



Agua Palentina S.L.
Carretera de Cervera a Potes km 14
34847 San Salvador de Cantamuda
Palencia
Tel.: +34 979 87 90 73
Fax: +34 979 87 90 66



<http://www.fuentesdelebanza.com/> - info@fuentesdelebanza.com
www.lebanza.com

Natural Mineral Waters

Mineral water is a European commodity and each country had its own regulations until 1980, when a common legislation was adopted and applied within the EEC (Council Directive). Mineral waters are the first dietary constituents with **health claims** since their definition states that they must have some characteristics, which give them **favorable health properties**. Mineral waters must have their original characteristics **preserved from the spring to the bottle** and they must exhibit a **constant mineral and trace element composition throughout the year** (Arnaud MJ, 1998).

Fuentes de Lebanza is Natural Mineral water recognized by European Member States as shown hereunder in the last list of Natural Mineral waters recognized by Spain (30 March 2012).

Last update: 30 March 2012

LIST OF NATURAL MINERAL WATERS RECOGNISED BY MEMBER STATES

List of natural mineral waters recognised by Spain

Trade Description	Name of source	Place of exploitation
Fuentes de Lebanza	La Cueva	San Salvador de Cantamuda (Palencia)

In the European Regulation of Natural Mineral Waters (**Council Directive 80/777/EEC**) as well as the **Codex Standards for Natural Mineral Waters**, it is stated that Natural Mineral Waters must be protected from any pollution and free of all contamination.

The spring of Fuentes de Lebaza is located in the Palentina Mountains, at the foothill of Picos de Europa and in the Fuentes Carrionas Natural Reserve. This protected area of mountains receiving snowfall and rain with water then filtering through rock strata picking up minerals explaining both its purity as well as its constant mineral composition when flowing naturally from the spring La Cueva located over 1.200 meters altitude.



**COUNCIL DIRECTIVE
of 15 July 1980**

**on the approximation of the laws of the Member States relating to the exploitation and marketing
of natural mineral waters**

(80/777/EEC)

CODEX STANDARD FOR NATURAL MINERAL WATERS

CODEX STAN 108-1981

2.1 Definition of natural mineral water

Natural mineral water is a water clearly distinguishable from ordinary drinking water because:

- a) it is characterized by its content of certain mineral salts and their relative proportions and the presence of trace elements or of other constituents;
- b) it is obtained directly from natural or drilled sources from underground water bearing strata for which all possible precautions should be taken within the protected perimeters to avoid any pollution of, or external influence on, the chemical and physical qualities of natural mineral water;
- c) of the constancy of its composition and the stability of its discharge and its temperature, due account being taken of the cycles of minor natural fluctuations;
- d) it is collected under conditions which guarantee the original microbiological purity and chemical composition of essential components;
- e) it is packaged close to the point of emergence of the source with particular hygienic precautions;
- f) it is not subjected to any treatment other than those permitted by this standard.

Fuentes de Lebaza comply with the EU legislation as well as the Codex Standard and its stable mineral composition all over the year exhibit interesting properties for human health as well as a unique taste and freshness.

Minerals

From the mineral and trace elements composition of **Fuentes de Lebanza**, its total dissolved solid (TDS) content of 123 mg/l corresponds to the criteria of a mineral water with a "**low mineral content**" ($50 < \text{TDS} < 500$) according to the European legislation.

Sodium

This low mineral content water allows its use by the whole family with unrestricted intake including infant formula feeding. **Fuentes de Lebanza** follows the European criteria of a mineral water "suitable for the preparation of infant food".

Its low sodium content (1.05 mg/l) authorized also the claim "**suitable for low-sodium diet**" according to the European Member States regulation.

Calcium & magnesium

Health effects of long-term water consumption have been demonstrated in epidemiological studies performed on population showing that hard water has a **protective effect against the risk of cardiovascular diseases** (Crawford et al, 1968). These effects were attributed to calcium and more recently also to the magnesium content. These two minerals are shown to be the protective factor for death from acute myocardial infarction (Rubenowitz et al, 1996) and to significantly decrease blood pressure in mild hypertensive consumers (Rylander & Arnaud, .2004).

These effects were observed for calcium concentrations ranging from less than 10 to 100 mg/l and significant differences were reported for lower magnesium concentrations, between 2 and 10 mg/l.

Thus, the mineral composition of **Fuentes de Lebanza** comply with the content of calcium and magnesium shown to have a protective effect on cardiovascular disease.

Mineral composition mg/l	
Total Dissolved Solids (TDS)	123
Calcium	37,8
Magnesium	2,48
Sodium	1,05
Bicarbonate	124
Sulfate	3,57
Chloride	1,81
Silica	4,63

Fuente: Centro Nacional de Tecnología y Seguridad Alimentaria (CNTA) 2008

Bicarbonate

Anions associated with these minerals, the most important is Bicarbonate and to lower extent Sulfate and Chloride.

Bicarbonate is present in all body fluids and organs and is playing a major role in **acid-base equilibrium in the human body**. The most important effect of bicarbonate ingestion reported is the change of acid-base balance as well as blood pH and bicarbonate concentration. It has been studied particularly in subjects doing **sport or fitness activities**. Among the acid produced, lactic acid generated during exercise is buffered by bicarbonate (Beaver et al., 1986). Bicarbonate also attenuates the acidity of dietary components such as proteins (Green and Whiting, 1994).

Sodium bicarbonate has been suggested to increase the pH in the oral cavity, potentially **neutralizing harmful effects of bacterial metabolic acids** (Ozanich et al., 1993; Miyasaki et al., 1986; Blake-Haskins et al., 1997). Sodium bicarbonate is increasingly used in dentifrice and its presence appears to be less abrasive to enamel and dentin than other commercial dentifrice (Lehne and Winston, 1983). There are also studies showing that bicarbonate-based powder and paste dentifrice **inhibit caries** and challenge the microbiological and dietary effects on carie formation (Tanzer et al., 1990).

Sulfate

Sulfate is present in all biological fluids of our body: **blood, saliva, intestinal secretion, milk** as well as **within our cells** and its concentration is maintained constant. **Intracellular sulfate concentration is 10 fold higher than plasma value** (29-34 mg/l).

Sulfate plays a large role in physiological processes such as the formation of mucopolysaccharides which are essential in the formation of extremely important biochemical constituents in **cartilages, hair** but also **venous and arterial vessels**. Sulfate conjugation is a very important control in **hormone metabolism**. It is the case of thyroid hormones which are metabolized through deiodination, deamination, decarboxylation and through sulfate and glucuronic esterification (Levy, 1986).

It has also been shown that sulfate in water is associated in 46 US States to **prevent the occurrence of kidney stones** (Sierakowski et al., 1976). It was also reported that mineral bioavailability is increased by its association with sulfate, due to its solubility (Normén et al., 2006) and finally health effects of sulfate has been reviewed (Arnaud, 2006).

Silica

A few studies have shown that a high daily intake of aluminum was significantly associated with increased risk of dementia and conversely, an increase of 10 mg/day in silica intake was associated with a reduced risk of dementia. It was hypothesized that the **beneficial effect of silica** may be mediated through the interaction with aluminum leading to a its decreased bioavailability and toxicity (Rondeau et al., 2009).

Taste

The taste of water is dependent on water mineral composition as well as cultural habits. Low mineralized waters are characterized by fine soft taste with refreshing feeling (Arnaud, 2005). These waters such as **Fuentes de Lebanza** can be appreciated when drunk during meals as well as all along the day.

References

- Arnaud MJ Mineral Water and Health, From Nutritional Science to Nutrition Practice for Better Global Health, Fitzpatrick DW, Anderson JE and L'Abbé ML, Editors In Proceedings of the 16th International Congress of Nutrition, Nutrition Montreal 97, Canadian Federation of Biological Societies, Ottawa Canada, pp. 258-260, 1998.
- Arnaud MJ, Le goût de l'eau, L'eau à la bouche, Alimentarium, I Raboud-Schüle et N Stäubli Tercier, CA Borgeaud, musée de l'alimentation, Vevey, pp. 23-27, 2005
- Arnaud MJ, Health effects of sulphate, Nutrition Discussion Forum, British Journal of Nutrition, 95, 650-653, 2006
- Beaver WL, Wasserman K and Whipp BJ, Bicarbonate buffering of lactic acid generated during exercise, J Appl Physiol, 60, 472-478, 1986
- Blake-Haskins JC, Gaffar A, Volpe AR, Bánóczy J, Gintner Z and Dombi C, J Clin Dent., 8, 173-177, 1997
- Crawford MD, Gardner MJ, Morris JN. Mortality and hardness of local water-supplies, Lancet. 1(7547):827-31, 1968
- Green TJ and Whiting SJ, Potassium bicarbonate reduces high protein-induced hypercalciuria in adult men, Nutrition Res., 14, 991-1002, 1994
- Lehne RK and Winston AE, Abrasivity of sodium bicarbonate, Clinical Preventive Dentistry, 5, 17-18, 1983
- Levy, Sulfate Conjugation in Drug Metabolism: Role of Inorganic Sulfate, Fed Proc. 45, 2235-2240, 1986.
- Miyasaki KT, Genco RJ and Wilson ME, Antimicrobial properties of hydrogen peroxide and sodium bicarbonate individually and in combination against selected oral, gram-negative, facultative bacteria, J Dent Res, 65, 1142-1148, 1986
- Normén L, Arnaud MJ, Carlsson N-G and Andersson H, Small bowel absorption of magnesium and calcium sulphate from a natural mineral water in subjects with ileostomy, Eur J Nutr. 45, 105-112, 2006
- Ozanich D, Medina NA, Wikesjö and Nygaard-Østby P, Effect of a sodium benzoate-sodium bicarbonate compound on dental plaque formation, J Periodontol., 64, 1067-1070, 1993
- Rondeau V, Jacqmin-Gadda H, Commenges D, Helmer C, Dartigues JF. Aluminum and silica in drinking water and the risk of Alzheimer's disease or cognitive decline: findings from 15-year follow-up of the PAQUID cohort, Am J Epidemiol. 169(4):489-96, 2009
- Rubenowitz E, Axelsson G, Rylander R., Magnesium in drinking water and death from acute myocardial infarction, Am J Epidemiol. 143(5):456-62, 1996
- Rylander RC and Arnaud MJ, Mineral water intake reduces blood pressure among subjects with low urinary magnesium and calcium levels, BMC Public Health, 4, 56, 1-5, 2004
- Sierakowski, Hemp and Finlayson, Water Hardness and the Incidence of Urinary Calculi In: Colloquium of Renal Lithiasis, Univ. Presses of Florida, Chapter 22, Finlayson and Thomas Ed., Gainesville, 213-220, 1976
- Tanzer JM, McMahon T and Grant L, Bicarbonate-based powder and paste dentifrice effects on caries, Clinical Preventive Dentistry, 12, 18-21, 1990

Dr Maurice J ARNAUD
Nutrition & Biochemistry
Bourg Dessous 2A
CH-1814 La Tour-de-Peilz (Switzerland)
Tel: +41 (0)21 9441985
Mobile: +41 (0)79 264 7259
Fax +41 (0)21 9446629
mauricearnaud@hotmail.com

1995-2003	Director of the Nestlé Water Institute
2006-2007	Member of the "Expert Specialized Committee" on "Additives, aroma and processing aids". Afssa (French Food Safety Agency)
2007-2008	Vice President Coca-Cola, Executive Director of the Beverage Institute for Health and Wellness.
2009-2012	Expert at anses (French agency for food, environmental and occupational health & safety).

Publications (21 among 72) with Arnaud MJ and Water as Keywords

[Influence of the consumption pattern of magnesium from magnesium-rich mineral **water** on magnesium bioavailability.](#)

Sabatier M, Grandvuillemin A, Kastenmayer P, Aeschliman JM, Bouisset F, **Arnaud MJ**, Dumoulin G, Berthelot A.

Br J Nutr. 2011 Aug;106(3):331-4.

[Should humans be encouraged to drink **water** to excess?](#)

Arnaud MJ, Noakes TD.

Eur J Clin Nutr. 2011 Jul;65(7):875-6.

[Influence of gender and body composition on hydration and body **water** spaces.](#)

Ritz P, Vol S, Berrut G, Tack I, **Arnaud MJ**, Tichet J.

Clin Nutr. 2008 Oct;27(5):740-6.

[Higher calcium urinary loss induced by a calcium sulphate-rich mineral **water** intake than by milk in young women: comments by Arnaud.](#)

Arnaud MJ.

Br J Nutr. 2008 Jan;99(1):206-9; discussion 210.

[Age-related changes in hydration.](#)

Arnaud MJ.

Nestle Nutr Workshop Ser Clin Perform Programme. 2002;6:193-205; discussion 205-6.

[Does oxygenated **water** support aerobic performance and lactate kinetics?](#)

Arnaud MJ.

Int J Sports Med. 2006 Sep;27(9):759; author reply 760.

[Nutrition discussion forum.](#)

Arnaud MJ.

Br J Nutr. 2006 Mar;95(3):650-3; discussion 654-6. Review.

[Small bowel absorption of magnesium and calcium sulphate from a natural mineral **water** in subjects with ileostomy.](#)

Normén L, **Arnaud MJ**, Carlsson NG, Andersson H.

Eur J Nutr. 2006 Mar;45(2):105-12.

[Effect of **water** deprivation on cognitive-motor performance in healthy men and women.](#)

Szinnai G, Schachinger H, **Arnaud MJ**, Linder L, Keller U.

Am J Physiol Regul Integr Comp Physiol. 2005 Jul;289(1):R275-80.

[Mineral **water** intake reduces blood pressure among subjects with low urinary magnesium and calcium levels.](#)

Rylander R, **Arnaud MJ**.

BMC Public Health. 2004 Nov 30;4:56.

[Mild dehydration: a risk factor of constipation?](#)

Arnaud MJ.

Eur J Clin Nutr. 2003 Dec;57 Suppl 2:S88-95. Review.

[Magnesium absorption from mineral water.](#)

Sabatier M, **Arnaud MJ**, Turnlund JR.
Eur J Clin Nutr. 2003 Jun;57(6):801-2.

[A compartmental model of magnesium metabolism in healthy men based on two stable isotope tracers.](#)

Sabatier M, Pont F, **Arnaud MJ**, Turnlund JR.
Am J Physiol Regul Integr Comp Physiol. 2003 Sep;285(3):R656-63. Epub 2003 May 29.

[Comparison of stable-isotope-tracer methods for the determination of magnesium absorption in humans.](#)

Sabatier M, Keyes WR, Pont F, **Arnaud MJ**, Turnlund JR.
Am J Clin Nutr. 2003 May;77(5):1206-12.

[Contribution of mineral waters to dietary calcium and magnesium intake in a French adult population.](#)

Galan P, **Arnaud MJ**, Czernichow S, Delabroise AM, Preziosi P, Bertrais S, Franchisseur C, Maurel M, Favier A, Hercberg S.
J Am Diet Assoc. 2002 Nov;102(11):1658-62.

[Meal effect on magnesium bioavailability from mineral water in healthy women.](#)

Sabatier M, **Arnaud MJ**, Kastenmayer P, Rytz A, Barclay DV.
Am J Clin Nutr. 2002 Jan;75(1):65-71.

[Effects of dehydration and rehydration on EMG changes during fatiguing contractions.](#)

Bigard AX, Sanchez H, Claveyrolas G, Martin S, Thimonier B, **Arnaud MJ**.
Med Sci Sports Exerc. 2001 Oct;33(10):1694-700.

[Investigation of mineral waters and soft drinks in relation to dental erosion.](#)

Parry J, Shaw L, **Arnaud MJ**, Smith AJ.
J Oral Rehabil. 2001 Aug;28(8):766-72.

[Free and total magnesium in lymphocytes of migraine patients - effect of magnesium-rich mineral water intake.](#)

Thomas J, Millot JM, Sebille S, Delabroise AM, Thomas E, Manfait M, **Arnaud MJ**.
Clin Chim Acta. 2000 May;295(1-2):63-75.

[Mineral water as a source of dietary calcium: acute effects on parathyroid function and bone resorption in young men.](#)

Guillemant J, Le HT, Accarie C, du Montcel ST, Delabroise AM, **Arnaud MJ**, Guillemant S.
Am J Clin Nutr. 2000 Apr;71(4):999-1002.

[Acute effects induced by a calcium-rich mineral water on calcium metabolism and on parathyroid function.](#)

Guillemant J, Le HT, Guillemant S, Delabroise AM, **Arnaud MJ**.
Osteoporos Int. 1997;7(1):85-6.