

THERMAL WATERS IN THE REPUBLIC OF ALBANIA AS AN OPPORTUNITY FOR THE DEVELOPMENT OF SUSTAINABLE TOURISM

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Abstract

The Republic of Albania is very rich in surface and underground water. In the territory of Albania there are thermal springs, which have been known by the inhabitants since ancient times. The thermal springs in my country are in Bilaj (Fushe Kruja), Bellova (Diber), Kozana, Hidrait (Elbasan), Dimal, Benja in the Langerica canyon (Permet), Vromoneri, Postenani (Leskovik), and Mamuras. Some of these thermal springs have been known by Albanians since the time of the Roman Empire. The geological construction of the Albanian soil plays a special role in the thermal waters, which are influenced by the properties of the rock composition of the Albanian subsoil. In addition to geological construction, relief and climatic conditions, a significant factor that guides the use of thermal waters is the way of management by man.

The purpose of the study, based on a detailed analysis of thermal water springs in Albania, is to identify the way they can be used and well-managed to serve as a development instrument in curative tourism in our country.

This article presents the curative tourism potentials, the forms and dimensions of their use so far, but also the need for drawing up strategies for sustainable development by the central and local government.

In order to carry out this study, field observations were carried out and it was used the literature of the field. Consultations with specialists (water engineers) were conducted well as interviews with doctors who work in curative centers, visitors of these centers and owners of hotels located near thermal springs. Thermal spring waters contain sulphur, magnesium, calcium and other minerals. These mineral waters have curative properties for various rheumatic diseases, skin diseases, nervous system diseases, respiratory diseases, etc.

The findings of the study will be at the service of central and local institutions, tourist operators, and interested communities, with the aim of involving all actors in making efforts for strategic intervention in areas that offer the possibility for the development of curative tourism.

Keywords: *underground water, thermal water, curative water*

1. INTRODUCTION

The Republic of Albania, with an area of 28,748 km², lies in the west of the Balkan peninsula. There are many thermal springs in the territory of Albania, which if used efficiently create an opportunity for sustainable development in the areas where they are located. The geographical position between the routes from the western Mediterranean to the Balkans and Asia Minor creates opportunities for use by different citizens. The Albanides are geological structures in the territory of Albania, which are interrupted by deep longitudinal fractures, to which geothermal energy sources are connected. Thermal waters are directly related to the geological structure. The thermal springs in Albania clearly show the traces of a former volcanization in the geological history of the earth's crust. This geological construction ensures the rich chemical mineral composition of the thermal waters, increasing their curative quality. The hilly mountainous relief of Albania, as well as the slopes of the mountains, where some of the thermal springs emerge at their foot, offer a stunning view for visitors. The springs of Peshkopia on the mountain of Korabi, those of Leskovik at the foot of the mountain of Postenan, those of Benja on the mountain of Dangëllia, offer visitors a stunning, attractive view, as well as opportunities for hiking in nature. The climate of Albania is typical Mediterranean. The length of stay of tourists in the thermal springs is closely related to the climate. This also shows the number of visitors in different seasons of

the year. In the spring season the number of visitors from April to May varies on average from 48,000 to 55,000. The number of visitors in the autumn season is higher than in the spring and goes from an average of 65,000 in September to 8,200 in October and decreases to 73,000 visitors in November. The accommodation structures of the thermal baths in Elbasan, Peshkopi and Permet are surrounded by forest areas where visitors are provided with clean and healthy quality air. The thermal springs emerge near the water flows, such as those of Peshkopia near the Bellova stream, then the waters flow into the Drini i Zi river. Also, those of Benja in Permet emerge very close to the stream of Langarica and then the waters flow into to the Vjosa river. Visitors are offered a stunning view of the Langarica canyon, the Vromoneri gorge and the Vjosa valley.

2. MATERIALS AND METHODS

Regarding the research methodology applied for the successful realization of this scientific work, it was used the contemporary literature published in Albania, but also in different countries of Europe, in this field related to theoretical issues of the study. In order to achieve the purpose of the study, qualitative and quantitative research methods of an applied nature were carried out having a geographical scientific approach. One of the methods was obtaining information from previous studies dealing with thermal waters in Albania. The main method is that of on-site observation of the territory where the thermal waters are located. Other methods include photography of thermal springs, hotel accommodation structures, interviews with the residents of the areas where curative tourism takes place, which are located near these waters. There were conducted interviews with various visitors, most of whom were annual visitors to curative thermal waters. Field observations were carried out in cooperation with engineers and specialists from the local government, but also in cooperation with the residents of the study areas. The integrated treatment of the potentials, directions, forms and dimensions of touristic developments has been carried out by means of analysis and synthesis. This on-site study made possible the verification of the problems for each area, enabling the comparison among them.

3. RESULTS

3.1. Geothermal areas in Albania

Geothermal areas are associated with regional detachment tectonics and active seismological belts. The spring and wells of thermal waters in Albania are located in three geothermal areas: Kruja, Ardenica and Peshkopia [13]. The geothermal area of Kruja is a large area that stretches about 180 km and has a width of 4-5 km. It starts on the Adriatic coast, in the North of Cape Rodon, continues with the structures of Ishmi, Kozan in the North of Elbasan, Llixha and Hydrai in Elbasan, Holta, Benja in the stream of Langarica, Postenan in Leskovik and Sarandaporos in the vicinity of the Albanian-Greek border [13].

Geothermal area of Kruja represents an anticline structure chain with carbonatic core of Cretaceous-Eocene age. The limestones continue with the Oligocene flysch. In some structures in the north of the area, such as that of Ishmi, the Tortonian molasses are placed transgressively directly on the upper part of the limestones. In other structures, such as in Kozan, Burdigalian marls lie transgressively over the volcanic fault. The carbonate formation is represented by neritic limestone, dolomitic limestone and dolomitë [13]. The largest number of thermal mineral springs of Albania is in the Kruja area, such as Uji i Bardhe - Mamuras, Kozani, Llixha and Hidraj near Elbasan, the springs of Holta near Gramsh, those of Langarica near Permet, as well as the spring of Sarandaporos, Leskovik. The geothermal area of Ardenica is located in the field of Myzeqe e Madhe, at the southwestern end of the transverse tectonic fault of Vlora-Elbasan-Diber. Geothermal reservoirs are aquifers belonging to the Neogene molasses formation. In the Bubullima-5 well, water comes to the surface from the limestones of the Patos-Verbas structure. In the brachyanticline of Ardenica deep wells have fountained hot water; Ardenica-3 and Ardenica-12; in the Seman anticline, wells Semani-1 and Seman-3 and well Verbas-2 in the monocline of Patos have fountained [1]. There are thermal springs in Dimal as well in the vicinity of the Osum River, where in the northern part of the Velabishti anticline, there are 3 springs with mineral water and 1 spring with soft mineral water coming to the surface. These springs are used by visitors who come on

daily basis and have poor mineralization. There are thermal springs in Kapaj of Mallakastra and in Selenica of Vlora. The spring waters of the geothermal area of Ardenica are not frequented by visitors, as they are located in the oil-bearing area and have low levels of mineralization [13]. The geothermal area of Peshkopia is located in the northeast of Albania, in the hydrogeological area of Korab. Two kilometers east of the city of Peshkopia, in Banja stream, there are four springs located next to each other. These sources are related to the tectonics of the Triassic gypsum diapir, which is surrounded by an Upper Eocene-Lower Oligocene flysch ring. The sources are related to the seismically active tectonic belt of Lake Ohrid-Diber [1].

4. DISCUSSION

4.1. Thermal springs and their touristic potentials

4.1.1. Thermal springs of Uji i Bardhë

Springs of Uji i Bardhë are located in the village of Zhej, about 2.0 km north-east of the town of Mamurras, by the stream of Shehu in the north-east of the mountain of Makarësh. The water is warm with a temperature of 22.0° C and has a strong smell of sulphureous gas and has a white presence of sulfur deposits [1]. Temperature and salinity are quite stable throughout the year. The total content of hydrogen sulphide gas (H₂S) dissolved in water fluctuates around 320 – 350 mg/l in unmixed thermal waters and decreases to around 70 mg/l when mixed with cold waters. The high content of sulphidic gas classifies them as "very strong sulphidic thermal mineral waters". If this content were to be accompanied by a high-water temperature of 30⁰-35⁰C, then very high-quality water would be produced for curative purposes [1]. The waters of these springs are used in an amateur way by various tourists who are passionate about them. Residents of the area are frequent visitors of the thermal waters of Mamurras. There are no accommodation facilities, so there is no data on the number of visitors.

4.1.2. Thermal mineral springs of Llixha, Elbasan

The thermal mineral springs of Llixha in Elbasan are located about 12 km in the South of the city of Elbasan. They consist of two groups of springs: the springs of Llixha, and the springs of Hidraj. The springs of Llixha are located in the Prifti stream, about 1.2 km in the North-West of the Guri i Keçikut peak (351.0 m) [1]. The springs of Hidraj are located in the stream of Banja, about 1.5 km to the South-East of the first group of springs, at an altitude of 360-400 m above sea level, specifically in the villages of Tregan and Çikallesh. The climate of the area is Mediterranean, therefore is warm, and the relief is hilly. There is a total of 20 springs and their grouping is done according to the description of Avgustinski (1957). The general flow of the springs of the Llixha is about 15 l/s and this flow seems to be preserved even today. The springs of Hidraj are three in total; they emerge on the southern slope of the peak of Kyçyka to the stream of Banja. The general flow of Hidraj springs today is about 13-14 l/s [1]. The temperature of the main thermomineral springs varies from 50⁰ to 58⁰ C, which classifies them as "very hot". The predominant value of the total hydrogen sulphide gas (H₂S) content fluctuates around 350 to 400 mg/l; spring No. 3 has the lowest content with 178 mg/l [1]. According to the content of this indicator, the thermal mineral springs of Llixha are classified as "very strong sulphides". The content of free carbon dioxide (CO₂) fluctuates around 160-180 mg/l and thermomineral waters are classified as "low carbon dioxide waters". The content in silicic acid (H₂SiO₃) is low; it fluctuates around 35 to 45 mg/l. Even the content of iodine and bromine in the springs of Llixha of Elbasan is low; usually they do not exceed 2-3 mg/l [1]. The thermal mineral springs of Llixha of Elbasan are classified as follows; "Very hot thermal waters, strong sulfhydric and medium salinity". The waters of Llixha of Elbasan contain 600-700 mg/l of minerals, cations Ca, Na, K, Fe, Mg, anions H₂CO₃, CO₂, sulfurous gas H₂S, etc. These waters are characterized by PH 6.58, radioactivity 0.04 mRo/h, low enthalpy and high flow, therefore they can cope with the influx of visitors [1]. The thermal water is partially conveyed to the user by means of pumps; only at spring No. 1 in Hidraj have been installed about 15 pumps. The springs of Llixha in Elbasan are the most popular thermal mineral springs of Albania. Located near the ancient Egnatia road, these springs have served as thermal baths since ancient times. They were used as curative baths even in the Middle Ages, during the Ottoman occupation. Their frequent use began in 1932, when the "Nosi" hotel was built, which was the first hotel where treatment began to take place under the

control of a doctor [11]. Based on the interviews conducted with the doctors who serve in the center of Llixha waters, it results that the thermal waters of these springs have positive and healing effects for rheumatic diseases, stomach problems, urinary tract infections, sterility, respiratory problems, skin diseases, traumatological injuries, as well as various kinds of paralysis. As one of the doctors stated, the high temperature and the increased content of hydrogen sulphide gas is what makes them of very high quality. According to the doctors in questions, the most suitable temperature for curative baths is around 34°C to 38°C . The water temperature of the springs of Hidrajt and Llixha goes above 50°C , but before use they are cooled in open tanks and the temperature decreases to 36°C - 34°C . [11]. Moreover, during the cooling of water, a part of sulphhydric gas is removed, from 350 - 400 mg/l, it decreases to about 200 mg/l. T [1]. These springs are frequented every year by thousands of visitors, who come not only for health reasons, but also to relax. These springs are located in a green area and offer a stunning view to the sick people as well as to the amateur visitors. The curative center of Llixha in Elbasan is the first certified center in Albania since 1932, when the operation of the "Park Nosi" hydrothermal balneal station began. The first analyzes of the water camps of Llixha of Elbasan were carried out at the Technology and Polytechnic Institute in Prague in 1924 - 1925. Until 1990 there were only 3 hotels in the area: "Ylli 1" hotel, "Ylli 2" hotel and the Nosi family building. Whereas the senior leaders of the Labor Party, which ruled our country from 1945 to 1990, were accommodated in a one-story building called "Vila" [11]. After the 1990s, the hotels were built in a chaotic way and without urban planning. Based on field observations, as well as from interviews conducted in the central thermal waters of Llixha and of Hidraj (Çikallesh and Tregan), it results that there are more than 68 entities that offer accommodation for curative baths and mud therapy to visitors. Among them we would like mention the curative centers and hotels: "Ylli 1 & 2", "Parku", "Panorama", "Natyra", "Iliria", "Miza", "Stringa", "Boçi", "Puka", "Liçi", "Besi", "Sulmina", "Drini", "Çekrezi 1 & 2", "Muça", "Myzeqarja", "Debrova", "Tashi" (1 ,2, 3, 4) etc.



Fig. 1. "Park Nosi" hotel



Fig. 2. "Debrova" hotel

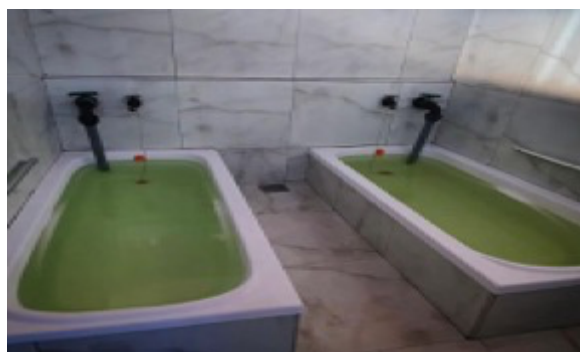


Fig. 3. Bath tubs in the "Park Nosi" hotel



Fig. 4. Hotels built in the spas of Elbasan in a chaotic manner after the 1990s



Fig. 5 & 6. Spa resources in Elbasan

Apart from the registered entities, unfortunately, the field monitoring shows that there are unregistered entities with a capacity of up to 10 beds that continue to work and accommodate visitors, but they do not offer the services of a doctor, bringing a high health risk to visitors. The number of visitors is about 28,650 people per year. Curative tourism is the future of the Tregan area, where residents have the opportunity to secure a relatively good income. Farmers in the area sell agricultural and livestock products to the host entities at very good prices. Some of them are employed in the hotel services set up in the vicinity of the curative springs. The geothermal springs of Elbasan are a very valuable asset for the community, because the number of tourists is increasing, bringing good income to the residents. Thermal waters are a very good opportunity for the sustainable development of the area.

4.1.3. The geothermal well of Kozan

The geothermal well of Kozan emerges in the structure of the same name, 8 km near the village of Shijon, in the North-West of the city of Elbasan, as well as about 35 km in the South-East of Tirana [13]. From a tectonic point of view, it is observed that the carbonate cores of the structural ranges of the northern part of the Kruja Zone continue. The buried anticlinal structures are built from Cretaceous and Paleocene-Eocene carbonate formations and from a hydrogeological point of view they constitute the deep aquifer layering of the sector. Deep wells have encountered several covered carbonate anticline structures that contain thermomineral waters [1]. The water has a high temperature of 65.5°C - 80°C , while the pressure is 191 atmospheres on the limestone ceiling at the bottom of the well. The water emerges of a horizon at a depth of 1816 - 1837 m [13]. The flow of the self-flowing well is about 10.0 l/s. The well water has low salinization, the dry residue is 4.1 gr/l, and the hydrochemical facies $\text{Cl-SO}_4\text{-Ca-Na}$. This means that in addition to salts such as Cl-Ca and Cl-Na , there is a high presence of gypsum, CaSO_4 in the water. The water has a strong smell of hydrogen sulphide gas. Due to the high levels of salts deposited in the mouth of the well, a very special sight is created. The use of the thermal water of the Kozan-8 well for the treatment of rheumatic diseases and arthritis has already become a profitable business. Most of the thermal water, after coming out of the well, flows to the surface through open and unregulated soil canals, collects in a surface basin and is transported from there through hoses to the nearby primitive baths. Clients (people in difficult situations) without any medical help enter some cubicles called baths where the continuity of the sessions depends only on payment [1].

4.1.4. Holta springs in Gramsh

Holta springs emerge on the north-western side of the Tervoll anticlinal structure, which is built from limestone carbonate formations of the Upper Cretaceous and of the Paleocene and Eocene. Tervoll structure represents a water-bearing massif where karst phenomena are widely spread. The circulation of karst waters is also linked to local tectonic faults which often expand and form karst channels. Numerous karst caves can be found located at several levels in Holta canyon, but they have not yet been studied [1]. Four thermal mineral springs are found in the last 300 meters of the Holta river canyon; one spring is located outside the canyon, while three others are located inside the canyon. The main feed of underground water is the infiltration of precipitations in the karst massif as well as the infiltrations of

Holta River without excluding the basin fluids which emerge from the depth [1]. The data show that the four springs have quite similar qualities; the temperature of the springs fluctuates around 23-24° C, which classifies them as “warm”. The salinity of the Holta spring no.1 water fluctuates around 2500 mg/l, which classifies it as “low salinity water” (1.0 to 5.0 gr/l). Based on the dominant ions, the water has a “sulphate-magnesium-calcium” composition with increased sodium and chloride content. The high content of sulphates is apparently related to the presence of evaporites that are assumed by all geologists to be located at great depths in this area [1]. “Warm sulphidic and low salinity thermal mineral springs”. Holta springs are not captured and are not used for curative purposes, although the large flow and the temperature of 23-24°C enable their use for this purpose [1]. The area where Holta thermal mineral spring is located is characterized by a nature with great touristic value. Passing through the canyon would surprise any visitor: water basins, karst caves, numerous erosional-fluvial forms, sometimes bare and sometimes densely green steep limestone slopes create beautiful views [1]. The spring waters are used by daily visitors who come and visit the canyon. We do not have accurate data on their number. From the interviews made in the area, with residents as well as with the owners of the restaurants located nearby, it results that the number of visitors varies from 1400 to 1600 on average every year. Also, residents of the surrounding areas who have various rheumatic problems go about 10-15 days every year, but they are not under the supervision of a doctor.



Fig. 7 & 8. The thermal springs of Holta

Fig. 9. Holta canyon

4.1.5. Thermal mineral springs of Benja in Permet

The springs are located at the western end of the Langerica river canyon, 7 km North-East of Permet and near the village of Benja, from which the springs take their name, at an altitude of 330-340 m above sea level [1]. Near the springs, there is an old stone-built bridge of rare beauty, which is called the Kati Bridge. The climate of the area is warm hilly Mediterranean. Permet has an average annual temperature of 15.3° C, in January it is 5.4° C, while in August it is 25.2° C. The thermal mineral springs of Benja are located in the most south-western part of the Kruja tectonic zone, close to the overthrust contact with the Ionian zone [1]. The Langerica structure core consists of thin-bedded limestones to massifs of the Eocene which are gradually covered by Oligocene flysch. The thermal springs emerge at the end of the Langerica river canyon, at a length of about 600-700 m. There are a total of 8 main sources, of which 4 emerge along the right bank of the river, while 4 emerge along the left bank of the river. Most of the springs emerge inside the river canyon, while springs 1, 7 and 8 emerge at its end, west of the Kati Bridge. The overall flow of the springs varies from about 70 l/s to over 200 l/s [1]. All springs emerge from Eocene limestone rocks and usually from strata fissures widened by the dissolution of the limestone. The temperature of the springs of the left bank of the river is about 4° C higher than that of the springs emerging on the right bank of the river; while in the springs of the left bank of the river the temperature fluctuates around 29.6 to 30° C, in the springs of the right bank of the river, it fluctuates around 23.8 to 26.6° C. Water ponds have been built in most of the springs for simple baths. The thermal mineral waters of Benja can be named as: “Warm waters, with Cl-Na composition, with low salinization and very low hydrogen sulphide gas content” [1]. Benja spring waters contain up to 1700 mg/l of mineral substances, mainly NaCl and less Ca, meanwhile they contain significant amounts of H₂S sulphurous gas [1]. The springs are in open nature, favouring their use for all ages. The curative centres

and accommodation structures are missing here. The highest flow of visitors is in the summer season, but here too, the number of tourists visiting them is not exact. The flow of visitors increases from June to August, reaching an average of about 18,000 visitors in 2022, of which more than 50% are foreigners. Visitors are accommodated in the Nemerçka hotel, in private houses in the villages of Benja, Iliar, Bodlonja and Petran. Many visitors stay in the hotels of the city of Permet, but also many foreigners stay in their own camper vans. The area of Permet stands out for its rich culinary tradition. Tourists also visit religious cultural objects of the Christian and Bektashi cults: the church of St. Mary of Leusa, St. Friday, Tekke of Ali Postivan, etc.



Fig. 10 & 11. The thermal springs of Bënjë



Fig. 12 & 13. The thermal springs of Bënjë

4.1.6. Thermal springs of Leskovik (*Sarandaporos*)

Leskovik (or Sarandapor) thermal mineral springs, which are also known by the local name of Vromoneri springs, are located about 5 km south-east of the city of Leskovik, on the right bank of Sarandapor River. Here the river breaks through a limestone hill and forms the Vromoneri gorge; the state border between Albania also passes through its bed [1]. Leskovik springs are part of the southernmost sector of the Kruja tectonic zone, in the northern periclinal of the Vronomer anticline, part of the Tomorr – Melesin – Vronomer anticline range. Three types of formations take part in the geological construction: carbonates, flisch and loose granular materials. The thermal springs of Leskovik and Kavasila (Greece) emerge on both sides of the Sarandaporos rivër [1]. This group consists of four sources; the best-known spring emerges about 20 m from the river bed and about 12 m above its

level. Three other springs emerge on the right bank of the Sarandoporo river. The Eocene limestone rocks of the Vromoneri anticline due to karstization have very high permeability. Here are some karst caves both in the central part of this anticline and in the Sarandoporo river canyon. According to some non-systematic measurements, it results that the flow of the Llixha spring fluctuates around 15 l/s, the temperature varies from 25.6° C to 26.7° C [3]. The salinity of Leskovik spring water fluctuates around 1110-1200 mg/l, so it is a thermal spring “with low salinity”. The overall maximum content of hydrogen sulphide gas (H₂S) is about 7 mg/l and according to this indicator, the water of this spring is classified as “very low sulphide”. These waters have a small content of mineral salts such as Ca, Na, Cl, and H₂SO₄ [1]. The Leskovik springs have been visited since the 18th century by the inhabitants of the South-Eastern part of Albania for curative baths. A curative centre with several rooms for visitors was built there around 1930, which operated until 1950. This centre was not allowed to be used by the state from 1950 to 1973, as it did not allow the presence of its citizens near the border line. In 1973, the state built a new curative centre and a hotel about 3 km away, where water was conveyed by self-flowing plastic pipes to this centre. The waters of these springs cure rheumatic, skin, cardiovascular, digestive diseases, etc. The number of visitors varies from year to year. The improvement of the road infrastructure, the increase of accommodation capacities by private subjects will lead to an increase in the number of visitors.



Fig. 14, 15 & 16. The thermal springs of Leskovik

4.1.7. Water Steam spring of Postenan - Leskovik

A steam spring can be found on the eastern slope of Postenan Mountain, 1.5 km south of Postenan village and about 3 km north-west of Leskovik. Hot steam emerges from a large vertical crack-cavity that cuts across the entire slope of Postenan Mountain [1]. The air temperature in the steam-bursting cavity is 47° C - 54° C, depending on the place of measurement. The balneological values of Postenan hot steam have been known for centuries by local residents. Today, the hot steam that rises from the deep rock cavity continues to be used by the local inhabitants in the same primitive way as before. However, even this is difficult, because the “rock of steam” is connected to the village of Postenan by a narrow and steep walking trail.

4.1.8. The thermal water springs of Bilaj near Fushë - Kruja

The thermal springs are located near the Gjola Bridge in the village of Bilaj near the national road Vora - Fushe Kruja. The springs of these thermal waters emerge from the deposits of the Ishmi valley. They are sulphurous waters rich in minerals such as: Ca, Na, K, Fe, Mg, etc. The water temperature is 55° C [13]. These waters have scientific curative values on rheumatism, skin and nervous system problems. In the village of Bilaj, during the search for oil, mineral water emerged. In 1970 - 1975, the first building for curative and medical service was built, which offered only daily outpatient service, as there were no beds but only bathtubs for baths. This building had two rooms and an apartment serving the political bureau of the Labour Party at that time. In 1996, the Kupa family privatized the property and built a hotel with very good conditions. Dozens of diseases of the nose, throat, sciatic nerve, skin, rheumatism,

sterility, etc. are cured through the sulphurous thermal water and mud. The service is offered on an outpatient basis and with several days of hospitalization. The centre has specialized medical staff which systematically checks every visitor. It is not possible for a visitor to take a bath without first having a medical check-up. Based on the field observation and interview with the head of the centre, the number of daily visitors reaches 9456 per year, while that of visitors with a stay of several days was 9875 for 2022 [13]. Most of the visitors of several days stay from 10 - 14 - 15 days, and they are mainly in the age group over 60 years old. The visitors are mainly from Tirana, Durres, Northern Albania, but also from the south and the Albanian territories, while in recent years there have been many foreigners. The stay at the "Ibrahim Kupa" balneal curative centre can be combined with visits to the cities of Kruja, Tirana, Preza Castle, to get to know their historical and cultural values closely.



Fig. 17 & 18. Ibrahim Kupa curative center in Bilaj

4.1.9. Thermal springs of Peshkopi

The thermal mineral springs emerge about 150 m to the East of the main building of Llixha, in the narrow valley of the Bath stream filled with thick alluvium. The slopes of the valley near the springs are built of Paleogene flisch formations. Apparently, the springs emerge at the border of the tectonic plate that surrounds the emergence of gypsum, which is not revealed on the surface here [13]. Some of the springs in Peshkopi provide hot water with a temperature of 43.5°C ; the waters of other springs are colder, up to 12°C . The springs have a big flow; among them, the one with the high temperature has a flow of 14 l/sec. The total mineralization of the spring water with a temperature of 43.5°C is 4.3677 g/l. It contains cations Ca, Mg, Na and K, anions Cl, SO_4 , HCO_3 and very small amounts of F, Br, HCO_3 , etc. The water of the second spring contains very little H_2S , 32 mg/l [13]. These waters have scientific values related to respiratory diseases: such as bronchial asthma, bronchitis, rheumatism, diabetes, skin diseases and gynaecological problems. The water from the source comes to the curative centre with the conveying pipeline and with self-flowing pipeline at a distance of about 150 m. The Llixha springs of Peshkopi are among the most popular thermal mineral springs of Albania. The interest in the wider use for curative purposes of springs of Peshkopi began in 1926. In 1956, a curative hospital with 30 beds and 12 bathtubs for baths was built for the first time. Since that time, the treatment of patients began to be carried out under the doctors' supervision [10]. In 1979, the first hotel was built at the entrance of the city with 130 beds, and in 1989, a rehabilitation centre with 50 bathtubs was built, and their total number together with the existing ones reached 62 [10]. After 1990, several private hotels were built, which greatly increased the number of beds for patients. However, many patients independently of the doctor take curative baths in two pools discovered outside the Curative Centre. According to the data of the Curative Balneal Llixha Centre of Peshkopi, more than 30,000 patients are treated in a supervised manner every year. The treatment is done with thermal mineral water in a natural state with a temperature of around 40°C . Visitors here are treated with these waters for chronic rheumatic diseases; some diseases of the digestive system such as colitis and gastritis; diseases of the respiratory system; diseases of the urinary system; gynaecological diseases, sterility. There are also many hotels in the valley of the Baths stream or Bellova as it is called by the locals, which welcome visitors. We do not have exact figures because there are also unlicensed accommodation structures. The number of visitors is

increasing and more hotels are needed to cope with the influx. From the interview conducted with the doctor at the balneal centre, it is clearly explained that all visitors first undergo a medical examination and then proceed to perform the treatment with thermal water.



Fig. 19 & 20. The thermal springs of Peshkopi



Fig. 21. Curative balneary center in Peshkopi



Fig. 22. Hotel of Ballkan

CONCLUSIONS

Albania has many thermal water springs, which are a potential for the development of health tourism, which is one of the many forms of tourism potential. The thermal springs must be put at the full service of tourism. In Albania, curative centres have been established in Peshkopi, Elbasan, Bilaj of Fusha - Kruja, which are fully operational with medical staff at the service of visitors. The state should always carry out on-site inspections to identify subjects that have built accommodation structures for visitors, as well as inserted thermal water in self-flowing pipes, but do not provide medical services. It is the duty of the state institutions to carry out on-site verifications. The addition of licensed hotel capacities will increase the number of visitors to these curative centres. Creative recreational facilities should be added to the existing centres, creating opportunities for visitors with a stay of several days to have as much fun as possible. Providing an accompanying local guide for the tourists will bring an increase in the number of tourists, especially younger ages, mainly around the forties. These springs are located near centres with significant natural and cultural potential for the visitors. Many springs such as Benja in Permet, Makaresh in Milot, Dimal in Berat, Karbunara in Lushnja, Selenica in Vlora, Kapaj in Mallakstra are used in an amateurish and unsupervised manner. All springs should be fully analysed by field specialists, with samples taken from each spring. The scientific data derived from analyses of the waters should accurately clarify their mineral composition, as well as explain the curative values that each spring has. The waters must be certified, licensed and put into full and supervised service for visitors. The establishment of balneal centres near them would create opportunities for the development of sustainable tourism and would bring an increase in income for the residents of the area where the springs are located. If accommodation structures are built for visitors in these areas, residents of the community near the

springs will trade agricultural products nearby. Investments should also be made in improving the road infrastructure, which has a direct impact on increasing the number of visitors to the thermal springs.

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