

**Thermal Effects:**

Peat Hyperthermia, exogenous elevation of the body temperature, local or systemic, occurs by means of a passive conductive transmission of thermal energy for local effect or a reflex response. It been demonstrated as a beneficial therapeutic measure for centuries.

**Local Heat Effects:**

- Elevation of cellular fluids
- Acceleration of collateral blood circulation
- Reduction of pain
- Relaxation of the skeletal musculature
- Enhanced range of motion, stretching capacity of collagen structures
- Antiphlogistic effect

**Hyperthermia Effects:**

- Initial stimulation of the sympathetic nerves, followed by adaptation, acclimatization for long term benefit as body attains a more parasympathetic state
- Regulation of optimal homeostatic functioning
- Prolonged tissue vasodilation – allows absorption of medicinal substances and excretion of toxins
- Increased circulation (increased stroke volume) – aid is reversal of cellular damage by allowing oxygen and nutrients to reach the cells and wastes and toxins to leave the cells
- Increased metabolism – mobilizes toxins stored in adipose (fat) tissue
- Immunological stimulation (mild hyperthermia)
- Immunological suppression (extreme hyperthermia)
- Hormonal stimulation – increases cortisol, catecholamines, PRL, renin, aldosterone, somatotropin, opiate-beta-endorphins, & acetylcholine
- Antineoplastic activity (anticancer)
- Antipyretic activity (anti-itch)

**Mechanical Effects:**

- Hydrostatic pressure increases
- Cohesion and viscosity, depending on the bath medium and depth of submersion

### **Biochemical Effects:**

- Elevation of Protein synthesis
- Estrogens stimulation
- Reduction of arachidonic acid (involved in hypersensitivity reactions)
- Inhibits inflammatory mediators such as leukotrienes, prostaglandins and thromboxane
- Decreases cytokines and increases growth factors – protects against cartilage destruction
- Increased vasodilation and circulation
- Reverse cellular damage- mobilizes toxins and improves cellular function
- Increases immune system
- Absorbs heavy metals- mercury, cadmium, lead, arsenic, and tin

### **Components of Peat**

#### **Humic acid**

- Inhibits mutagenicity of various mutagens -including benzopyrene (carcinogen in cigarettes)
- Heavy metal chelator - mercury, cadmium, lead arsenic and tin
- Antiviral activities
- Activation of granulocytes – binds to CHO, amino acids and steroids by means of hydrogen bonding/covalent bonding and epsilon donor=acceptor complexes
- Inhibits plasmin (clotting enzyme)
- Stimulates respiration and increases efficiency of oxidative phosphorylation

#### **Fulvic Acid**

- Heavy metal chelator – aluminium (thought to contribute to Alzheimer's disease)
- Stabilization of collagen- increases mechanical and chemical resistance of collagen

#### **Sulphur (yellow mineral)**

- Antioxidant- acts as a radical trap for free radicals and destruction of free oxygen radicals
- Antiseptic
- Analgesic effect – acts as a transmitter
- Antiinflammatory and increased immunity by decreasing Langerhans cell activity (desensitising on allergic diseases of the skin) 2,3
- Dermal dilator

### **Pine Essential Oil**

- Promotes oxygen supply in red blood cells and tissues by stimulating circulation
- Increases parasympathetic androgen (growth hormone) aspect of respiratory system
- Increases excretive function of mucous membranes in lungs and purifies them
- Antitoxic and antiseptic effect on mucous membranes
  
- Increases cellular respiration by increasing oxygen/carbon dioxide exchange which increases energy and burning metabolism which supports the thyroid gland
- Increases dermal gas exchange and circulation as well as purification

### **Methyl Salicylate (Oil of Wintergreen)**

- Counterirritant with analgesic and antiphlogistic effects
- Biosynthesis of prostaglandins
- Potent Vasodilator
- Inhibits platelet aggregation (clumping) <sup>1</sup>
- inhibitor of cyclooxygenase

### **Glycerine**

- Humectant (moistening agent)

### **References:**

<sup>1</sup> Harrison et. al.; 1981

<sup>2</sup>Research in immunohistochemical reaction of the epidermal Langerhans Cells after a sulphur bath containing 40mg of sulphur demonstrated inhibition of Langerhans Cells functions by 50%. As an inhibitor of Langerhans cells and the destruction of free oxygen radicals, sulphur is a direct anti-inflammatory agent on derma and mucosa. (Artmann and Pratzel, 1987-1991).

<sup>3</sup>This may explain the concept of the desensitising effect of the sulphur bath on allergic diseases of the skin. (M.Z. Karagulle, Z.N. Tutuney, O. Aslan, and E. Basak, 1994)