

Thalasso Spa Lepa Vida inside the salt pans: the experience of Sečovlje

Neli Glavaš^{1, 2} & Nives Kovač¹

[1] Marine Biology Station, National Institute of Biology, Fornače 41, 6330 Piran, Slovenia

E-mail: glavas@mbss.org, kovac@mbss.org

[2] SOLINE Pridelava soli d.o.o, Seča115, 6320 Portorož, Slovenia

E-mail: neli.glavas@soline.si

ABSTRACT In Sečovlje Salina the use of saline mud (peloid) for healing purposes dates back to the 13th century. Although the therapeutic effects of the saline peloid have been exploited for centuries, its current use is still based mainly on experience and long tradition of spa tourism. In 2013 the company SOLINE Pridelava soli d. o. o. (Salt Production Co. Ltd.) which is producing the salt in the traditional manner and thus protecting and preserving the natural and cultural heritage within Sečovlje Salina Nature Park, decided to bring thalassotherapy and therapeutic medical treatments directly to the healing source by creating the Lepa Vida Thalasso Spa Center inside the salt pans. The complex is inserted in the natural reserve and designed as a minimal intervention in a protected cultural and natural landscape. The open space facilities for a variety of therapeutic purposes cover an area of around 4000 m² and include: sunbathing, swimming, massages, medical gymnastics in the seawater, kneading, brine baths, salt scrubs and therapies with saline peloid. Visitors can continue the treatments at home with a line of several beauty products which include brine, bath salts and salt peelings. In parallel with the development of spa centre an experimental 'maturation basin' was established, where a pilot study of peloid composition and transformations during maturation (with brine) is still ongoing. The results confirm that

the quality of the therapeutic saline peloid depends on the composition of the saline mud and brine characteristics in the process of maturation. The findings of the pilot study will be used in the establishment of controlled production of saline peloid in Sečovlje Salina. By taking into account the nature conservation regulations and respecting the nature park the Lepa Vida Thalasso Spa in Sečovlje Salina is a good example where an economic activity and environmental protection collide.

Key words: Sečovlje Salina, thalasso spa, peloid, geochemical analysis

1. SEČOVLJE SALINA

Northern Adriatic has been in the past an important area for the production of sea salt. Today of the many salt pans only the ones in Sečovlje and Strunjan remain active. In terms of size and production Sečovlje Salina is the most important and geographically speaking the northernmost Salina in the Adriatic Sea and one of the few in the Mediterranean where salt is still produced in the traditional way (Figure 1). The first records date back to the year 804, while the biggest expansion and salt production was under the rule of the Austro-Hungarian Empire. In addition to the economic role, the Salina is extremely important from the naturalistic point of view as it gives shelter for rare and special plant and animal species. That's why in 1989 the salina was declared as Sečovlje Salina Nature Park and from 1993 is also a Ramsar locality. Today the production of salt and conservation of natural and cultural heritage is managed by company SOLINE Pridelava soli d. o. o.

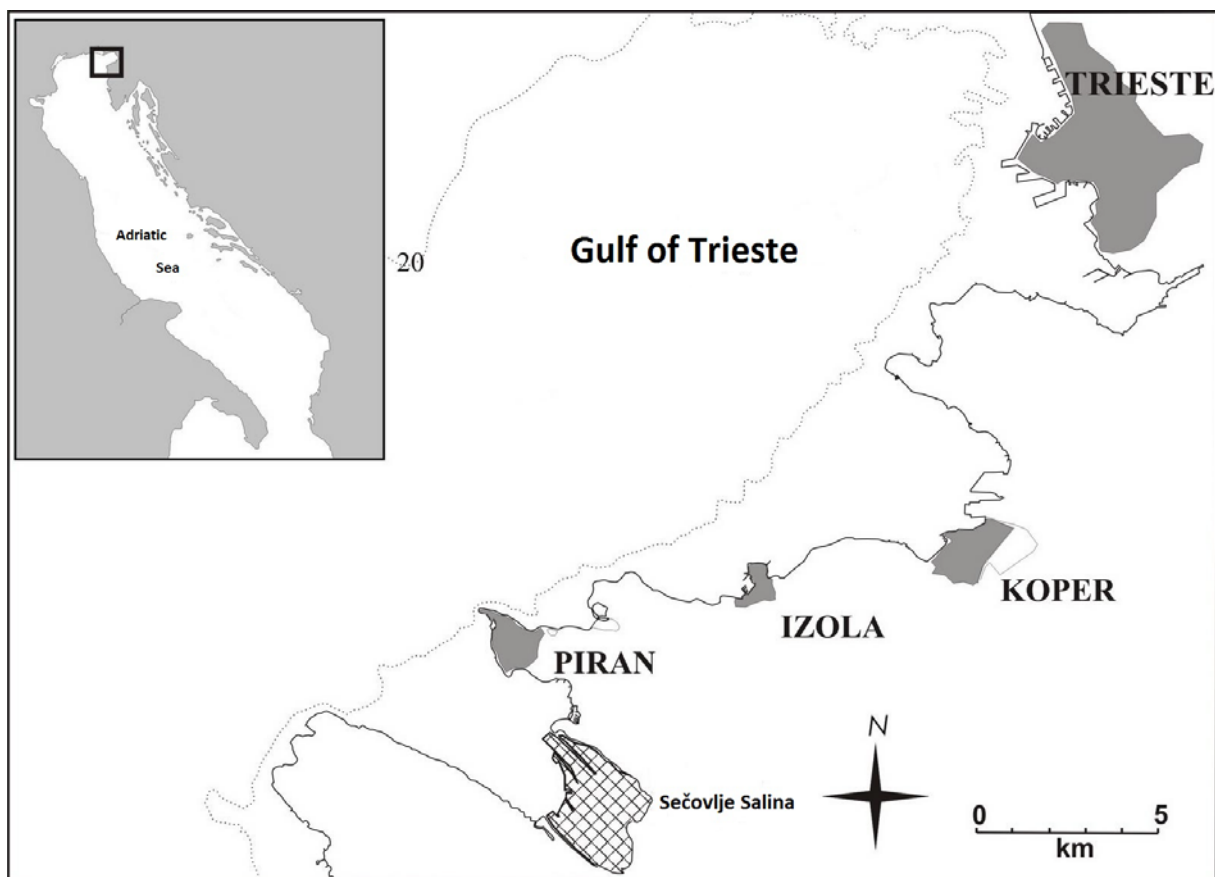


Figure 1: Sečovlje Salina location.

Salt is recovered from seawater by solar evaporation, a process that leads to the fractional crystallization of different salts. First to crystallize are the less soluble salts (calcium carbonate, gypsum), followed by halite and finally magnesium salts. The sea water is taken by the high tide and channelled into a system of shallow basins, which are divided into four groups. A special characteristic of salt-making in these salt pans is »petola«, a microbial mat which forms the bottom of the fourth group of shallow basins, where the salt crystallizes (crystallizing pans). The culturing of this artificial microbial mat originated in the 14th century, when this new technological procedure was introduced from the nearby island of Pag (central Adriatic) (Pahor and Poberaj, 1963; Žagar, 1992; Geister, 2004) and continued unchanged until the present days. This just a few millimeter thick layer of minerals and microorganisms prevents the mixing of the muddy floor with the seawater and salt, contributing to the production of very white marine salt (Faganeli et al., 1999; Schneider and Herrmann, 1980; Herrmann et al., 1973).

2. NATURAL HEALING PRODUCTS FROM THE SEČOVLJE SALINA

In Sečovlje Salina during the process of salt production two side products with healing properties are produced: saline mud (fango) and brine (aquamadre). The healing properties of these products are well-known since the Middle Ages and are still used today (Brglez et al., 2005; Pupini, 1910). The area of Portorož is a known Slovenian health resort with more

than a century of tradition in wellness tourism. Brine (aquamadre) is a by-product in the production of salt with a high concentration of mineral substances, containing magnesium, calcium, potassium, iron, bromide, sulphides, etc. in addition to sodium chloride. It can be up to ten times denser than sea water. The healing properties base on the chemical effect, whereby the mechanical effects are also important since water builds up pressure on the body from all directions and acts similar to lymph drainage therapy. Buoyancy is also essential in baths, which facilitates the movement of affected and damaged limbs. The temperature at which brine is effective and has therapeutic effects is around 38 °C. The saline mud (peloid) is formed from the nearby marine or land sediments from the area of the salina, which are then gradually matured with the highly concentrated brine under natural conditions in open maturation pans. In contact with the mineral rich brine the saline mud undergoes biological and biochemical changes that result in the formation of healing saline peloid. In 2013 the Ministry of health of the Republic of Slovenia declared both saline peloid and brine as natural remedies for specific indications. The saline peloid can be used for the treatment of chronic and inflammatory rheumatic diseases; chronic gynecological diseases of a non-malignant character, sterility; chronic urological diseases, impotency and incontinence and skin diseases (mainly psoriasis, acne and other chronic changes in the keratotic character of the skin). Similar the brine (aquamadre) is indicated for: inflammatory and degenerative rheumatic diseases; progressive internal rheumatic diseases; skin diseases (mainly psoriasis and exacerbations of the disease, keratotic changes in the skin, chronic eczemas and other chronic changes on the skin) and gynecological diseases (chronic inflammatory processes of the urogenital system, dysmenorrheal complications and conditions following operations for non-malignant conditions, primarily sterility). It must be emphasized that before using the saline peloid or the brine for medical purposes, a medical examination is required on the condition of the cardiovascular system, skin changes and the psychophysical condition. Both saline peloid and brine are also widely used also for relaxation and beautifying purposes.

3. LEPA VIDA THALASSO SPA

The use of saline mud (peloid) for healing purposes dates back to the 13th century, when Portorož became known as a health resort. At that time Benedictine monks from the Monastery of St. Laurence treated some diseases with sea water and saline mud from the nearby salt pans. Today the healing products from the salina are still used in several local hotel and spa centers. Nevertheless in 2013 the company SOLINE Pridelava soli d. o. o. decided to bring thalassotherapy and therapeutic medical treatments directly to the healing source by creating the Thalasso Spa Lepa Vida inside the Nature Park. The complex is inserted in the natural reserve and designed as a minimal intervention in a protected cultural and natural landscape (Figure 2 and 3). The open space facilities for a variety of therapeutic purposes cover an area of around 4000 m² and include: sunbathing, swimming, massages, medical gymnastics in the seawater, knaiping, brine baths (in 10-15 % or 20 % brine concentration), salt scrubs and therapies with saline peloid. Lepa Vida Thalasso Spa is

open from May to October and since it is open-air spa, its operation depends on the weather conditions. In accordance to rules which apply to the natural park the Thalasso spa can accommodate a maximum of 55 guests. Visitors can continue the treatments at home with a line of several beauty products which include brine, bath salts and salt peelings.



Figure 2: Aerial view of the Thalasso Spa Lepa Vida complex (photo by: I. Škornik, KPSS)

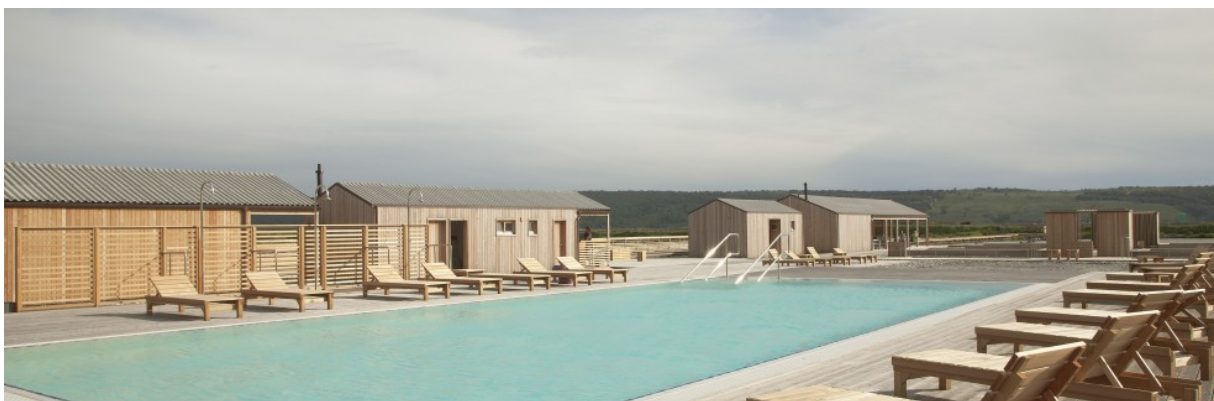


Figure 3: Thalasso Spa Lepa Vida (photo by: Soline d.o.o.)

4. PILOT STUDY OF PELOID COMPOSITION AND TRANSFORMATIONS DURING MATURATION

Although the therapeutic effects of the saline mud and brine are being exploited for centuries, its current use is still based mainly on experience and long tradition of spa tourism. Until recently, there were no large-scale targeted studies on this issue. That why in 2012 we begin with a pilot study of marine sediment maturation into saline peloid. We determined peloid composition and transformations during maturation with brine in open maturation basins with several physicochemical analyses including: FT-IR spectroscopy, CHNS analysis (organic carbon and total nitrogen content), mineral compositions by XRD, multielemental composition by XRF and granulometry. The analysis revealed that the saline peloid is composed mainly of inorganic constituents: carbonates, silicates (quartz) and clay minerals. Total organic carbon (TOC) and total nitrogen (TN) concentrations ranged from 1.46 to 3.03 % and from 0.15 to 0.25 % respectively. Mineralogical analysis confirmed calcite, quartz, halite, muscovite, manganese oxide and clay minerals as the major components (Ogorelec et al., 1981; Ogorelec et al., 2000). The particle size analysis showed that samples were mostly composed of silt size particles (83 %).

The preliminary results revealed that during one year of maturation the mud underwent in changes regarding organic matter content and multielemental composition. Maturation with highly concentrated brine in summer months resulted in a decrease in organic matter content and also affected the elemental composition especially the heavy metal content. Our results confirmed that the saline peloid in summer time included lower concentrations of potentially toxic elements like Cu, Ni, Pb, Zn, Cr, Co and As. This is very important for the balneological application of the saline peloid as the potentially toxic elements can be absorbed through the skin during the application the peloid (Veniale et al., 2007; Carretero et al., 2010). The results confirm that the quality of the therapeutic saline peloid depends on the composition of the marine sediment and brine characteristics in the process of maturation. The findings of the pilot study will be used in the establishment of controlled production of saline peloid in Sečovlje Salina. Thalasso Spa Lepa Vida located in the lee of the salt fields in Sečovlje Salina Nature Park represents a good example where an economic activity and environmental protection collide.

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