

Marine Products and Methods of Thalassotherapy: A Review

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Date of Submission: 15-07-2020

Date of Acceptance: 31-07-2020

ABSTRACT: Thalassotherapy refers to the use of seawater and its components for treatment and therapeutic purposes. Seawater is known for its high mineral content and its high density, and also for its chemical composition. They are also rich in various elements such as sodium, magnesium, calcium, potassium etc. The marine elements such as sea mud and sand, algae and plankton are also used for various treatment purposes. Thus, thalassotherapy refers to an organised plan for therapy, prevention and for the improvement of health. The conditions around these sea areas are also seen to be of importance. Marine elements such as macroalgae and microalgae have been studied for their applications in the treatment of various conditions and diseases. They have shown promising results in curing body pains in rheumatism and arthritis, and also in improving the wellbeing of an individual. This review focuses on these methods of treatment and a few of the algal varieties used for the same. The future scope of these methods of treatment are found to be increasing as it proves to be a natural method of therapy and the possibilities of adverse reactions are very low, thus are seen to be widely accepted.

KEYWORDS: thalassotherapy, seawater, macroalgae, microalgae, wellbeing, treatment.

I. INTRODUCTION

The sea has a relaxing effect on individuals. It is known that seawater and climate provide a healing effect and a positive effect on the well-being of individuals. Thalassotherapy is the use of sea water which can be characterised by its high mineral content and its high density, and also by its chemical composition, and is rich in chlorides of sodium, magnesium, calcium, potassium, iodine, and also rich in marine peloids known as limes.

The term Thalassotherapy emerges from the Greek word thálassa, which means sea or ocean and consists of multiple seawater-based treatments. This therapy comprises the usage of seawater and all of its related marine elements such as the marine environment, sea mud and sand, algae and plankton, for therapeutic and preventive purposes [12]. Such treatments based on remedies taken from the sea are common in Europe and is also used in wellness tourism and in medical tourism [1,2,3].

Thalassotherapy is applied for a variety of conditions, such as, for the medical treatment of chronic illnesses, like respiratory and skin diseases, or prophylaxis occurring in healthy individuals. It also plays a major part in wellness programs and helps in toning-up and improving physical fitness of an individual [4].

Thalassotherapy can refer to an organised plan for therapy, prevention and the improvement of health. In this therapy, the maritime climate has an immediate effect (by the sea). Sea water, known for its healing effects, is drawn out locally and used. Marine products like mud and algae are also used for various applications. The climate also plays an important role, eg. solar and UV radiation.

Peloids are substances made up of an organic or inorganic solid base, which can be used for healing purposes, after a specific maturation period [13]. When seawater is also used along with this substance, it is called marine mud, or sea mud. Peloids can also be mixed with natural products such as macroalgae and can be applied on to the body in the form of dressings for wellbeing purposes. Salt waters, when used with peloids, or mud products can be used to treat rheumatism and skin diseases. These therapeutic agents act together through a number of mechanical, thermal, and chemical mechanisms. When this salt water which is rich in sodium and chlorides are topically

applied, they penetrate the skin and are capable of modifying the cellular osmotic pressure and can stimulate the nerve receptors in the skin through ion channels in the membrane [5].

Marine products have a range of medical and pharmaceutical value [2]. Marine organisms produce chemical compounds and over 6000 compounds have thus far been isolated. Of these compounds, hundreds provide drug leads, containing antiviral, antibacterial, and antifungal properties.

II. THALASSOTHERAPY ELEMENTS

Thalassotherapy consists of elements such as sea water, sea climate, sea sand, seaweed. It involves a combination of elements derived from the sea, such as sea water, algae, mud and plankton, obtained from a certain depth of the sea. These are processed and heated to the body temperature of an individual, and used in appropriate doses and for defined durations.

Sea water:

Sea water is a mixture of organic and inorganic particles containing suspended organic compounds in which many solids and gases are dissolved. Analysis reports showed that sea water generally consists of sodium chloride, calcium and magnesium sulphate composition including calcium and potassium (major elements-99.28%). Other than these, fluorine, iodine, phosphorus, iron, silicon, rubidium, lithium and arsenic elements are also located [6]. One of the beneficial effects of sea water is tightening of skin [2].

Sea climate:

The seaside maritime climate is also an important factor for therapy. Environmental factors such as temperature (sunlight), salt particles in sea air have physiologically positive effect on individuals. Sunlight activates sea air, magnesium and cobalt rich organisms in sea water, where these organisms become more active and increase the absorption of skin [2].

Sea sand:

The sea floor is made up of mud, silt, sand, fine gravel, coarse gravel, stones and rocks. Mud is a combination of clay and silt, and this mud containing sulphur and radioactive elements can be used to treat rheumatism, skin diseases, liver and spleen diseases and also digestive and nervous systems [6]. A sea sand bath stimulates the body's defence system initiating relaxation.

Sea weed:

Sea weed is used both in the food and the health sector. Algae therapy is used for both body and face masks, where they have intense moisturizing effects on the skin and improve the elasticity and smoothness of the skin [6]. There are around 25,000 different species of algae in the sea water and contain about 32 to 60 elements and minerals, used for various applications to improve health.

III. MARINE MACROALGAE IN THALASSOTHERAPY

A wide range marine algae have been used as medications for number of illnesses [7]. They supposedly have protective abilities, ensure the safety of mariners and also facilitate child birth [2].

Medications:

Lithothamnium calcareum, (a calcareous marine alga), contains thallium and is used in the treatment of osteoporosis, aching joints, tiredness, rheumatism, gingivitis, decalcification etc.

Fucus vesiculosus, is a rockweed, and is proved to be effective for those individuals with excess weight but with a normal appetite. *Spirulina maxima*, is a freshwater alga used in the treatment of anaemia and muscular tiredness [7]. *Spirulina platensis* contains high amounts of linoleic acid. *Ascophyllum* and *Spirulina* are also known to have a slimming action in individuals [23].

A number of species of red algae are also used in treatments: Irish moss (*Chondrus crispus*), has antigingivitis and antiscarring properties; dulse (*Palmariapalmata*) and laver (*Porphyra* sp.) are used as seasoning salts. *Porphyra atropurpurea* is used to treat wounds and burns and *Palmariapalmata* has an antiperspirant potential.

Brown algae are good sources of iodine and potash and can also be used in medicine. Kelps, such as *Alaria*, *Laminaria*, *Agarum*, *Nereocystis*, and *Macrocystis* are also good sources of iodine. *Chlorella*, the green alga has antifungal and antibiotic properties. Others like *Durvillea* and *Hypnea* can be used as anticoagulants.

Algae in pharmacology:

Algae have been both praised and criticized by various groups [8,9,10]. They have multiple uses in food, feed, fertilizer production, cosmetology and also in therapy. Algae are also a rich source in pharmacology.

Lyngbya majuscula is recognized by oncologists. This is a reef dwelling blue-green alga which secretes a substance, curacin-A, which is

known to function as an antiproliferative that can prevent cell division and therefore blocks the growth of the cancer and its spread. Algae present in marine mud is used in therapy, where the marine electrolytes and algal components penetrate the skin, providing the desired effect [2].

Marine vegetal mud is made up of compacted moss which are brought in by tides to the beach region. They are dried and converted to powder and further mixed with marine clay powder. For local application, the peloid can be combined with sea water and used, after heating.

Algae in clinical thalassotherapy:

Marine algae are used in packs used for thalassotherapy. Algal powders or algal salts are used for home bath therapy. Dressings made up of various species, such as *Fucus*, *Laminaria*, *Ulva*, and *Ascophyllum* can be prepared and applied to different regions of the body to relieve pain caused by rheumatism and arthritis; also can be applied to shoulders and lumbar regions to treat back pain [2]. There are almost 25,000 identified species of algae, of which around 60 are used in pharmacy, food, and in cosmetology. The most commonly used algae in these areas are *Porphyra*, *Eucheuma* (red algae), *Laminaria*, and *Undaria* (brown algae).

Seaweed:

A bath of seaweed can be prepared with warm seawater and fresh seaweed, composed of varieties like *Fucus serratus* (Phaeophyceae). *Fucales*, such as *F. serratus* and *F. vesiculosus* possess a wide range of valuable components, as well as antioxidants, fatty acids, iodine, including many others [14,15,16].

IV. MARINE MICROALGAE IN THALASSOTHERAPY

Microalgae are photosynthetic prokaryotic and eukaryotic micro-organisms found to develop in both freshwater and highly saline environments [11]. They are rich in unsaturated fatty acids, vitamins A, B1, B2, B6, B12, C, E, nicotinamide, biotin, folic acid, and pantothenic acid. They are also used as food for special diets, nutraceuticals or cosmetics such as ointments and protective agents.

A microalgae bath and a peloid (marine mud) were produced from a marine species *Nannochloropsis gaditana*. The biomass from the microalgae was collected every month and frozen for further use. Microalgae bath was prepared by adding approximately 150 g of frozen microalgae into a bath, setting it to 20 min of jets with full

body coverage. The marine mud was prepared by mixing commercial bentonite with seawater. Studies with microalgal peloid volunteers showed improved skin elasticity, with a moisturizing and above all, helped in the treatment of fatigue [13].

V. METHODS OF THERAPY

The applications of thalassotherapy were primitive in the early days, with the use of sea water and marine climate. Nowadays, these treatment methods have been modernized day by day. Seawater can be used in various forms, such as in wave pools filled with seawater, heated seawater baths, and electro-acupuncture are some of the seawater applications, which can be considered as new approaches to treatment [17].

A few of the treatment methods applied in thalassotherapy centres are as follows;

Hydromassage/multi-jet bath:

This bath uses several jets of water automated to target specific parts of the body. This treatment provides relaxation to the muscles and joints and improves circulation.

Affusion shower:

A fine spray of warm sea water rich in minerals is given all over the body which relaxes and rejuvenates the body.

Jet shower:

Sea water with a high salt content is used in the jet system. It combats cellulite, and also in toning, relaxing and providing firmness to the body and the skin.

Seaweed/Algae bath:

A bath with seaweed (eg. *Laminaria*) replenishes the body with vital elements such as potassium, magnesium, calcium and trace elements while toning up the body. It also helps in relieving stress.

Hand and foot treatments:

Hot and cold baths are given for the hand and feet to improve circulation and also relieve joint pains.

Seaweed wraps:

Seaweeds are applied as a thick layer over the skin as it has a relaxing, slimming and remineralizing effect.

Marine mud/Mud mask/Peloid mask:

Warm marine mud masks are applied all over the body by which marine elements penetrate the skin and help in relieving rheumatic pains.

VI. CONCLUSION

This shows that thalassotherapy is slowly gaining importance as an alternative method of treatment to improve the wellbeing of an individual. It is also a developing part of health tourism all around the world, especially in countries near the oceans and seas [19,20]

Taking into consideration all of these aspects, this therapy is found to be increasingly used to treat various medical conditions, and has also lead to the development of a wide range of pharmaceuticals. This therapy is also widely seen used in combination with other treatments methods, such as acupuncture and has also been accepted by the world health organization [22]. Many centres advertise thalassotherapy methods along with other problems of the present day such as anti-stress, weight loss, dietetics, body pains, antismoking, post-childbirth, chronic headaches, or insomnia. This sea therapy causes no harm to the environment and is thus widely sought after in the European countries.

Currently, a number of marine macroalgae have been studied for their effects in thalassotherapy, whereas only a few microalgae are seen to be recognized in therapy. Therefore, more studies on these microalgae will prove to be effective in broadening the scope of this method of treatment. For this to happen, treatment centres should constantly be involved in identifying various species that may prove to be effective. Newer methods of treatment can also be identified and implemented, thereby attracting many more individuals to partake in such natural methods of treatment.

Future prospects of thalassotherapy could involve integration of these methods in spas all around the world, as it is a non-invasive method of treatment, with assured results. In order for this to occur, awareness is to be provided to such wellness centres, stating the importance and advantages of thalassotherapy on individuals. It is an area which brings about a good revenue as people are always willing to pay for natural methods of treatment rather than conventional methods. It also provides job opportunities for new enterprises that want to develop in alternative tourism. Increasing awareness of a healthy life, technological advances, improving life expectancy, requirement for preventive methods of treatment and the willingness of individuals to improve their wellbeing are seen as important factors which will ultimately play a part in the future of thalassotherapy applications.

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