# NATURAL MINERAL WATER AND SPRING WATER MONITORING

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## 1. Introduction

**The main feature of natural mineral and spring waters is their original purity. Each water is unique - they all have their own underground course, no rock is shared by more than one water, each water dissolves specific minerals and they all remain underground for a unique period of time. Additionally, each water exhibits different and unmistakable microbiological, physical and chemical features, which ought to be preserved until it reaches the end consumer.[1]**

**Bottled natural mineral or spring water is in the exact same state as it occurs in nature, while the label details its exact origin. Packing natural mineral water or spring water - a colourless liquid of delicate flavour - is no easy task. This complex industrial process starts with the protection, preservation and valuation of the aquifer where the water is collected; it ends when the properly sealed and labelled bottles reach the end consumer. The water's original purity is guaranteed up until the moment of consumption. [1]**

**The water's underground origin shields it from external aggressions. This ensures it is a microbiologically sound product, free of human contamination or chemical treatment of any sort. It stands out as a natural product, a true gift from nature, devoid of additional chemicals and providing consumers with minerals and trace elements vital to the human body. Calcium, silica, fluorine and magnesium, in suitable doses, are excellent natural additions to our daily diet.**

**Natural mineral and spring waters are regulated by strict laws, at both domestic and European levels; these requirements set it apart from other types of water for human consumption. Its distinctive features include: the preserved underground origin - original purity; the fact that any type of chemical treatments is explicitly banned; the mandatory bottling at the spring; and the applicability of food product laws, namely those targeting hygiene, HACCP, labelling and traceability.[1]**

## 2. Monitoring natural mineral and spring waters

**According to the legislation currently in force, water should reach the end consumer in a pure condition, exactly as it was in the origin. It should remain intact during packing and no transforming processes are to be employed, except in those cases specifically exempted by the law. Hence, in order to ensure original purity, natural mineral and spring water industries are regulated by "harsh" legislation, which specifies the microbiological, physical and chemical features of the water, both at the spring and inside the bottles (final product), as well as the requirements related to food product hygiene.**

### 2.1. Code of good hygienic practice

**In compliance with Regulation # 852/2004 of the European Parliament and of the Council, of April 29, 2003, APIAM - the Portuguese Industrial Association for Natural Mineral and Spring Waters - has adopted the Code of Good Hygienic Practice for the Natural Mineral and Spring Water Industries, the goal of which is to assist companies in attaining compliance with the legislation currently in force.**

**This Code is based on the principles and procedures proposed and adopted by the European industry, more specifically by the EFBW, the European federation representing the interests of the natural mineral and spring water industry.[2]**

**The code is divided into three different sections:**

**I. General information on food quality and safety: an overview of the main features of a quality management system and a food safety management system working together. The document also highlights the relevance of a solid policy based on risk management - involving risk analysis, assessment and communication - and on food quality and safety management.**

**II. Prerequisite programme: a set of universal, predefined procedures deemed essential for the monitoring of structural and operational conditions inside the facilities, such as: surrounding areas, buildings, bottling regions (including filling machines), handling of packing materials; and storage places for finished products. Similar to the ISO / TS 22002-1: 2009.**

**III. HACCP (Hazard Analysis and Critical Control Points): this section features the foundations for applying HACCP, as followed by the natural mineral and spring water industries; it encompasses the complete production process in all its dimensions, not forgetting the legislation currently in force and integration with the Quality Management System in use. [3]**

### 2.2. Legal monitoring of water attributes

**As previously mentioned, natural mineral and spring waters are regulated by strict legislation, which ensures the preservation of their original purity throughout the entire industrial process. Since no water can be subject to chemical treatment of any sort, it bears mentioning how essential it is to make sure, right at the source, that it poses no risk whatsoever to human health. Therefore, the first production stage to be legislated in microbiological and physical-chemical terms is the collection at the source. It is also a legal requisite to monitor the water after the bottling process - the end product - in similar terms regarding its microbiological, physical-chemical attributes.**

**The microbiological parameters to be analysed are listed in the Decree-Law 156/98 of June 6, art. 4. As for the physical-chemical l parameters, they are specified in Dispatch 14413/2016, of November 29. The legislation does not indicate the frequency at which the tests should be conducted. However, the DGEG - Direção Geral de Energia e Geologia (Directorate-General for Energy and Geology), which oversees the industry, issues a yearly monitoring plan covering the entire process - from the place of abstraction to the bottling facilities, including the end product. In addition to the analyses' periodicity, the plan also establishes the bacteriological, physical-chemical parameters which should be tested by each company. Test results are then sent to the DGEG for compliance checking. [4]**

### 2.3. Internal monitoring of water attributes

**Many companies in the industry establish their own laboratory monitoring procedures, in order to comply with their HACCP plan and/or Food Safety Management System (NP EN ISO 22000:2005). These companies exceed the demands imposed by legislation, which only requires laboratory monitoring of water in the place of abstraction and as an end product.**

**The internal laboratory monitoring includes laboratory controls which can often serve as validation points for the prerequisite programme. For instance, companies will carry out swabs, to check if their employees wash their hands properly. The plan's periodicity is based on the company's result history and on risk analysis.**

## 3. Conclusion

**Natural mineral and spring waters preserve their essential and original characteristics throughout the entire production process. In order to ensure the water's original purity, natural mineral and spring waters are subject to laws enforced by competent authorities, who will attest the results' compliance.**

## References

**[1] APIAM - Portuguese Industrial Association for Natural Mineral and Spring Waters: www.apiam.pt**

**[2] Livro Branco Águas Minerais Naturais e Águas de Nascente (Natural Mineral and Spring Waters White Paper) - APIAM**

**[3] Code of Good Hygienic Practice and HACCP practical application guide – APIAM – 2016**

**[4] Directorate General for Energy and Geology – www.dgeg.pt**