

The Bottled Water Labels and Consumers' Awareness

Michailides Panagiotis, Associate Professor
Department of Primary Education
University of Crete, Rethymno, 74100
Tel: 0831-77627 Fax: 0831-77596
e-mail: michail@edc.uoc.gr

Kimionis Georgios
PhD Student University of Crete Department of
Primary Education, Rethymno, 74100
Tel: 0831-24520 Fax: 0831-24520
e-mail: geokim@edc.uoc.gr

The environmental pollution and contamination caused by the contemporary human activities have affected the quality and quantity of water and especially the drinking water that is essential for the life. This fact combined with the conditions of the water supply systems has raised a serious concern of the citizens as far as the suitability of the provided water is concerned.

In the recent years a considerable increase of the consumption of bottled water has been observed in Greece following a similar increase observed, some years ago, in West Europe and in North America. The main reason, as the research has shown, is the mistrust of the citizens about tap water. (Papapetropoulou and Mavridou, 1995). Hutton (1985) found that people in America are afraid of pathogenic microorganisms, toxic and carcinogenic elements. Also sludge, rust and signs of rotteness have been detected in tap water (cited in Papapetropoulou and Mavridou, 1995). A Research from the United State Environmental Protection Agency (2000) has shown that consumers prefer bottled water because it tastes better than tap water; also it is cleaner and healthier¹.

As a matter of fact, what has been mentioned above cannot be the only reason for consuming bottled water. In addition, further reasons should be identified in consumers increasing sensitivity for environmental issues, as well as in the advertising policy of the bottling companies. Better bottling water processing conditions and more effective distribution ways may also be considered as supplementary reasons.

Research has shown that during 1988 the average consumption per person in Greece was approximately 10 litres of bottled water per year, whereas in 1995 the consumption increased up to 30 litres a year. There has been a continuous increase so far (Papapetropoulou and Mavridou, 1995).

However, a good bottled water quality cannot be taken as granted. There are several factors influencing its quality, such as its chemical composition (not always constant), the conditions of bottling, of transportation and of store. The ways and duration of the delivery to the consumers plays also a role.

In compliance with trade regulations, the water's composition², some of its physiochemical characteristics, its origin, its expiring date and commercial title (trademark) must be written on the labels.

Some questions are now in order:

Referring to the quality of the bottled water is the information provided on the label sufficient to the consumer?

Has this information any influence on his choice?

What the consumers do know about on the terminology, the various indications recorded on the labels and on the recommended values and allowed limits on the drinking water composition?

Does the consumer finally check the label (or at least the expiry date) or does he buy motivated by factors not related to quality?

In this work:

1. We record the information (commercial title, description of the water, the classification and the origin of the water and its composition) provided on the labels for a variety of bottled water brands.
2. We compare the recorded compositions of the different brands with the corresponding recommended values and allowed limits.
3. We investigate whether the data provided in the labels inform the consumers about the water's quality.
4. We investigate the consumers' preferences about bottled water and the reasons for such preferences.

In order to answer the above questions, a sample of 56 different trademark labels of bottled water circulated in Greece and other European countries were collected, analysed and discussed. Also a semi-structured questionnaire that combined open and closed questions was used on a random sample of 158 subjects/consumers, all of them citizens of Rethymnon-Crete.

Out of the 56 different bottled water labels that were studied, 29 bear on the label "Mineral Water"³ and 27 "Natural

¹ <http://www.epa.gov/ogwdw000/consumer/know.html> (9/1/2000)

² on the time of the bottling - it is assumed that this composition will remain unaffected during and after the process of bottling.

Table Water”⁴. Of course, neither the reliability of the appellation nor the kind of the bottling process, if any, may be checked by the consumer at purchase time.

The brands collected originate from the following regions:

		Belgium	4
Epirus	2	France	6
Crete	13	Germany	2
Macedonia	3	Spain	5
Peloponnese	7	Italy	8
Rhodes	1	Cyprus	2
Central Greece	2	Scotland	1
<u>Total for Greece</u>	<u>28</u>	<u>Total</u>	<u>28</u>

On the labels of bottle water apart from the anion and the cation content some physiochemical parameters, such as the pH, the total dissolved solids, the hardness and conductivity are usually mentioned. These characteristics are related to the quality of the drinking water. Recommended values and corresponding allowable limits are defined by International or National directions and laws. For an overall apprehension on the drinking water quality several other biological parameters, which are usually omitted or difficult to get, are also important. The microbiological quality of water has to do with bacteria, which are normally existent in water and/or may develop after bottling. Bottled water is a sensitive product for which strict measures must be taken for its quality. (Papapetropoulou, Mavridou 1995).

Comparing the chemical composition as it appears on the labels of the 56 samples of bottling water, we notice that a significant percentage of them exceed the recommended values and in some cases the maximum allowable limits⁵. In particular, as far as the ions are concerned, the situation is:

	Ca ⁺⁺	Mg ⁺⁺	Na ⁺	K ⁺	NH ₄ ⁺	Fe ⁺⁺	Mn ⁺⁺
Recommended values	<100	<30	<20	<10	<0,05	<0,05	<0,02
Cases above the limit	14	15	12	5	3	0	0
Maximum Values		50	175	12	0,5	0,2	0,05
Cases above the limit		10	1	3	1	0	0

no maximum limits are defined for HCO³⁻.

	HCO ³⁻	Cl ⁻	NO ³⁻	NO ²⁻	F ⁻	SO ⁴⁻⁻	
Recommended values		<25	<25			<25	
Cases above the limit		13	3		0	17	
Maximum Values			50	0,1	1,5*	0,7**	250
Cases above the limit			0	0	1	2	4

*For temperature 8-12⁰C, **For temperature 25-30⁰C.

The increased Ca⁺⁺ values may cause health problems related to the kidneys. On the other hand, literature suggests that a high ratio Mg⁺⁺/Ca⁺⁺ may be beneficial to the weak hearted (Manoussakis 1992).

Referring to pH, 11 of the 56 samples did not quote any value despite the explicit obligation. Of the rest 4 quote a value lower than the suggested value of 6.5. On the total, 2 samples quote a pH value of 7, 4 a value less than 7 (acid behaviour) and the rest a value higher than 7.

Referring to the conductivity, only 35 of the 56 samples quote a value. From them 19 quote a conductivity value beyond the limit of 400 µS/cm (in temperature 250 C), an expected outcome due to the high ion concentration (Kalergis, 1986).

We underline that a significant number of samples didn't include physiochemical characteristics on their labels although they should. This has as a consequence the fact that the information provided to consumers is insufficient. In order to further investigate the consumers' preferences, their ability to value and check the bottled water that they buy and any additional information that the consumers would like to be included on the labels, a questionnaire was constructed. This questionnaire was delivered to consumers at the area of Rethymnon, a more or less typical area for Greece. This particular research took place from October to December 1999 and 250 questionnaires were delivered 158 of them were returned. Although the sample size is small the findings are useful as an indication of the consumers apprehension. The characteristics of the sample are:

³ According to an EU directive the Mineral Water is defined as 'a good microbiological quality water originated underground and is gushed or pumped out to the surface. The Mineral water must not undergo any process during bottling as the Presidential Decree 433/1983/OJ163A/9-11-83 determines it.

⁴ Natural Table Water or simply Bottled Water is defined as the water destined for drinking that should be undergone a process of cleansing by chlorium or ozone or UV rays during bottling.

⁵ The recommended values and the Maximum values are according to the EC directive 80/778 'On the quality of drinking water', published in 30-8-80 in the Official Journal of EC. The Ministerial Decision A5/288/86 is in harmonizing with the above directive.

Age	No.	%	Sex	No.	%
<18	48	30.4	Male	73	46.2
19-30	52	32.9	Female	85	53.8
31-60	58	36.7			

The main findings are as follows:

Do you drink bottled water?	
Always – exclusively	12%
Often	30%
Sometimes	52%
Never	6%

However, answering to another question, 65% preferred to drink bottled water versus a 35% who stated that they prefer tap water. The reasons they state for their preference are summarised in the following table:

Prefer tap Water – 35%		Prefer bottled water – 65%	
At hand/used to	24%	Clear/more clear than tap water	17%
Trust it	17%	Don't smell	16%
Cheap	14%	Healthy	14%
Clear/more clear	11%	Easy to use	13%
Under inspection	9%	Don't trust tap water	8%
Healthy	7%	Without solids	5%
Decontaminated	4%	Under inspection	4%
Good taste	4%	Trust it	4%
Safe	3%	Safe/more safe	3%
Better	3%	Better	3%
Fresh	3%	Without bacterial	2%
		Tap water smells chloride	2%
		Constant quality	2%
		Good taste	2%
		Insufficient water supplies	1%
		Bad quality of tap water	1%
		Solids in water supplies	1%
		Stereotyped well	1%
		Microbes in water supplies	1%

Only one of the participants stated honestly that he drinks bottled water because by stereotype it is considered as good.

Can you conclude the water quality from the label?		Do you Know the difference between Mineral and Natural table Water	
Answer No	75%	Answer No	32%
Answer Yes	25%	Answer Yes	68%

The inconsistency between the results stating that consumers were aware of the difference between Mineral and Natural table water whereas they cannot judge the water quality may be due to the fact that consumers tend to relate the appellation Mineral to the content of minerals.

A small percent (9%) always checks the values inscribed on the label before buying, whereas 44% sometimes check it and 46% never check it at all.

Referring to the question regarding any additional information the consumers would like to be included on the labels, the consumers' responses include:

Information about the consequences to the water quality an exposition to the sun may cause. Requirement for a certificate for its eligibility as drinking water as well as information about the frequency of health inspections (they probably mean information or requirement for a Quality Certificate). These answers indicate the public's concern about the microbiological quality of water in excess of its chemical and physiochemical characteristics.

Indication about the processing methods used was also mentioned as a desirable information. This demand seems to arise from the concern of the consumer about the relation of the quality of the bottled water he drinks to that pumped from the spring.

In addition, the consumers asked for the allowable limits to be included on the label together with the chemical composition, which must be presented in a clear way and with bigger and more legible letters. For many, the small print used produces the impression that there is an attempt to withhold or hide relevant information.

Conclusions

We found that the chemical composition, for many of bottled water's trademarks differ significantly from recommended values. For many their chemical composition is outside the allowable limits.

More than 1 in 3 of the consumers trust tap water for drinking. Taking into account the bad history of the drinking water supply systems this is a significant percentage reflecting recent improvements. However most of the consumers drink bottled water and they believe that it is "a good quality water" although they cannot judge the water quality. May be this is the reason why, despite their belief, the consumers wish some additional information related to the water quality to be written on the bottle's label.

References

<http://www.epa.gov/ogwdw000/consumer/know.html> (9/1/2000)

Papapetropoulou M., Mavridou A., "Microbiology of aqueous environment" Travlos-Kostaraki publ. Athens 1995 (in Greek).

Kallergis G. A., 'Applied Hydrogeology', vol. A', Athens 1986 (in Greek).

Manousakis G., "Microelements in Human Health", Kyriakidis publ. Thessaloniki 1992 (in Greek).

Ministerial Decision, A5/288/86.

Official Journal of EC, directive 80/778 'On the quality of drinking water', 30-8-80

Presidential Decree 433/1983/OJ163A/9-11-83 'terms for the exploitation and trade of natural and mineral water'