SPRING
Caldes d’Estrac

Geothermal physical-chemical properties of medicinal mineral water, its application to the human body and history
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1. GENERAL CONTEXTUALIZATION OF THE GEOTHERMAL SYSTEMS STRUCTURE IN NE IBERIAN PENINSULA.

CATALONIA

Legend:
- Thermal Spring
- Sulfide Spring
- Carbonic Spring

2. Arties 17. St. Llorenç Muga 32. Caldes de Malavella
3. Trebós 18. La Mercè 33. Sta. Coloma Farners
4. Boi 19. Cantallops 34. La Sellera de Ter
11. Combien 26. El Pasteral 41. La Puda de Montserrat
14. Ripoll 29. Madremanya
15. Ribes de Freser 30. Cassà de la Selva

La Riera, 29 Caldes d’Estrac Maresme Barcelona-Spain
www.balnearicaldetes.cat
Tel. 93.791.26.05
2. SPRINGS OF THE PRE-COASTAL AND COASTAL RANGE, PLATES TERMED AS ‘CATALÀNIDES’

The various hydrothermal manifestations of Catalonia appear at these two well-defined morphostructural units: Pyrenees and Catalànides.

Catalànides are both Pre-Coastal and Coastal mountain ranges separated by a rift known as Pre-Coastal Depression. Its recharge area is the Montseny Massif; the waters are rains infiltrated into depths of 2,000 to 3,000 meters at a temperature of 90-130°C, dissolving minerals from rocks and ascending by convection, so that the waters circulate through the faults.

The origin of the thermal springs seems to be in the deep infiltration of the rain waters; these, once heated, rise to the surface by thermo syphon effect, taking advantage of the tectonic fracture zones. Its discharge rate is very constant because the stocks of these geothermal systems are very abundant.

The circulation of this water is deep, about 3,000 meters. At the Pre-Coastal Range the minerals are dissolved, adding by friction to its chemical composition, while the Coastal Range stands by sedimentation (Spring of Caldetes). The main reaction is hydrolysis, principally the sodium one, which releases Na, Ca and SiO2. In general, these processes are typical for low flow waters and, consequently, long residence time in large bags of water, mineralizing itself by 'sedimentation'.
The spring flowing in Caldes d’Estrac is placed at the point of tectonic fracture determined by a fault that connects the Vallès-Penedès Depression with the Coastal System at a depth of approximately 2,800 meters, next to the stream of Caldetes; its thermal trunk is branched by a superficial fracture effect, emerging the ‘Spicy Fount of Argentona’ and the Spring Titus in Arenys de Mar. It is heated by a geothermal force (magma), rising to the surface at 38,8ºC by a thermosyphon effect and using the tectonic fractures. Its mineralization is carried out with granite minerals and sedimentation.

In the last 200 years the physico-chemical analysis has been unchanged, presenting the same flow and temperature.
3. THERAPEUTIC PURPOSES OF THE MEDICINAL MINERAL WATER THROUGH THE APPLICATION OF BALNEOTHERAPY (HYDROTHERAPY - PHYSIOTHERAPY)

Sodium chloride water (CINa) with medium mineralization and soft hardness, colourless, tasteless and transparent. Due to its chemical composition, the actions that this water has over the human body are stimulants, anti-inflammatory, diuretic; and due to its temperature of 38.8°C, the water improves the blood circulation causing a sedative and relaxing effect, by the vasodilator response and the increase of the blood speed to the muscles and ligaments.

Effectiveness in the human body

If the balneotherapy treatments applied at our headquarters are directed and supervised by Doctor Marius Biscarri. We dispose of experts in nutrition and dietetics, certified nurses and physiotherapists in different specialties.

Medicinal mineral water

Cellular stimulator, anti-inflammatory. When ingested, it is quickly absorbed, following by an intense and lasting diuresis. Thermal bath, sauna.

Respiratory apparatus, bronchial spasms, nasal congestion, rhinitis, chronic laryngitis, bronchitis. Inhalations, thermal bath.

Inflammatory skin disease as well as psoriasis. Gynecological with endocrine background disorders, vegetative or metabolic. Individual thermal bath.

Cellular stimulator, anti-inflammatory. When ingested, it is quickly absorbed, following by an intense and lasting diuresis. Thermal bath, sauna.
Sedative and relaxing by the vasodilator response and increase of blood speed to muscles and ligaments action. Chronic disorders of the musculoskeletal system and the trauma effects (osteoarthritis or osteoarthritis). Especially in coxarthrosis to combat the abductors contraction and the medium gluteus hypotrophy.

Gonarthrosis, quadriceps and internal or localized in the vertebrae vast strengthening. Thermal bath, physiotherapy, mud, paraffin.

Drinking it, once cold, is indicated for the uric and oxalic calculations, inflammation of the urinary tracts. Digestive disorders as the constipation.
4. PHYSICO-CHEMICAL ANALYSIS OF THE MEDICINAL MINERAL WATER (MINERAL COMPOSITION)

- Organoleptic features: odourless, colourless and tasteless

- Physico-chemical determinations
  - Average T° of the gallery: 31.6 °C
  - T° of the water: 31.6 °C
  - Conductivity (at 31.6 °C): 1.8 mS/cm
  - pH (31.6 °C): 7.37
  - pH (31.6 °C): 29.2
  - Total hardness: 10.5 °F (very soft water)

- Dissolved gases
  - Carbon Dioxide, 495 mg/L

- Chemical determinations

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<td>Carbonates</td>
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From the study of the analytical determinations carried out about this water in the last 200 years (Rubio 1853 - Novellas 1877 - Manjanés 1886 – Oliver Rodés 1972 – Berdonces i Serra 1985).

It is believed that the determinative of Estrac has its origin in the place name of ‘Estarac’, that comes from the Celtic / Celtiberian / Laietan ‘Astaracus’. One of its meanings is way to the water or way near the water. Surely it is a place of worship for them.

One of these tribes, Laietans, occupied the territory that currently constitutes the region of Maresme, namely the land comprising the Montgat Hill and the mouth of the Tordera.

‘The Village from the Hill of the Enchanted’ is the closer to what is today Caldes d’Estrac and is one of the few settlements near the sea.

Later, the Romanization on the Iberian Peninsula was very strong.

Definitively defeated the Carthaginians, Rome took all the land domains of the principality. Commonly, it is taken as the initial date of the Roman domination the landing of Scipio troops at Empúries (-218), rapidly taking possession of the Catalan lands.

Marta Prevosti ensures that at the area between the river Besòs and the stream of Caldes it was found 352 Roman discoveries in Caldes. Via Augusta passed by Estrac and its springs with hot water or "termes" were called as "Aquae Calidae."

In his work ‘Caldetes or the old Quadra d’Estrac’ Carreres i Candi (historian) maintains that the XVIII century when the modern baths were built, the former Roman buildings were completely battered. We can therefore say that the Romans enjoyed the hot waters ‘Aquae Calidae’ of Caldes d’Estrac.
Roman Milestone not found but documented in 1559 as a municipal milestone among Arenys de Munt and Caldes d’Estrac.

The water has been a vital element in the development of the humanity. The primitive people held in high esteem the springs and founts, and considered that their waters possessed magical powers conferred by any deity. This natural elixir had been used in initiation rituals and therapies. Throughout the history, important civilizations as the Egyptian, Greek and very especially the Roman, were spread and popularized the use of the baths in both therapeutic and hygienic way. And much better if the waters were thermal.

...Because of its use, this spring was named ‘Aquae Calidae’, Hot Water. Becoming a mandatory stop site for legions recovery from its travels and hurts.

Following the timeline, Arabs also left a footprint of their passage by the spring...

Islam gave great importance to the hydrotherapy. Mahoma handed much importance to the hygiene and the body cares related to the water. The wise Persian Al-Razi, highly prestigious philosopher, physician and chemist, discoverer of the sulphuric acid and ethanol, and also credited for the invention of the alembic, used the hydrotherapy in baths and drinks. The same could be said of Avicenna, considered as the most important doctor of the Arab culture, he used the thermal water in beverages and in cases of bleeding, burns and the smallpox.
In 713 the Saracen wave came, and in seven years dominated these lands (Maresme today); different authors remarked that they did not leave any stone upon a stone.

In 785 year the Frankish King Charlemagne wanted to establish a brand as a protection from the Saracen raids. He cut the paths from Barcelona ‘The Guilleries, Montseny, Montenegre, Collsacreu (Arenys de Munt)’ and the corridor until the beaches of Riera of Caldes d’Estrac where the ‘Hill of the Enchanted’ was built, a military settlement for the coastal path monitoring.

In 800 year Maresme was a scene of violent confrontations between the troops of Charlemagne and Abd al Malik; finally the border at the Llobregat river basin was restored.

...It is known a popular legend about princess Fàthima suffering leprosy; the maiden Leonor from a Moorish expedition was at prince Zeiri court, who reported the maiden that there were miraculous waters in his village. The Moorish court lived at the popularly known as ‘Tower of the Enchanted’. The treatment had been a success, and the princess was cured of her evil. According to the legend, she fell in love with a handsome young villager named Busquets, and they get married.

The general lack of interest in thermal waters at the Middle Ages leaded to a widespread ruin of much of the thermal centres. Some public springs served as huge help for lepers and those who came from the Crusades in Palestine arriving to Europe sick and wounded.
In the XI century the ephemeral castle Montalt happened to belong to the castle of Mataró. In the early XIII century a knight from Barcelona Pere Gruñidos built a church and a hospital near the hot fountains that gave the town its name. In 1219 gentlemen from castle of Mataró, Guillema de Castellvell and his son Gillem de Montcada, ceded a part of the territory neighbouring St. Vicents de Llavaneres to that hospital.

In this Vila on the spring flow, at the beginning of the XIII century as mentioned in the previous paragraph, all the appointed knights belonging to the order of the temple, built the first thermal hospital in Spain and also a seaport that could have been located at the intermediate area of the current stream and disappearing due to the constant flooding of rainwater near the legendary Via Augusta. With the aim to defend this natural wealth, the templars rose a tower on the upper hill – ‘the Tower of Enchanted’ - from where it was not only possible to protect the village, the balenario and the hospital, but also the entrances and exits of the boats at the seaport. The templars cared as anyone these miraculous waters.

From that time is the parish Church, consecrated in 1219, after the occurrence of the discovery of an image of Black Madonna in a cavity of a rock – on which in XIX century it was built the Chapel of Remedy.

The most famous in Catalonia thermal verge is Our Lady of Remedy in Caldetes. From the medieval temple - parish Church of Santa Maria - only remains preserved the area of the feet, the baptismal font, rests of arches, rests of a tomb, a rosette and a gargoyle; the Virgin of Remedy dominates the major altar of the Church, at which we can see the cross pateó templària. Few meters away, near the building Milans - where we can find the current Municipal Library – there is the House of King, where at the beginning of the XVI century, King Jaume II ‘The Right’ was hosted when he came to take the waters with his second wife Maria de Xipre (1279-1319).

In 1779 an agreement was signed between the Church and the City Hall which acknowledged that the land, the water and the building belonged to the parish Church, that the right to the use by all the villagers was free of charge, and that the benefits should be divided between the City Hall and the Church. Finally, however, in 1818 new baths were built (the current building) municipally owned, and the former were covered by the construction of a new City Hall. It worth noting that ‘the right of the villagers for the gratuitous use of the water’ is still in force since the XVII century.

But the closer historic reference point to the thermal village that we know today dates from 1820, when the public Baths were remodelled and Caldes d’Estrac became a well renowned modern establishment.
The inauguration of the first railroad of the peninsula in 1848, between Barcelona and Mataró, that arrived to Arenys de Mar just nine years later, gave a considerable incentive. According to the local Historical Collections, 72,026 passengers used the new line in 1857. Two decades later, Caldes d’Estrac had become one of the most important summer resorts in the country. Catalan summer Capital and ‘dolce far niente’.

Thus in 1818 the construction of new baths that would be eventually owned by the municipality was started.

In XX century, thanks to the research by Marie and Pierre Curie on radio, it was started to learn the radioactivity, especially important in some very hot and volcanic waters. Many of the therapeutic effects of the thermal waters and the contained gases are precisely due to its radioactive nature. The radioactive level decreases as getting away from the spring and that is why this water is only effective IN SITU.
Located on the previous Roman thermal baths. A central corridor provides access to the different chambers that are on either side of a linear plan. The baths spaces are designed in a shape of a vault that subserves ventilation.

The exterior appearance was changed, as we can see at the photograph above, the access entrance and inside it was decided for a more present day but no more noble image.

Nowadays, in 2013, the company Aigües Termals Caldes, SL., concessionaire of the water use and the balneario building, reformed its inside attempting not to modify the structure of the building that dates from 1818. As the most outstanding work worth mentioning the improvement of the physiosanitary treatment of the medicinal mineral water, adapting it to the current legislation. (Promoted and funded by the City Hall of Caldes d’Estrac.)

The City Hall of Caldes d’Estrac and Aigües Termals Caldes, SL. join the efforts to honour the municipal rating as “Thermal Vila of Catalonia” in its entirety: hydrotherapy, culture, gastronomy, history and legend and, of course, the lovely landscape of Maresme. The municipalities classified as such are: Benifallet, Caldes d’Estrac (Caldetes), Caldes de Malavella, Caldes de Montbui, el Vendrell, La Garriga, Sant Climent Sescebes, Sant Hilari Sacalm, Santa Coloma de Farners, all of them with the peculiar features of their medicinal mineral waters.
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