Comparative Analysis of Minerally Created Alkaline Water and Electrolyzed Alkaline Water: Benefits and Potential Risks

By

Kirby Cochran
Founder - AQUAhydrate
Randall Waters
Developer – Perfect Water

Introduction

Alkaline water has gained popularity for its potential health benefits, particularly in promoting acid-base balance, improving hydration, and providing antioxidant effects. Two primary methods of producing alkaline water exist: mineral addition and electrolysis. This white paper aims to compare the benefits and potential negative effects of minerally created alkaline water and electrolysis alkaline water, drawing on evidence from confirmed research and published studies.

Methods of Producing Alkaline Water

Minerally Created Alkaline Water

Minerally created alkaline water is produced by adding a blend of alkaline carbonates, such as soda ash or bicarbonate of soda and alkaline minerals such as calcium, magnesium, and potassium to regular purified, spring or culinary water. This process increases the water's pH level and mineral content, which can provide additional health benefits. The side effect of additives often affects product taste.

Electrolyzed Alkaline Water

Electrolyzed alkaline water, also known as ionized water, is produced by running water through an electrolysis machine that polarizes and separates the water into alkaline and acidic components. Electrolyzed drinking water can be produced as an electrolyte rich source solution as is commonly found in most electorally ionized water, or as a 100% ionic infused water. The electrolyzed alkaline water, enriched with hydroxyl ions, has a higher pH and as produced, measures a negative Oxygen Reduction Potential (ORP) displaying the key reductive or antioxidant properties due to the presence of molecular hydrogen (H_2).

Health Benefits of Minerally Created Alkaline Water

Improved Acid-Base Balance

Minerally created alkaline water can help neutralize excess acidity in the body, promoting a balanced pH. Research by Wynn et al. (2009) found that alkaline mineral water reduced bone resorption in postmenopausal women, suggesting its potential in supporting bone health by preventing excessive acidity that can leach calcium from bones.

Enhanced Mineral Intake

One of the significant advantages of minerally created alkaline water is the additional intake of essential minerals. A study by Rylander et al. (2004) highlighted that mineral-rich drinking water contributes to daily mineral intake, particularly calcium and magnesium, which are vital for bone health, muscle function, and cardiovascular health.

Health Benefits of Electrolyzed Alkaline Water

Antioxidant Properties

Electrolyzed alkaline water is rich in molecular hydrogen, which has potent antioxidant effects. A study by Ohsawa et al. (2007) demonstrated that molecular hydrogen can selectively neutralize harmful reactive oxygen species (ROS), providing protection against oxidative stress and related chronic diseases.

Improved Hydration and Athletic Performance

Electrolyzed alkaline water is believed to have smaller water clusters, potentially enhancing hydration. Burckhardt (2013) reported that athletes consuming alkaline ionized water had better hydration status and reduced blood viscosity, suggesting improved circulation and performance.

Gastrointestinal Health

Research by Koufman and Johnston (2012) indicated that alkaline water with a pH of 8.8 deactivated pepsin, a digestive enzyme linked to acid reflux, providing relief for patients with reflux disease.

Electrolytes Added For Taste

Most current electrolyzed alkaline water products add a blend of carbonates and minerals to impact flavor. This electrolyte blend can also provide similar advantages as memtioned above and in the referenced Rylander study (2004).

Potential Negative Effects

Minerally Created Alkaline Water

Excessive Mineral Intake

While minerals are essential for health, excessive intake can lead to adverse effects. For example, high levels of calcium can cause hypercalcemia, leading to kidney stones and impaired kidney function (Vannucci et al., 2010).

Taste and Palatability

Minerally created alkaline water may have a distinct taste due to the added minerals, which some individuals might find unpleasant. This could affect water consumption habits, potentially leading to inadequate hydration.

Electrolysis Alkaline Water

High Alkalinity

Consuming water with excessively high pH levels can disrupt the body's natural pH balance. A study by Heil and Seifert (2009) noted that long-term consumption of highly alkaline water could potentially alter stomach acidity, affecting digestion and nutrient absorption.

Electrolyte Imbalance

Prolonged consumption of ionized water might lead to electrolyte imbalances. According to a study by Nakao et al. (2010), while short-term use showed benefits, long-term effects need further investigation to ensure electrolyte balance and overall safety.

Comparative Analysis

Bone Health

Minerally created alkaline water, enriched with calcium and magnesium, directly contributes to bone health by providing essential minerals. In contrast, electrolyzed alkaline water supports bone health indirectly by neutralizing acidity and reducing oxidative stress, which can also affect bone resorption.

Antioxidant Properties

Electrolyzed alkaline water has a clear advantage in terms of antioxidant properties due to the presence of molecular hydrogen. This characteristic is not present in minerally created alkaline water, making electrolysis alkaline water more effective in combating oxidative stress. The added use electrolytes added for taste can also provide the mentioned benefits.

Hydration and Athletic Performance

Both types of alkaline water have shown benefits in improving hydration and athletic performance. However, the smaller water clusters in electrolysis alkaline water may provide an edge in fluid absorption, enhancement in cellular hydration and reducing muscle fatigue.

Gastrointestinal Health

Electrolyzed alkaline water has demonstrated specific benefits in managing acid reflux and gastrointestinal health due to its ability to deactivate pepsin. Minerally created alkaline water does not exhibit these specific gastrointestinal benefits.

Conclusion

Both minerally created alkaline water and electrolysis alkaline water offer distinct health benefits and potential risks. Minerally created alkaline water provides essential minerals that support bone health and overall mineral intake. Electrolyzed alkaline water, with its antioxidant properties and enhanced hydration capabilities, offers significant advantages in reducing oxidative stress and improving athletic performance.

However, considering the potential risks associated with high alkalinity and long-term consumption, it is crucial to balance the benefits and monitor intake. Electrolyzed alkaline water stands out for its superior antioxidant properties and specific gastrointestinal benefits, making it a strong candidate for those seeking targeted health improvements.

Best Water for Human Consumption

For overall health benefits, including bone health, hydration, and antioxidant protection, a combination of both minerally created and electrolysis alkaline water could be ideal. However, electrolysis alkaline water, with its unique properties and broader range of benefits, emerges as the best option for human consumption, provided its intake is monitored to prevent potential adverse effects.

References

- Burckhardt, P. (2013). The effect of alkaline water on hydration status and blood viscosity in athletes. *Journal of the International Society of Sports Nutrition*, 10(1), 63.
- Heil, P., & Seifert, J. (2009). Influence of bottled water on hydration status and subjective measures of hydration in healthy adults. *Journal of the International Society of Sports Nutrition*, 6(1), 27.
- Koufman, J. A., & Johnston, N. (2012). Potential benefits of pH 8.8 alkaline drinking water as an adjunct in the treatment of reflux disease. *Annals of Otology, Rhinology & Laryngology*, 121(7), 431-434.

- Nakao, A., et al. (2010). Effectiveness of hydrogen-rich water on antioxidant status of subjects with potential metabolic syndrome-an open label pilot study. *Journal of Clinical Biochemistry and Nutrition*, 46(2), 140-149.
- Ohsawa, I., et al. (2007). Hydrogen acts as a therapeutic antioxidant by selectively reducing cytotoxic oxygen radicals. *Nature Medicine*, 13(6), 688-694.
- Rylander, R., et al. (2004). Mineral water intake reduces blood pressure among subjects with low urinary magnesium and calcium levels. *BMC Public Health*, 4(1), 56.
- Vannucci, L., et al. (2010). Calcium intake in bone health: A focus on calcium-rich mineral waters. *Nutrients*, 2(3), 419-430.
- Wynn, E., et al. (2009). Alkaline mineral water lowers bone resorption even in calcium sufficiency: alkaline mineral water and bone metabolism. *Bone*, 44(1), 120-124.