

MICROBIOLOGICAL STUDIES REQUIRED FOR A SCIENTIFIC MANAGEMENT OF THE NATURAL MINERAL WATER SOURCES

STUDII MICROBIOLOGICE NECESARE PENTRU UN MANAGEMENT STIINTIFIC AL SURSELOR DE APE MINERALE NATURALE

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This paper presents some of the results obtained concerning the discovery, characterization, screening and management of some still unknown or not yet fully characterized natural sources of mineral waters, in order to render them economically profitable and to contribute to the public health development. Following some empiric, local observations upon the qualities they have in the treatment of different maladies, a set of physical, hydrological, chemical and microbiological analyses was established, in order to substantiate scientifically their therapeutic potential. Moreover, the authors have selected some areas situated in the neighborhood of the old (some of them already closed) salt mines.

Key words: microbiological properties, mineral water springs

Introduction

Romania, especially their western and north-eastern parts, is already known as a rich side concerning the natural mineral water resources, in comparison to the rest of Europe. Presently, a small number of these springs are exploited economically profitable, and their introduction in the national and international tourist's and balneal-therapy circuits requires a good management based on the relevance of the scientific researches. This paper presents the results of

microbiological studies applied on two mineral water sources located in Cluj district, which are still not fully characterized. This is a step in order to render them more important to the public health development.

Materials and Methods

The study was carried out in a rural area situated in the neighborhood of some closed salt mines. After realization of two small balneal lakes, the local institutions have developed a new health resort, which needs a large scientific study for their extension. The microbiological studies that were carried out were based on the methods approved by European Union. The obtained results were compared to the international recommended data, in order to establish the possibilities of using these springs for a human treatment and in order to recommend a new way for the scientific management. Moreover, these microbiological studies were carried out in a recognized laboratory, which has the required installations and reagents involved in such activity.

Results and Discussions

The obtained results indicate a great number of NTG at 37°C and 22°C (more than the value legally allowed), and a similar situation for the total coliphormes (bacilli like *Escherichia coli*).

Table 1:

Results of the microbiological studies of the water samples

No.	NTG 37°C no/ml	NTG 20°C no/ml	Total coliformes /100 ml	Fecal coliphormes /100 ml	Fecal <i>Streptoco- ccus</i> /100 ml	<i>Pseud. aer.</i> /100 ml	<i>Clostri- dium</i> /50 ml
1	1.0×10^2	9.0×10^1	6	6	absent	absent	absent
2	4	8.0×10^1	over 16	over 16	absent	absent	absent
3	8.0×10^1	2.0×10^1	over 16	absent	absent	absent	absent
4	6.0×10^1	1.0×10^1	2	absent	absent	absent	absent
5	5.0×10^3	1.0×10^3	over 16	7	absent	absent	absent

Table 2

Results of the microbiological studies of the soil samples

No.	Total number of aerobes mesophiles microorganisms (no/g)	Coliphormes bacteria (no/g)	<i>E. coli</i> (no/g)	<i>Pseudomonas aeruginosa</i> /100 ml (no/g)
1	1.6×10^6	2.4×10^2	absent	present
2	1.6×10^5	1.4×10^2	absent	present
3	3.2×10^5	3.6×10^1	absent	present
4	1×10^5	absent	absent	absent
5	1.6×10^5	absent	absent	absent
6	3.2×10^5	absent	absent	absent

The analysis of the obtained results indicates an excess of the impermissible microorganisms. This situation indicates that these water sources are yet used in a

large measure, in the absence of the sanitary protection zone and, moreover, with unpractical results.

Conclusions

The paper presents the obtained results concerning the microbiological aspects of some still unknown natural sources of mineral waters, in order to introduce them in the national and international tourist's and balneal-therapy circuits.

There is a great replicability of the scientific procedures involved in the described proposal. As they use standardized parameters, the new aspect is the comprehensive method for monitoring them.

The content of the proposed paper has a great practical application, because it contributes to the development of some important natural sources and also to the sustainable development of the rural or mono-industrial zones, which have the opportunity to increase their potential.

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Lucrarea prezinta unele dintre rezultatele obtinute, privind descoperirea, caracterizarea, monitorizarea si managementul unor surse naturale de ape minerale, necunoscute inca sau insuficient caracterizate, in vederea valorificarii lor economice si contribuirii la dezvoltarea sanatatii consumatorilor. Pe baza unor empirice observatii locale privind calitatile acestor izvoare in tratarea diferitelor afectiuni, s-a efectuat un set de analize fizice, hidrologice, chimice si microbiologice, in scopul evidentierii potentialului lor therapeutic. In plus, autorii au selectat anumite zone, situate in proximitatea unor vechi mine de sare (unele fiind deja inchise).

Cuvinte cheie: proprietati microbiologice, izvoare, ape minerale.