



VILNIUS SALININKAI GYMNASIUM

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Research of mineral water in the Lithuanian
markets



INTRODUCTION

- Mineral water is naturally formed water that contains dissolved minerals. Because of them, it differs in its taste and may have healing properties. In the earliest times of human existence, mineral water has been used for therapeutic purposes. It was used to treat various diseases and wounds. Lithuania is rich in water. Most of it is underground, and springs whose mineral waters are gushing from the depths of the earth. Mineral waters of Lithuanian origin: "Vytautas", "Tichė" and "Neptūnas". As many different types of mineral water are sold in Lithuania, I decided to investigate how much and what mineral substances and additives are in the mineral water, and which mineral water is the most beneficial for health.

RESEARCH PART

- To find out what minerals are in mineral water first you need to go to store. Twenty-seven mineral waters were selected for testing at the store. Once the labels were photographed, they had to be examined. 3 mineral waters were taken in glass containers and twenty-four in plastic containers.

Eil. Nr.	Name	Type of bottle	Still	Capacity	Minerals	Producer
1.	„Aset“	Stiklas	+	1,5 l	Cl ⁻ ; Mg ²⁺ ; K ⁺ ; CO ₂	Lietuva
2.	„Aix“	Plastikas	-	1,5 l	Mg ²⁺ ; Na ⁺ ; Cl ⁻ ; NO ₃	
3.	„Borjomi“	Plastikas	+	1,25 l	Na ⁺ ; Ca ²⁺ ; Mg ²⁺ ; HCO ₃ ; Cl ⁻ ; CO ₂	
4.	„Cristaline“	Plastikas	-	1,5 l	Ca ²⁺ ; Mg ²⁺ ; Na ⁺ ; K ⁺ ; HCO ₃ ; SO ₄ ⁻² ; Cl ⁻	
5.	„Clever“	Plastikas	+	1,5 l	K ⁺ ; Na ⁺ ; CO ₂	
6.	„Donat Mg“	Stiklas	-	1 l	Mg ²⁺ ; Ca ²⁺ ; HCO ₃ ; SO ₄ ⁻²	Lietuva
7.	„Darida“	Plastikas	-	1,5 l	Na ⁺	Lietuva
8.	„Evian“	Stiklas	-	1,5 l	Ca ²⁺ ; Na ⁺ ; K ⁺	
9.	„Essentuky“	Plastikas	-	1,5 l	HCO ₃ ; SO ₄ ⁻² ; Cl ⁻ ; Mg ²⁺ ; Na ⁺ ; H ₂ BO ₂ ; K ⁺	
10.	„Hermis“	Plastikas	+	1 l	CO ₂ ; Ca ²⁺ ; Mg ²⁺ ; K ⁺ ; Na ⁺ ; SO ₄ ⁻² ; Cl ⁻ ; HCO ₃	Lietuva
11.	„Norte“	Plastikas	+	1,5 l	Ca ²⁺ ; CO ₂ ; NaCl	Lietuva
12.	„Norte vita fruit“	Plastikas	-	1,5 l	NaCl ; CO ₂ ; C ₆ H ₈ O ₇	Lietuva
13.	„Norvil“	Plastikas	+	1,5 l	HCO ₃ ; Cl ⁻ ; SO ₄ ⁻² ; Na ⁺ ; K ⁺ ; Ca ²⁺ ; Mg ²⁺ ; CO ₂	
14.	„Neptūnas“	Plastikas	+	1,5 l	Na ; Cl ; CO ₂ ;	Lietuva
15.	„Pellegrino“	Plastikas	+	1 l	CO ₂ ; SO ₄ ⁻² ; HCO ₃ ; Ca ²⁺ ; Mg ²⁺ ; Cl ⁻	
16.	„Perrier“	Plastikas	-	1,5 l	Ca ²⁺ ; Mg ²⁺ ; Na ⁺ ; HCO ₃ ; SO ₄ ⁻² ; Cl ⁻ ;	

17.	„Ph8“	Plastikas	+	1,5 l	CO_2 ; Ca^{2+} ; Mg^{2+} ; Na^+ ; K^+ ; F ; Cl^-	Lietuva
18.	„Rasa“	Plastikas	+	1,5 l	CO_2 ; Mg^{2+} ; Ca^{2+} ; Na^+ ; K^+ ; SO_4^{-2} ; HCO_3 ; Cl^- ; F	Lietuva
19.	„Rasa light“	Plastikas	–	1,5 l	CO_2 ; Mg^{2+} ; Ca^{2+} ; Na^+ ; K^+ ; SO_4^{-2} ; HCO_3 ; Cl^-	Lietuva
20.	„Sairme“	Plastikas	+	1 l	CO_2	
21.	„Tiche“	Plastikas	–	1,5 l	SO_4^{-2} ; Ca^{2+} ; Na^+ ; Mg^{2+}	Lietuva
22.	„Uniqa“	Plastikas	–	1,5 l	I ; Ca^{2+} ; Mg^{2+} ; Na^+ ; Cl^-	Lietuva
23.	„Vichy fresh“	Plastikas	–	1,5 l	$\text{C}_6\text{H}_8\text{O}_7$; E202; $\text{C}_6\text{H}_{12}\text{O}_6$	
24.	„Vichy“	Plastikas	+	1,5 l	CO_2 ; K^+ ; Mg^{2+} ; Na^+	Lietuva
25.	„Vytautas“	Plastikas	+	1,5 l	CO_2 ; NaCl ; Ca^{2+} ; Cl^- ; HCO_3 ; K^+ ; Mg^{2+} ; Na^+ ; SO_4^{-2}	Lietuva
26.	„Vittle“	Plastikas	–	1,5 l	Ca^{2+} ; Mg^{2+} ; Na^+ ; K^+ ; HCO_3 ; SO_4^{-2} ; Cl^-	
27.	„Žalia giria“	Plastikas	–	1,5 l	F ; Cl^- ; SO_4^{-2} ; Na^+ ; K^+ ; Ca^{2+} ; Mg^{2+}	Lietuva

The substances were found in mineral water

1. Ca^{2+} - Calcium
2. Mg^{2+} - Magnesium
3. SO_4^{-2} - Sulfates
4. HCO_3 - Calcium carbonate
5. Na^+ - Sodium
6. Cl^- - Chlorine
7. F - Fluorine
8. K^+ - potassium
9. I - Iodine
10. $\text{C}_6\text{H}_8\text{O}_7$ - Citric acid
11. $\text{C}_6\text{H}_{12}\text{O}_6$ - Glucose
12. E202 - Potassium sorbate

Effects of minerals to the human body



Calcium

- Calcium is essential for the body's vital functions. It is present in all plant and animal tissues and fluids , it stimulate heart work, activate blood protective proteins, help it to clot, calcium is the most important part of the animal skeleton.



Magnesium

- Magnesium is one of the most essential trace elements for athletes and dieters. Magnesium is rich in nuts, grapes, grains, cabbage, carrots, buckwheat, soybeans, rice.



Amžius	Kalcis (mg/diena)
nuo 0 iki 6 mėnesių	210
nuo 7 iki 12 mėnesių	270
nuo 1 iki 3 metų	500
nuo 4 iki 8 metų	800
nuo 9 iki 18 metų	1300
nuo 19 iki 50 metų	1000
51+ metų	1200

Sulfates

- Sulphates (SO₄²⁻) combine excess steroid hormones to maintain the required activity of biologically active substances in the body.



Calcium carbonate

- Calcium carbonate is a salt of calcium and carbon dioxide. Calcium carbonate can be used as cure. Gives strength to the bones.



Sodium

- Sodium is needed in the body to maintain the osmotic pressure of cells, affects the water balance in the body, regulates blood pH, stimulates nerve activity.



Chlorine

- Water is disinfected with the help of chlorine. In Western Europe, 95% of drinking water is disinfected with chlorine and chlorine compounds. Too much chlorine in body can poison you.



Fluorine

- Fluoride is needed to make toothpaste, fluorinate water. Adult teeth absorbs only 20% of fluoride in toothpaste. Excess fluoride displaces calcium from the bones. This is especially dangerous for the elderly. Therefore, one of the many causes of tooth sensitivity is bone thinning



Potassium

- Potassium is important for nerve and muscle cell activity. Potassium is needed to maintain water balance, has an effect on the transmission of nerve impulses, muscle contraction, heart rate.



Iodine

- Iodine is very important for the thyroid hormones that regulate cell metabolism. It is mainly found in sea fish, cod liver, sea cabbage.



Citric acid

- Citric acid increases the activity of many antioxidants, but is not itself an antioxidant. Its antioxidant effect helps to minimize the harmful effects of the sun and the environment. Well whitens and moisturizes the skin.



Glucose

- Glucose is the starting material for many compounds necessary for the living organism. One of the two most important functions of glucose in living organisms is to supply them with energy.



Potassium sorbate

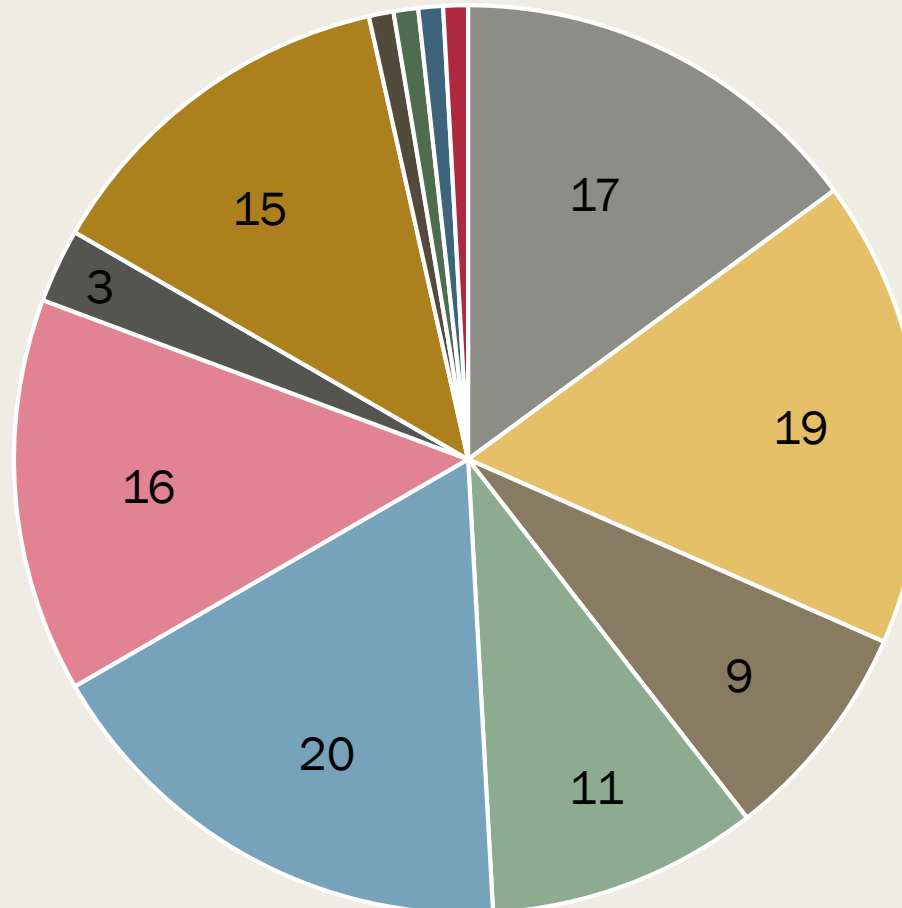
- Potassium sorbate is irritating to the skin, eyes and respiratory tract. Researches show that sorbates are gene toxic and mutagenic to human blood cells.



Content of substances in mineral water

Quantity of substances

The numbers on the chart indicate how much of the tested water had certain substances



■ Kalcis ■ Magnis ■ Druskos ■ Kalcio karbonatas ■ Natris ■ Chloro ■ Fluoras ■ Kalis ■ Jodas ■ Citrinų rūgštis ■ Gliukozė ■ Kalio sorbatas

Bottle collecting station in Lithuania

- **Bottle collecting station in Lithuania** - a machine that collects containers and returns a deposit for it. This machine sorts the packages and compresses or assembles them, thus reducing their volume. This saves further logistics costs. A deposit of 10 cents can be recovered upon return of the packaging marked with the deposit system mark. The system includes metal, glass and plastic beverage packaging marked with the deposit system logo.



Mineral water treatment in Lithuania

- Biuvete - a building on a mineral spring, from which gushing natural mineral water is taken. Mineral water "Gintaras" is being used to treat people in Eglė's sanatorium. Amber water is recommended to drink for patients with chronic inflammation of the stomach.
- This mineral water regulates the acidity of gastric juice, promotes the secretion of gastric juice, reduces smooth muscle tone, inhibits inflammation, regulates metabolism.

composition

M 4 $\frac{\text{Cl } 76 \text{ SO}_4 \text{ HCO}_3^3 \text{ 10}}{\text{/Na+K/ 56 Ca 26 Mg 16}}$ pH 7,68

CONCLUSIONS

After research, I found out that the most common substance in mineral water is Sodium. It has been found in the waters of as many as 20 producers. The mineral water that had the most of all kinds of minerals was “Vytautas”. As many as 9 different minerals were found in it. In my opinion, it is healthiest to drink spring water, but if there is no such opportunity, I advise to drink “Vytautas”, because it contains the most minerals and is quite inexpensive and it is the most popular water in Lithuania is “Vytautas”.

Thank you for your attention



SOURCES

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