

# Study on Mineral Water Consumption in Romania

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## Abstract

*Human health is conditioned by the quantity and quality of the consumed water, which has multiple functions in the body. Water quality is influenced by its chemical composition and the excess or the absence of certain substances that may cause several diseases.*

*The production and marketing of mineral water in Romania is regulated in the sense that its availability on the market is only possible after receiving the approval from the National Agency for Mineral Resources (NAMR) or from a competent authority of an EU member state.*

*The annual water consumption average in Romania is 55 litres per capita and it is at the middle of the European consumption ranking, which is, on average about, 45 litres per capita.*

*The main brands on the Romanian market are: Borsec, Zizin, Bucovina, Poiana Negri, Izvorul Alb, Carpatina, Roua Muntilor, Perla Harghita.*

*The production, distribution and marketing of mineral water is a business worth billions of euros, and those involved focus on quality, packaging and marketing strategies.*

**Keywords:** *water; mineral waters; marketing; sale; distribution; brand.*

**JEL Classification:** *D3; F14; O52.*

## Introduction: The Importance of Water in Human Existence

Representing a considerable part of body weight, water is a vital element for the body. If a person can live several weeks without food, without water the person cannot live for more than two days. Water plays an essential role in food digestion, body hydration, neurological brain activity etc.

As a good business subject to marketing, water ranks first in the world's most worthy merchandise category.

Water is required for every function of the human body and it should be consumed daily to ensure health.

Doctor and scientist research converges to a clear conclusion: there could be no life on Earth without water. Live organisms contain about 70-98% water.

The human body contains about 70% water, the percentage being different depending on age (80% young, 60-65% old). Water is found in different percentages in all tissues: adipose tissue, bones, muscles, lungs, kidneys, blood, brain (Table 1)

**Table 1.** The proportion of water in some parts of the human body

Part of body	blood	muscle	brain	lungs	kidneys	eyes	bones
Water percent	83%	75%	83%	86%	83%	95%	31%

Source: based on information from <http://www.scientia.ro/biologie/corpul-omenesc/3883-apa-in-organism.html>

The main functions of water in live organisms are:

- Helps to transport and absorb nutrients, being solvent for many minerals: Na, Ca, K, Mg, Cl;
- Helps digestion and prevents constipation;
- Maintains proper kidney function;
- It has the role of dilution and waste treatment;
- Helps maintain body temperature;
- Controls the acid-base balance;
- It is the main medium of transmission of information to all body cells.

The daily water requirement of a healthy adult is approx. 2.5 litres of which 1.5 litres should be represented by drinking water, the rest coming from the liquids that are part of the composition of the food consumed and the water resulting from the metabolism of the ingested nutrients with the food.

In drinking water, besides the natural components there may be other chemical compounds accidentally infected by contamination. According to WHO (World Health Organization) norms (Banu, 2002) chemical substances in water can be grouped in three categories:

1. Substances with harmful action on living organisms. Concentration above the limits imposed by standards is causing harm to consumers. In this category enter: F, Cr, Pb, As, Se, Cd and cyanides.
2. Compounds that do not show toxicity to the body, but their presence beyond the permissible limits generates sensory and physical characteristics that make water unattractive. It is included in this category: Fe, Mn, Cu, Zn, Ca, Mg, SO<sub>4</sub><sup>2-</sup>, Cl<sup>-</sup> and phenols.
3. Substances whose presence has the effect of contaminated water and makes it non-drinkable: NH<sub>3</sub>, H<sub>2</sub>S, phosphates, nitrites, nitrates.

Water pollution can have different sources such as:

- Bacteria, viruses and other pathogens;
- Organic matter from sewage and industrial wastes;
- Detergent, hydrocarbons, phenols;
- Phosphate and nitrate fertilizers;
- Inorganic and mineral salts from industrial waste water discharged into rivers.

Public health is directly influenced by water quality. Some of the non-communicable diseases are caused or favoured by the chemical composition of the water consumed (Table no. 2).

**Table 2.** The main types of conditions favoured the chemical composition of water

Disease	Cause
Endemic goiter	insufficient iodine content
Dental caries	absence of fluorine (less than 0.5 mg / l)
Endemic fluorosis	excess of fluorine (more than 1.5 mg / l)
Cardio-vascular	calcium deficiency
Lead poisoning	lead concentration of more than 0.1 to 0.2 mg / l (as a result of the use of lead pipes or industrial pollution)

Table 2 (cont.)

Cholera	the cholera vibriion germ resists untreated chlorine water
Typhous	the hectic bacil resists uninfected water
Cadmium poisoning	cadmium intake exceeds 200 µg / day

Source: <http://www.high-health.info/apa/influenta-apei-asupra-sanatatii.htm>

## Formation and Characteristics of Mineral Waters

The water circuit in nature has a continuous character. Thus, evaporated waters from land sources (lakes, rivers, seas, oceans) are transformed into atmospheric water. Air streams carry this water, and in contact with hotter areas, it condenses and falls on the ground, giving rise to surface waters and groundwater (underground waters).

Underground waters, under certain conditions, come to the surface in the form of springs containing varying amounts of salts from the rocks encountered in the path.

When salt content exceeds the concentration of 1 gram per thousand, flat or carbonated mineral water is formed.

Mineral waters come from natural or artificial springs, geologically and physically protected, they have a complex chemical composition, and can generate therapeutic effects. Mineral water is considered to contain at least 250 parts per million total dissolved solids (TDS); no added minerals are allowed in this water. These waters differ from drinking water through the chemical composition and the quality of the connective tissues, through the physical properties and the therapeutic effects confirmed by an institution empowered in this respect.

In order to have a therapeutic effect, mineral water must meet certain conditions:

- Physical qualities of temperature, ph and specific osmolarity;
- Certain chemical characteristics:
  - a mineralization greater than 1 g / l;
  - a concentration of chemicals with proven pharmacological action at the following minimum concentrations: CO<sub>2</sub> - 1 kg / l; Fe - 10 mg / l; Br - 5 mg / l; H<sub>2</sub>S - 1 mg / l; I - 1 mg / l; Ag - 0.7 mg / l etc.;
  - an absence of radioactive compounds or their presence acceptable therapeutic limits;
- Scientifically proven clinical effects.

The main criteria for mineral waters classification are (Munteanu, 2013):

A. Depending on the chemical composition, there are the following types of water:

- alkaline and alkaline earth;
- chlorine-sodium or saline, contains at least 1g of salt / l, comes from sedimentary rocks, contains salt and other substances (I, Br, Ca, Mg, Fe);
- sulfate, which may be: sodium, magnesium, calcium, alaunic, and the like;
- ferruginous, is unstable due to the oxidation tendency of Fe<sup>2+</sup> ions in Fe<sup>3+</sup>, coming from eruptive or sedimentary rocks;
- sulfurous, which is unstable in contact with air, is formed in gypsum or bitumen deposits;
- iodide;
- brominated;
- ferruginous;
- arsenical;
- carbonated;
- radioactive.

B. Depending on the source of origin there are the following types of water:

- deep water, obtained from condensation of volcanic magma;
- surface water, from precipitations infiltrated into the soil and mineralized at the encounter with rocks;
- pond water, existing in underground captive layers.

**Table 3.** List of natural mineral waters (commercial name with letter A) officially recognized in Romania

Crt. No.	Trade name	Source name	Place of exploitation
1.	ALPINA BORȘA	Izvorul nr. 1 bis, Izvorul nr. 2	Baia Borșa (Maramureș county)
2.	AMFITEATRU	Izvorul 3 Copou	Iași (Iași county)
3.	APA CRAIULUI	Izvorul nr. 5 Gâlgoaie	Dâmbovicioara (Argeș county)
4.	AQUATIQUE	Izvorul Bușteni	Bușteni (Prahova county)
5.	AQUA CARPATICA	Izvorul Băjenaru	Păltiniș (Suceava county)
6.	AQUA CARPATICA	Izvorul Haja	Păltiniș (Suceava county)
7.	AQUA CARPATICA	F2 Păltiniș	Păltiniș (Suceava county)
8.	AQUA CARPATICA	Ichim nr. 1 Ichim nr. 4	Gălăuțaș, Bilbor village (Harghita county)
9.	AQUA SARA	F4750 Boholt	Boholt (Hunedoara county)
10.	AQUA VITAL	Sacoșu Mare	Sacoșu Mare (Timiș county)
11.	ARTESIA	A3	Sânsimion (Harghita county)

Source: Monitorul Oficial al României/ The Official Gazette of Romania, Part I., 26 01.2016; Order no. 22/2016 on the approval of the List of Natural Mineral Waters recognized in Romania

*Mineral waters* are those intended for the consumption of the population, which are sold bottled and have a pleasant taste. They are considered food and must be stable, do not show sediment or precipitate on the container (sometimes deferred to prevent precipitation) and do not affect the health of consumers, regardless of the amount consumed. Most of the consumed mineral waters contain CO<sub>2</sub>, or are artificially enriched with CO<sub>2</sub>, to improve the stability of the compounds.

In Romania there are numerous springs of mineral water, such as Govora, Căciulata, Călimănești, Biborțeni, Zizin, Vâlcele, Covasna, Borsec, Sângeorz, Vatra Dornei, Herculane, Lipova and Malnaș Bai.

**Table 4.** List of natural mineral waters (commercial name with letter B) officially recognized in Romania

Crt. No.	Trade name	Source name	Place of exploitation
1.	BĂILE LIPOVA	F11	Lipova (Arad county)
2.	BIBORȚENI	Biborțeni F8	Biborțeni (Covasna county)
3.	BIBORȚENI	Biborțeni F9	Biborțeni (Covasna county)
4.	BILBOR	F1 SNAM	Bilbor (Harghita county)
5.	BILBOR	Q1	Bilbor (Harghita county)
6.	BODOC	Bodoc	Bodoc (Covasna county)
7.	BORSEC	Borsec	Borsec (Harghita county)
8.	BORSEC	Făget BORSEC	Borsec (Harghita county)
9.	BUCOVINA	C7 Secu	Dorna Candrenilor (Suceava county)
10.	BUCOVINA	Roșu	Vatra Dornei (Suceava county)
11.	BUZIAȘ	FII bis Buziaș	Buziaș (Timiș county)

Source: Monitorul Oficial al României/ The Official Gazette of Romania, Part I., 26 01.2016; Order no. 22/2016 on the approval of the List of Natural Mineral Waters recognized in Romania

*Medicinal waters* are considered to be a drug, they are usually highly mineralized, and their consumption takes place at the indication and under the supervision of the physician. Consent for consumption is achieved through complex clinical trials. In terms of health effects, there are sometimes different interpretations from one country to another. Their source is groundwater and bottling usually takes place in the original state, which is why it has sediments at the base of

the container. For these, it is not necessary to adhere to maximum admissible concentrations for some components, which may exceed these limits in the proven situation that they have a therapeutic effect (Feru A., 2012).

**Table 5.** List of natural mineral waters (commercial name with letter C) officially recognized in Romania

Crt. No.	Trade name	Source name	Place of exploitation
1.	CARPATINA	Domogled	Băile Herculane (Caraș-Severin county)
2.	CARPATINA	Toșorog	Toșorog (Neamț county)
3.	CARPATINA	F20B Lipova	Lipova (Arad county)
4.	CERTEZE	Certeze	Certeze (Satu Mare county)
5.	CEZARA	Băcăia	Băcăia (Hunedoara county)
6.	CHEILE BICAZULUI	Bicazul Ardelean (foraj FH1)	Bicazul Ardelean (Neamț county)
7.	CORA	F1 SNAM	Malnaș Băi (Covasna county)
8.	CRISTALINA	FI	Sâncrăieni (Harghita county)
9.	CRISTALINA	A1	Sânsimion (Harghita county)
10.	CRISTALUL MUNȚILOR	Izvorul Pârâul Rece	Vama Buzăului (Brașov county)

Source: Monitorul Oficial al României/ The Official Gazette of Romania, Part I., 26 01.2016; Order no. 22/2016 on the approval of the List of Natural Mineral Waters recognized in Romania

## The Situation of Consumption and Types of Water Marketed in Romania

The main types of water existing in the Romanian commercial network are found in the official list of recognized Natural Mineral Waters and are presented in alphabetical order in Tables 3, 4, 5, 6, 7 and 8. This list is updated every year and is published both in Monitorul Oficial al României (The Official Gazette of Romania) as well as that of the European Union. The marketing of natural mineral water brands on the Romanian market is only possible after the fulfilment of the exploitation and distribution criteria and the obtaining of the opinion from the National Agency for Mineral Resources (NAMR) or from the competent authority of an EU member state.

**Table 6.** List of natural mineral waters (commercial name with letters D,H,I,L,O) officially recognized in Romania

Crt. No.	Trade name	Source name	Place of exploitation
1.	DEALUL CETĂȚII	FH1	Miercurea-Ciuc (Harghita county)
2.	DORNA	Dorna Candrenilor	Dorna Candrenilor (Suceava county)
3.	DORNA	Poiana Vinului	Poiana Vinului/Dealul Floreni (Suceava county)
4.	HERA	Hera	Budureasa (Bihor county)
5.	IZVORUL ALB	Izvorul Alb	Dorna Candrenilor (Suceava county)
6.	IZVORUL CETĂȚII CRIZBAV	Izvor	Crizbav (Brașov county)
7.	IZVORUL MINUNILOR	Izvorul Minunilor - Stâna de Vale	Stâna de Vale (Bihor county)
8.	IZVORUL TĂMĂDUIRII	Sonda F1	Stoiceni Târgu Lăpuș (Maramureș county)
9.	K-Classic	F6 Boholt	Boholt (Hunedoara county)
10.	KEIA	Izvorul Zăganului	Ciucăș (Prahova county)
11.	LIPOVA	F8E, F9 bis	Lipova (Arad county)

12.	LITHINIA	FH2 Parhida	Parhida (Bihor county)
13.	OAȘ	Certeze Negrești	Negrești (Satu Mare county)

Source: Monitorul Oficial al României/ The Official Gazette of Romania, Part I., 26 01.2016; Order no. 22/2016 on the approval of the List of Natural Mineral Waters recognized in Romania

The consumption of carbonated mineral water has a long tradition in Romania, while non-carbonated mineral water (flat) has been in the preferences of some consumers for several decades. By 2010, the market was dominated by 60% of the carbonated mineral waters in the following categories: carbonated (34%), carbonated natural (17%) and naturally carbonated, carbon-dioxide enriched source (4%), partially decarbonated (5%). The remaining 40% of consumption consisted of natural non-carbonated (flat) natural mineral waters, the share of which increased significantly year by year, reaching 55% of the market today, with a trend of growth in the future (Magazine *Magazinul Progresiv*, 2016)

**Table 7.** List of natural mineral waters (commercial name with letters P, R) officially recognized in Romania

Crt. No.	Trade name	Source name	Place of exploitation
1.	PERENNA PREMIER	Calina	Dognecea (Caraș-Severin county)
2.	PERLA APUSENILOR	FH2 Chimindia	Chimindia-Deva (Hunedoara county)
3.	PERLA COVASNEI	F1	Târgu Secuiesc (Covasna county)
4.	PERLA HARGHITEI	F1, F2	Sâncrăieni (Harghita county)
5.	PERLA HARGHITEI	FH2	Sântimbru (Harghita county)
6.	PERLA HARGHITEI	A2	Sânsimion (Harghita county)
7.	POIANA NEGRII	Poiana Negrii	Poiana Negrii (Suceava county)
8.	RARĂUL	Puț Lebeș, FH1	Fundul Moldovei (Suceava county)
9.	ROUA MUNȚILOR	F2 SNAM	Perimetrul Secu - Moara Dracului, Dorna Candrenilor village (Suceava county)
10.	ROUA MUNȚILOR	F4 SNAM Roșu	Perimetrul Roșu-Vatra Dornei, localitatea Roșu (Suceava county)

Source: Monitorul Oficial al României/ The Official Gazette of Romania, Part I., 26 01.2016; Order no. 22/2016 on the approval of the List of Natural Mineral Waters recognized in Romania

Rio Bucovina mineral water bottling and soft drink production company started a 2011 market study, analysing consumer habits in cities with more than 50,000 inhabitants in Romania (<http://www.rio-bucovina.ro/communiques/>). The results show that “Romania owns about 60% of Europe’s water reserves, but only operates 20% of them. The bottled water market in Romania reaches about 11,300,000 hectolitres, or about 0.16 litres / day / person. Potential consumption could reach 1 billion litres / year. However, the estimated increase in consumption is moderate, about 5% per year. Romanians prefer bottled water brands in Romania, so the top sales are headed by Borsec, Dorna, Bucovina, Perla Harghitei or Aqua Carpatica. Bottled water imports account for a maximum of 1-2% of consumption.”

**Table 8.** List of natural mineral waters (commercial name with letters S, T, V, Z) officially recognized in Romania

Crt. No.	Trade name	Source name	Place of exploitation
1.	SAGUARO	F3	Târgu Secuiesc (Covasna county)
2.	SESTINA	Șeștina	Valea Sălardului (Mureș county)
3.	SPRING HARGHITA	FH2M	Miercurea-Ciuc (Harghita county)
4.	STÂNCENI	Stânceni	Stânceni (Mureș county)
5.	STÂNCENI	Ciobotani	Stânceni (Mureș county)
6.	TIVA HARGHITA	F8	Sâncrăieni (Harghita county)
7.	TUȘNAD	Tușnad	Tușnad (Harghita county)
8.	TUȘNAD	Tușnad Nou	Tușnad (Harghita county)

Table 8 (cont.)

9.	VALEA BRAZILOR	Biborțeni F7	Biborțeni (Covasna county)
10.	VALEA IZVOARELOR	S1, S2 Covasna	Covasna (Covasna county)
11.	VĂLCELE	Elisabeta	Vălcele (Covasna county)
12.	ZIZIN	Sursele Zizin	Zizin, Târlungeni village (Brașov county)
13.	7 IZVOARE	Șapte Izvoare	Dobrești (Dâmbovița county)

Source: Monitorul Oficial al României/ The Official Gazette of Romania, Part I., 26 01.2016; Order no. 22/2016 on the approval of the List of Natural Mineral Waters recognized in Romania

In terms of annual consumption per capita, at the European level, Romania, with about 55 litres, is located at a distance from the main consumers Italy, Germany, Spain, Belgium, France, Switzerland, which have values 2-3 times higher (Table 9). The position held by Romania is, however, superior to the northern countries and most former communist countries. The average European mineral water consumption is about 45 litres.

On the Romanian market there are about 35 companies specialized in the bottling and distribution of mineral water. Of these, the top 5, with a share of 85% of total production, are: Romaqua Group, Coca-Cola HBC Romania, Rio Bucovina, Carpathian Springs and private label manufacturers (Magazin Progresiv, 2016)

At territorial level, Harghita county is ranked first, with about 40% of the waters bottled in 2015, and second is Suceava County, with about 30%. Regarding the exploitation areas, according to Tables 3, 4, 5, 6, 7, 8, the 1st place is also held by Harghita county with 15 areas, followed by: Suceava - 12 areas, Covasna - 8 areas, Mureș, Brașov, Bihor - with 3 areas, Prahova, Timiș, Dâmbovița - 2 areas.

Table 9. The position of annual mineral water consumption in some European countries

Country	Consumption litres / person	country	Consumption litres / person
Italy	198.0	Hungary	102.2
Germany	155.9	Austria	96.5
Spain	136.5	Portugal	94.5
Belgium	129.0	Slovakia	75.2
France	121.9	Poland	61.9
Switzerland	118.0	Romania	54.5
Greece	105.4	United Kingdom	26.2

Source: study Financiar newspaper 11.12.2015

The Romanian mineral water market is dominated by Borsec brand with a market share of about 30%. It exports to 20 countries and has numerous awards, the most recent being: “The best mineral water in the world” in 2004 at the world’s most important competition in West Virginia, Berkeley Springs International Water Tasting Awards; another award is that of “The most trusted brand - Trusted Brand” in the field, title won for six consecutive years in 2006 - 2011. (<http://fabricatinro.ro/borsec-un-brand-romanesesc-ce-taie-setea>).

There are also other important brands on the market: Bucovina, Izvorul Alb, Perla Harghitei, Izvorul Minunilor, Zizin, Biborțeni, Izvorul Harghita, Carpatina, Poiana Negri, Tușnad etc.

Until 1993, mineral water was bottled exclusively in glass recipients, after which the use of PET bottles was spectacularly expanded, about 90% of its production now being marketed in such bottles. Capacities for bottling are for glass recipients of 0.33; 0.5; 0.75; 1.0 litres and for PET recipients of 0.5; 1.0; 1.5; 2; 2.5; 5.0, 6.0, 10 litres.

## Conclusions

- The quality of mineral waters (flat or carbonated) is influenced by the fixed residue in the composition, which does not refer to impurities, but to the level of mineral salts. The most recommended are poorly mineralized or flat waters because they can be consumed unlimitedly.
- With regard to highly mineralized medicinal waters, the recommendation is that they should only be consumed at the recommendation of the physician as they may cause kidney, biliary, heart, or other ailment problems.
- Flat/plain water has a balanced content of minerals, it is formed in calcareous soils, it has calcium ions, magnesium and acid carbonates, but it contains a small amount of carbon dioxide.
- According to a study carried out in the main hypermarkets, the inhabitants prefer more than 85% of the Romanian brands of natural mineral water or consumption water for their reputation as well as because of the higher price of the imported brands. Of urban consumers, about 80% prefer flat/plain water. With regard to rural consumers, there is a preference for carbonated water, flat water being substituted by alternative spring water or fountain water.
- Conquering new segments of consumers on the mineral water market involves focusing on quality, bottling, promotion and advertising. High-performance technologies that ensure consistent quality, attractive bottling, appropriate labelling, and effective marketing strategies ensure market innovation.

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