milan. Litaliana Aromi are one of the world's leading companies on natural flavouring and infusions. They are a family owned and run billion a Euro business that was founded in 1880.
- The company have carried out extensive trials using our healthy anti-oxidant alkaline water with their natural flavours & infusion processes with remarkable results.
- For the first time they developed a stable, sugar free, flavoured alkaline drink. This has never been achieved before. All flavoured drinks are acidic. Coke Cola, for example, has a pH balance of about 2.4.