



Controls Cholesterol and Sugar



Aava's bicarbonate-rich mineral composition helps control LDL cholesterol, control blood sugar, improve insulin sensitivity and have positive implications on Diabetes.

1. Evidence-Based Complementary and Alternative Medicine Journal: *The Consumption of Bicarbonate-Rich Mineral Water Improves Glycemic Control 2015*

Hot spring water and natural mineral water have been therapeutically used to prevent or improve various diseases. Specifically, consumption of bicarbonate-rich mineral water (BMW) has been reported to prevent or improve type 2 diabetes (T2D) in humans.

To elucidate the molecular level effects of BMW consumption on glycemic control, blood metabolome analysis and fecal microbiome analysis were applied to the BMW consumption test. During the study, 19 healthy volunteers drank 500 mL of commercially available tap water (TW) or BMW daily. TW consumption periods and BMW consumption periods lasted for a week each and this cycle was repeated twice.

Biochemical tests indicated that serum glycoalbumin levels, one of the indexes of glycemic controls, decreased significantly after BMW consumption. Metabolome analysis of blood samples revealed that 19 metabolites including glycolysis-related metabolites and 3 amino acids were significantly different between TW and BMW consumption periods. Additionally, microbiome analysis demonstrated that composition of lean-inducible bacteria was increased after BMW consumption.

Our results suggested that consumption of BMW has the possible potential to prevent and/or improve T2D through the alterations of host metabolism and gut microbiota composition.

<https://pubmed.ncbi.nlm.nih.gov/26798400/>

2. Journal of Nutrients 2017: *Prevention and Therapy of Type 2 Diabetes-What Is the Potential of Daily Water Intake and Its Mineral Nutrients?*

We aim to present an overview of the possible influence of drinking water in general and mineral water in particular in improving glycemic parameters in persons with or without type 2 diabetes. We performed a literature search that produced 15 randomized controlled trials (RCTs) on this topic with mainly small sample sizes. We also discuss relevant observational and animal studies as well as the effects of important supplements in mineral water such as hydrogen carbonate and magnesium.

Meta-analyses of prospective cohort studies and other observational studies, **studies with animal models and interventional studies using hydrogencarbonate and magnesium supplements suggest a probable positive effect of drinking water and mineral water in particular on glycemic parameters, supporting the positive results found in some of the RCTs, especially those substituting diet beverages or caloric beverages with water, or those using bicarbonate and magnesium-rich water.**

<https://pubmed.ncbi.nlm.nih.gov/28829398/>



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3. Advanced Pharmaceutical Bulletin 2014: *Hypolipidemic Activity of a Natural Mineral Water Rich in Calcium, Magnesium, and Bicarbonate in Hyperlipidemic Adults*

Purpose: This study compared the effects of a mineral water rich in calcium, magnesium, bicarbonate, and sulfate and a marketed mineral water with a composition similar to that of urban water on the lipid profile of dyslipidemic adults.

Methods: In a randomized controlled trial, 32 adults received one liter of "rich mineral water" daily for one month, and 37 adults drank the same amount of normal mineral water for the same period. Changes in lipid profiles were compared separately in each studied group at the end of one month.

Results: Results showed that mean cholesterol and low density lipoprotein LDL levels were significantly decreased in both studied groups after one month of drinking mineral water ($P < 0.05$); however, no significant differences in high density lipoprotein (HDL) and triglyceride (TG) levels were seen in either group one month after drinking.

Conclusion: A one-month intake of mineral water rich in calcium, magnesium bicarbonate, and sulfate decreased cholesterol and LDL levels in dyslipidemic adults.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3992968/>

4. American Diabetes Association 2011: *Low Water Intake and Risk for New-onset Hyperglycemia*

Objective: Water intake alters vasopressin secretion. Recent findings reveal an independent association between plasma copeptin, a surrogate for vasopressin, and risk of diabetes.

Research design and methods: Participants were 3,615 middle-aged men and women, with normal baseline fasting glycemia (FG), who were recruited in a 9-year follow-up study. Odds ratios (ORs) and 95% CIs for the incidence of hyperglycemia ($FG \geq 6.1$ mmol/L or treatment for diabetes) were calculated according to daily water intake classes based on a self-administered questionnaire.

Results: During follow-up, there were 565 incident cases of hyperglycemia. After adjustment for confounding factors, ORs (95% CIs) for hyperglycemia associated with classes of water intake (<0.5 L, $n = 677$; 0.5 to <1.0 L, $n = 1,754$; and >1.0 L, $n = 1,184$) were 1.00, 0.68 (0.52-0.89), and 0.79 (0.59-1.05), respectively ($P = 0.016$).

Conclusions: Self-reported water intake was inversely and independently associated with the risk of developing hyperglycemia

<https://pubmed.ncbi.nlm.nih.gov/21994426/>



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5. International Journal of Basic and Clinical Endocrinology 2018: *Water intake keeps type 2 diabetes away? Focus on Copeptin*

Introduction: In both diabetic subjects and animal models high levels of vasopressin (AVP) have been detected. The relationship between AVP and glucose metabolism is mediated through several direct and indirect effects and most of them are still unknown.

Methods: We have reviewed 100 manuscripts retrieved from Cochrane Library, Embase and Pubmed Databases in order to highlight a possible relationship between copeptin and type 2 diabetes and to provide insights on the molecular mechanism that could explain this association.

Results and conclusions: **AVP potentiates CRH action at pituitary level resulting in an increased ACTH secretion and in turn in an increased cortisol secretion that escapes the negative feedback loop. Further, AVP regulates insulin and glucagon secretion through V1b receptor and promotes hepatic glycogenolysis and gluconeogenesis through V1a receptor.** In addition to worsen glucose metabolism, AVP has been reported to have a role in the pathogenesis of diabetic complications such as cardiovascular diseases, kidney and ocular complications. Due to the very low concentration of AVP in the blood, the small size and poor stability, the assay of AVP is very difficult to perform. **Thus, copeptin, the stable C-terminal portion of the prepro-vasopressin peptide has been identified as an easier assay to be measured and that mirrors AVP activity**

<https://pubmed.ncbi.nlm.nih.gov/30027433/>

6. NIH Vopr Kurortol Fizioter Lech Fiz Kult Journal Clinicl Trial: *Changes in Tissue Insulin Sensitivity Under the Action of Potable Mineral Waters (clinico-experimental research) 1999*

The trial included 43 Wistar rats with alloxan diabetes, 80 patients with impaired carbohydrate tolerance, 80 patients with non-insulin-dependent diabetes mellitus (NIDDM). 22 healthy volunteers and 60 intact rats served control. Glucose levels were measured 10, 20, 30, 45, 60, 90 and 120 minutes after insulin administration (3.7 U/m²). **It was found that insulin resistance in impaired carbohydrate tolerance was higher than in diabetes. Mineral water intake improves recovery of sensitivity to insulin. This improvement was more evident in intact rats. Therefore, mineral water is a good prophylactic modality.**

<https://pubmed.ncbi.nlm.nih.gov/10641542/>

7. The American Society for Clinical Investigation 2019: *Magnesium supplementation improves diabetic mitochondrial and cardiac diastolic function*

In heart failure and type 2 diabetes mellitus (DM), the majority of patients have hypomagnesemia, and magnesium (Mg) supplementation has improved cardiac function and insulin resistance. Recently, we have shown that DM can cause cardiac diastolic dysfunction (DD). Therefore, we hypothesized that Mg supplementation would improve diastolic function in DM. High-fat diet-induced diabetic mouse hearts showed increased cardiac DD and hypertrophy.



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DM mice also had hypomagnesemia. Ventricular cardiomyocytes isolated from DM mice exhibited decreased mitochondrial ATP production, a 1.7 ± 0.2 -fold increase of mitochondrial ROS, depolarization of the mitochondrial membrane potential, and mitochondrial Ca^{2+} overload.

Dietary Mg administration (50 mg/ml in the drinking water) for 6 weeks increased plasma Mg concentration and improved cardiac function. At the cellular level, Mg improved mitochondrial function with increased ATP, decreased mitochondrial ROS and Ca^{2+} overload, and repolarized mitochondrial membrane potential. In conclusion, Mg supplementation improved mitochondrial function, reduced oxidative stress, and prevented DD in DM

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6485371/>

8. The Journal of Clinical Experimental Cardiology 2017: Mineral Water Rich in Bicarbonates Reduces Serum Cholesterol in Moderate Risk Cholesterol Males

According to the World Health Organization (WHO), the mortality from coronary heart disease in Indonesia reached 138,380 or 10% of total deaths per year in 2014.

Dyslipidemias are disorders of lipoproteins that can be manifested by the elevation of serum total cholesterol, Low-Density Lipoprotein (LDL) cholesterol and triglyceride concentrations and a decrease in the High-Density Lipoprotein (HDL) cholesterol concentration.

Hydroponic therapy (drinking of mineral water), in particular water that is rich in natural bicarbonate has shown to have an effect in reducing cholesterol anemic and lipaemic levels by increasing the lipoprotein metabolism.

This study compares the consumption of a mineral water that is rich in natural bicarbonate (ARDESYA®, France) (MWH) versus a marketed mineral water that is low in bicarbonate (MWL) and their effects in lipoprotein metabolism in high cholesterol males subjects.

Twenty-two (22) males with elevated serum total cholesterol and a mean BMI of between 23.9 ± 4.4 kg/m² were randomized into 2 groups. Each group received either (MWH) (n=14) (sponsored by ARDESYA®, France), or MWL (n=8). Subjects drank 1.25 liter of designated water per day for 28 weeks. Three visits were planned at the clinical center post screening, which included the first day before mineral water was consumed (V1), 15th day (V2), and 29th day (V3). **Results indicated that there was significant reduction in serum total cholesterol (p=0.002) and LDL cholesterol (p<0.001) in subjects drinking MWH, but not in the MWL group.**

In conclusion, regular consumption of rich bicarbonated water can significantly lower total cholesterol and LDL-c in moderate risk cholesterol males

<https://www.longdom.org/proceedings/mineral-water-rich-in-bicarbonates-reduces-serum-cholesterol-in-moderate-risk-cholesterol-males-56679.html>