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Emphasizing the Main Factors Involved between the Green Zones Created Near the Natural Salted Lakes or Springs and the Treatment of Some Nervous System Disorders

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ABSTRACT

In recent years, more and more data has become available about the benefits of green in and around towns and cities. Vegetation helps people to recover faster from illness; this reduces costs of healthcare and improves the patients' quality of life. This aspect of introducing vegetation in and around hospitals is increasingly becoming a topic of focus in connection with the concept of a 'healthy environment'. Since the creation of the first people's parks, urban planners have been aware of the fact that vegetation enhances the quality of life for townspeople. Green areas are places where people can go for recreation and physical exercise or simply to find some peace and quiet. This benefits their health and reduces the stress levels of the average city dweller. A positive correlation exists between the amount of green in a person's living environment and that person's sense of safety. In highly urbanized locations, the design of green elements requires special attention. Our paper presents a multidisciplinary study of areas located near the old salt mines and their recovery by entering in the spa and leisure circuit. Specific components were monitored, like the salted waters quality in lakes and/or springs and in the selection of different plant species adapted to high salinity of the soil. According to studies conducted in Europe, the environment plays a crucial role in physical, mental and social development of the population. In recent years, the continuous degradation of environmental quality due to factors such as air pollution, noise, chemical compounds and disappearance of natural areas, in combination with lifestyle changes led to the emergence of a growing number of diseases such as different forms of diabetes, cardiovascular and nervous system disorders and cancer.

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Introduction

The mineral waters are those in which the content in fixed solid substances is over 1g/Kg or those which differ from the common water by the presence of rare substances, by the gases content or by temperature, over 20°C. The mineral waters have the characteristic that they regenerate through the infiltration of the surface waters in the depth and mineralization.

The assessment of a water as mineral is done by enhanced accuracy in ascertaining its physical, chemical and microbiological properties and more over through obviousness of some scientifically demonstrated curative effects.

In accordance to bibliographical data are considered therapeutic waters exclusively only those of natural origin whose mineralization processes took place in an underground aquifer system or in a natural saline lacustrine ecosystem, protected against pollution risks and containing some specific chemical substance in distinct concentrations.

Using high performance lab instruments in physico-chemical, microbiological, geochemical and pharmacological analyses, the type of such mineral waters can be identified and determined. Subsequently the waters can be collected from the depth of surface lakes using adequate methods, equipments and technologies. By setting up protective measures, in conformity with the geographical region, the mineral water sources can be appropriately set up as swimming pools, spaces recreation and sport spaces.

In nature water constitutes the existence fundamental element, with which are connected all the elements that characterize an environment.

Depending of the habitats' nature, natural water sources can be classified in two major categories: surface waters and underground waters.

The Romanian mineral waters have a great hydro-chemical variety which can be classified in three major predominant types: salty, sulphurous-sulphate and with dissolved carbon dioxide gas, among them occur some secondary hydro-chemical characteristics such as a content in iron, arsenic, potassium, calcium, manganese, chlorine, etc., depending on the natural local rocks leached.

The task of our studies was represented by the characterization of some areas situated near the natural salted lakes and /or springs, in order to capitalize on them as a resort for recreation.

There are since quite a few years different studies all around the world concerning a potential connection between the properties of a green zone and their use as therapeutic landscapes [1-4]. For example, even since 2015, Mireia Gascon and her team have published a review about “Mental Health Benefits of Long-Term Exposure to Residential Green and Blue Spaces” [3]. According to their conclusions “Given the increase in mental health problems and the current rapid urbanization worldwide, the results of this systematic review should be taken into account in future urban planning”. In additional we can indicate the study conducted by Margarita Triguero- Mas and her research team that are presenting the relationship between the natural outdoor environments (NOE) including both surrounding greenness and green and/or blue spaces, and a better mental health, mostly observed at males, younger people and low-medium educated [2]. Their studies were carried out in: Barcelona (Spain), Stoke-on-Trent (United Kingdom), Doetinchem (Netherlands)and Kaunas (Lithuania).

But we can find this kind of researches carried out also very recently, in 2021 and 2022 [5-10]. As an example we can select the study published in 2021 by F. Gomez et al concerning “Green zones, bioclimatic studies and human comfort in the future development of urban planning”, whereas their researches were conducted in Valencia (Spain) “taken as a prototype of the Mediterranean city”. Their study has begun from the analysis of the climatological situation of the city and it was continued based on “the performance of several internationally well-known “comfort indices”. Their conclusion was similar with that one taken at the European level and it refers to the current importance of the green zones, while “urban living limits access to nature and can increase exposure to certain environmental hazards, such as air and noise pollution” [9].

Material and Methods

Following some empiric, local observations upon the qualities of

the natural salted waters in the treatment of different maladies, a set of physical, hydrological, chemical and microbiological analyses was established, in order to emphasize the properties which can be useful for the development of different “green zones”. Moreover, the authors had selected some areas situated in the neighborhood of the old (perhaps already closed) salt mines from Romania.

The analytical determinations were realized during different locations and seasons, in order to check the weather’s influence upon the properties of these natural salted water sources and to improve their use for the public health use.

Some elements (for ex. iron total concentrations) were determined by A Perkin Elmer FAAS, while other ones by Elan DRC-e inductively coupled plasma spectrometer ICP-MS.

Iron dosing has been achieved by atomic absorption spectrophotometry in the flame at the wavelength 248,3 nm. The calibration curves were between 0,5- 3,0 mg/L for iron.

The next steps required for our issues were represented by the selection of some dendrological species, by checking their adaptability to salted areas.

Dendrological species are woody ornamental species which, unlike forestry species, have exclusively decorative function. They come from the spontaneous flora of Romania, the flora of other countries with similar climatic conditions and from the breeding of some Romanian species or hybridization. A cultivar is a plant or group of plants selected for ornamental or biological characteristics, different from the basic species from which they are coming and that can be maintained by vegetative propagation.

Results and Discussions

Chemical Characterization

The results concerning the chemical composition of some different natural salted springs are presented in the Tables and Figures 1, 2 and 3.

Table 1: Analytical determinations of some natural mineralized springs from the resort Someseni, during summer

| Sample No. | Characteristics | Spring No. | Spring No. | Spring No. | Spring No. |
|------------|----------------------|------------|------------|------------|------------|
| | Characteristics | 1 | 2 | 14 | 15 |
| 1 | Conductivity (ys/cm) | 2257 | 2530 | 1995 | 2310 |
| 2 | pH | 7,75 | 7,99 | 7,66 | 7,67 |
| 3 | Chlorides (mg/L) | 606 | 737 | 490 | 587 |
| 4 | Na (mg/L) | 494 | 614 | 370 | 565 |
| 5 | K (mg/L) | 6,6 | 4,7 | 9,0 | 5,6 |
| 6 | Fe (mg/L) | 0,13 | 0,07 | 0,12 | 0,10 |
| 7 | Mn (mg/L) | 0,015 | 0,022 | Under 0,01 | Under 0,01 |

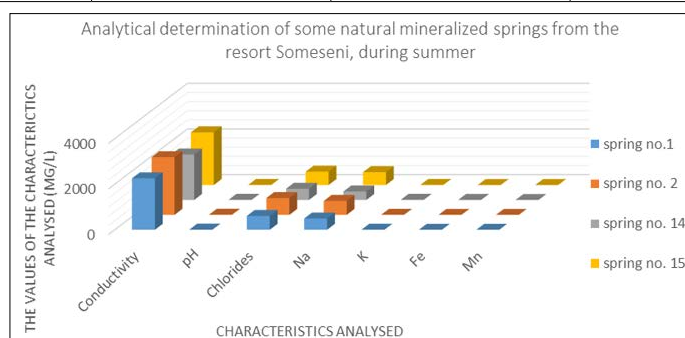


Figure 1

Table 2: Analytical determinations of some natural mineralized springs from the area Pata- Rat, during spring

| Sample No. | Characteristics | Spring No. | Spring No. | Spring No. | Spring No. |
|------------|----------------------|------------|------------|------------|------------|
| | Characteristics | 1 | 2 | 14 | 15 |
| 1 | Conductivity (ys/cm) | 211 | 265 | 313 | 5,6 |
| 2 | pH | 7,23 | 7,20 | 7,12 | 8,86 |
| 3 | Chlorides (mg/L) | 197,2 | 126,6 | 118,7 | 1,60 |
| 4 | Na (g/L) | 145,8 | 143,2 | 86,5 | 2.0 |
| 5 | K (mg/L) | 31,8 | 42,5 | 45,0 | 49,2 |
| 6 | Fe (mg/L) | 1,2 | 1,6 | 1,55 | 0,27 |
| 7 | Mn (mg/L) | 0,85 | 1,0 | 0,97 | 0,037 |

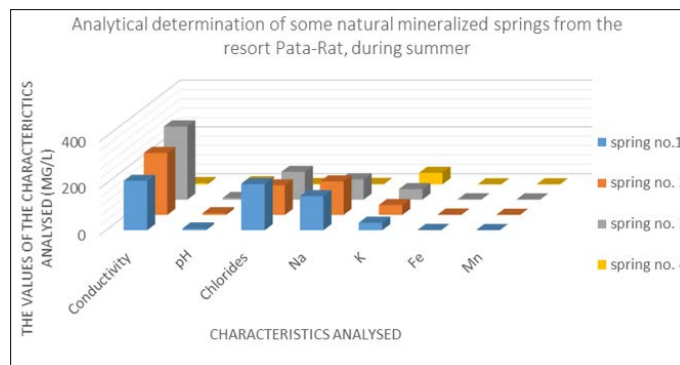


Figure: 2

Table 3: Analytical determinations of some natural mineralized springs from the area Pata- Rat, during summer

| Sample No. | Characteristics | Spring No. | Spring No. | Spring No. |
|------------|----------------------|------------|------------|------------|
| | Characteristics | 1 | 2 | 5 |
| 1 | Conductivity (ys/cm) | 315 | 305 | 304 |
| 2 | pH | 7,49 | 7,70 | 7,48 |
| 3 | Chlorides (mg/L) | 157,4 | 161,6 | 150,0 |
| 4 | Na (g/L) | 118,8 | 88,0 | 71,3 |
| 5 | K (mg/L) | 36,0 | 35,7 | 35,5 |
| 6 | Fe (mg/L) | 1,62 | 1,33 | 1,47 |
| 7 | Mn (mg/L) | 0,94 | 0,88 | 0,85 |

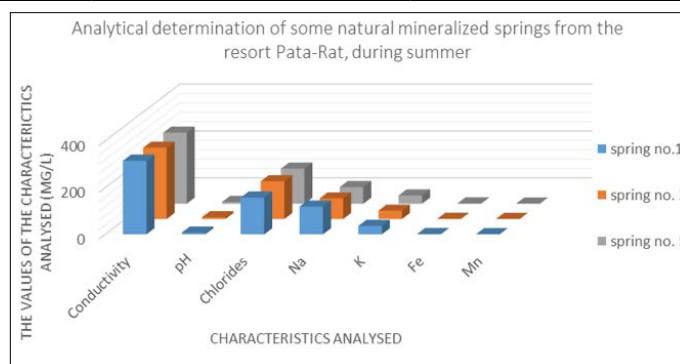


Figure: 3

Selection of Plant Species

Our analysis had as a result the selection of some specific activities which must be realized in the future, in order to realize new green locations situated on the salted areas, such as:

- Studies on the general aspects of using dendrological species on saline soils (observations on woody vegetation of the area, research methods and techniques)
- Development of an experimental model for testing some

dendrological species on saline areas (purchase of dendrological seedlings, testing the dynamics of growth and development under laboratory conditions, changes in leaf surface area, root volume and content of mineral elements of plants)

- Checking the experimental results regarding the resistance of selected species in saline environment, in order to create new green zones in the neighbourhood of the intensely developed urban areas.

Unfortunately this kind of research have to wait for better times, because of the situation due to the pandemic state with Covid-19 and to the war that is rulling near our country, which are involving other requested actions and expenses.

Conclusions

1. In recent years, the continuous degradation of environmental quality due to factors such as air pollution, noise, chemical compounds and disappearance of natural areas, in combination with lifestyle changes led to the emergence of a growing number of diseases such as different forms of diabetes, cardiovascular and nervous system diseases and disorders and cancer. Vegetation helps people to recover faster from illness; this reduces costs of healthcare and improves the patients' quality of life. A positive correlation exists between the amount of green in a person's living environment and that person's sense of safety.
2. Our issues were to verify the chemical characteristics of some natural mineralized springs and lakes from Romania, to find the proper plant species adapted to saline soils and to establish if some special security measures are requested in the case of using these natural resources as "green zones" needed for the treatment of different nervous system disorders.
3. These researches can conduct finally to open green areas created within the urban settlements or even the start for new independent resorts, improving air quality locally, expanding the range recreation and leisure factors.

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