In the mud there are substances endowed with high anti-inflammatory activity; these substances are synthesized by micro-organisms colonizing mud during the maturation process.

Maturation process (1, 2, 3, 4, 5)

Mud is incubated for two months within thermal water continuously flowing at 85-87° of temperature. During this stage, mud is abundantly colonized by cyanobacteria and micro-algas, conferring important chemical, physical and therapeutic properties.

CLAY PROCESSING
- Making of clay from the two thermal lakes’ depths (Arquà Petrarca and Lispida)
- Clay immission in tanks within watering places
- Drying process
- Flooding with thermal waters
- Maturation
- Application
- Regeneration

CHANGES IN PHYSICAL, CHEMICAL AND BIOLOGICAL COMPOSITION OF CLAY TURNING INTO MATURE MUD
- Increase of rehydration volume
- Increase of thermal insulation capacity
- Increase of lipidic content
- Appearance of diatoms and cyanophyceas producing therapeutic principles
- Changes in viscosity and plasticity (vector action of mature mud on active principles transdermic passage)
In the mud there are substances endowed with high anti-inflammatory activity; these substances are synthesized by micro-organisms colonizing mud during the maturation process.

**BACTERIAL COLONIZATION**

Among the main micro-organisms colonizing mud there are some cyanobacteria; the most numerous group belongs to *Phormidium* genus.

**MUD MATURATION PROCESS**

During maturation process clay is gradually colonized by several micro-algae (Diatoms and Cyanophyceas) belonging to Abano-Montegrotto-Battaglia Thermal Basin ecosystem.

**MICRO-ALGAS DISTRIBUTION IN MUD BATHS**

- A viscous aggregate made of Cyanophyceas and Diatoms, named Bioglees, grows up on mud surface.
- At a depth of few millimetres Cyanophyceas decrease until they disappear, while only Diatoms are still present in depth.
One of the most abundant cyanobacteria colonizing Euganean mud baths belongs to *Phormidium* genus; ETS-05 stock has been isolated for the first time in Abano – Montegrotto – Battaglia mud baths. ETS-05 produces glycolipidic substances with high anti-inflammatory activity and no kind of side effects, even after several treatments.

Peculiar environmental conditions of Abano – Montegrotto – Battaglia Thermal Basin foster this cyanobacterium’s growth. Many trials showed how these micro-organisms necessarily need Abano – Montegrotto – Battaglia environmental characteristics to accomplish their development.

The particular Euganean mud baths maturation process achieves a mature mud enriched in ETS-05 cyanobacterium and then provided with high anti-inflammatory activity.
CST01 anti-inflammatory effect (10 mg/kg and 20 mg/kg) on model in leg acute oedema induced by carrageen. Indomethacin 10 mg/kg has been used as reference drug. Data are expressed as mean change in leg volume compared to a basal value.

CST01 anti-inflammatory effect (1%, 2%) on ear oedema model induced by croton oil. Betamethasone-17, 21-dipropionate (BETA) 0.05% has been used as reference drug. Data are expressed as mean change in ear thickness (mm) compared to a basal value.
Mud baths treatment reduces inflammatory and degenerative damages to cartilage.

**Therapeutic effects of mud baths (osteoarthrosis)**

INCREASE IN ANTIOXIDANT DEFENCES

Changes in transferrin and ceruloplasmin serum levels (antioxidant substances) after 12 mud baths applications in patients with arthrosis.

PROTECTIVE ACTION EXERTED ON CELLULAR METABOLISM

Nitric oxide, myeloperoxidase and glutathione-peroxidase serum levels before and after mud baths and therapeutic baths treatments.

REDUCTION IN INTERLEUKIN – 1 SERUM LEVELS

Reduction in interleukin – 1 serum levels after 6–12 mud baths applications in patients with arthrosis.
Efficiency of mud baths treatment

Mud baths treatment reduces inflammatory and degenerative damages to cartilage

**Therapeutic effects of mud baths (osteoporosis)** (18, 19, 20, 21, 22)

* Trial findings show that mud baths treatment is as able as FANS therapy to reduce PGE2 serum levels, without any side effects on gastroenteric system.

**ACTION ON CARTILAGE REPAIR MARKERS**

<table>
<thead>
<tr>
<th>Serum Level (pg/ml)</th>
<th>IL-1</th>
<th>TNFα</th>
<th>IGF 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vorher</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nachher</td>
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<tr>
<td>Vorher</td>
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<tr>
<td>Nachher</td>
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</tr>
</tbody>
</table>

* p<0.05

**ABSENCE OF SIDE EFFECTS ON GASTROENTERIC SYSTEM**

PGE2 and LTB4 mean serum levels before and after 12 days of mud baths treatment: Interleukin -1 levels reduction.
Indications

Osteoarthrosis and other degenerative diseases
Osteoporosis
Extra-articular rheumatisms

RECOMMENDED TREATMENT COURSE:

Mud bath-balneotherapy
12 MUD BATHS + 12 THERAPEUTIC BATHS
or
12 THERAPEUTIC BATHS
Curable diseases through thermal treatments

OSTEOARTHROSIS - OSTEOPOROSIS AND OTHER DEGENERATIVE DISEASES

- Osteoarthrosis
  - Diffused arthrosis
  - Cervicoarthrosis
  - Lumboarthrosis
  - Limb arthrosis
  - Discopathy without herniation and without symptoms of irritation or nerve compression
  - Slipped disc surgery outcome
  - Rheumatic cervical diseases
  - Scapolo-humeral periarthritis (except for acute forms)
  - Rheumatoid arthritis in quiescence stage
  - Articular rheumatism outcome
  - Periarthritis
  - Ankylopoietic spondylitis
  - Spondyloarthritis
  - Spondyloarthrosis and spondylolisthesis

Osteoporose

RECOMMENDED TREATMENT COURSE:

12 MUD BATHS
+ 12 THERAPEUTIC BATHS
or
12 THERAPEUTIC BATHS
Curable diseases through thermal treatments

**EXTRA-ARTICULAR RHEUMATISMS**

- Extra-articular rheumatisms
  - Inflammatory rheumatisms (in quiescence stage)
  - Rheumatism-originated fibrosis
  - Rheumatism-originated tendinitis
  - Rheumatism-originated lumbago
  - Fibrositis
  - Fibromyositis

**RECOMMENDED TREATMENT COURSE:**

- Mud bath-bainotherapy
  - 12 Mud Baths
  - + 12 Therapeutic Baths
  - or
  - 12 Therapeutic Baths
Mud baths are gradually applied on the whole skin, at a temperature of 38-42°C, with the exception of anterior chest area, head and external genitals. Mud baths treatment takes from 15 to 20 minutes for general baths, 30 minutes for the partial ones. At the end of mud bath the patient is taken away from bath, washed in a hot shower and plunged into the Thermal Bath at a temperature of 37°C for 8 – 10 minutes. After the bath the patient, dried with hot clothes, goes to his room and stays in bed, well wrapped up, for 30 – 60 minutes for his Sudoral Reaction.


11) European Patent Pending n° 05100038.8 – Priority IT/09.01.04/ITA MI 20040011 Title “Anti-inflammatory active principles in Euganean thermal MUD” Inventor: Lalli A, Andreoli C, Ceschi Berrini C, De Appolonia F, Marcolongo G. Date 05.01.05.


