

MINERALS, EARTHS, METALS, SEMI-PRECIOUS STONES AND GEMS IN PERSONAL CARE PRODUCTS

Anthony C. Dweck FLS FRSC FRSH
Technical Editor

Introduction

Mention the word “naturals” and the first thought that comes into many minds would be plants, botanicals and herbal materials. The next thought would probably be essential oils and after a little more deliberation the idea of honey, seaweeds and sea salts would be achieved. However, there are many interesting materials that do not grow in the soil but are a part of the geology. It was felt that a review might be useful.

Minerals

Muds, Sands and Clays

MARINE GLACIAL CLAY

Marine Glacial Clay comes from a remote estuary on the west coast of Canada, and is harvested by hand. It is washed by a 10 foot tide every day in the unpolluted water of the North-West coast of British Columbia. Marine Glacial Clay can be used for the face and entire body. In its natural state this clay was used by the native Indian people for centuries for its curative and therapeutic properties and has been used successfully for burns, scalds, cuts, athlete's foot, chicken pox, eczema and other topical skin conditions with very promising results. It contains 37 minerals and trace elements. Major components silicon (63.99%), aluminium (14.37%), Iron (6.22%), Calcium (4.41%), Sodium (3.50%), Magnesium (3.22%), Potassium (2.01%). It also contains 29 minor minerals including traces of rare earths. Ph: 6.5 - 7.3.

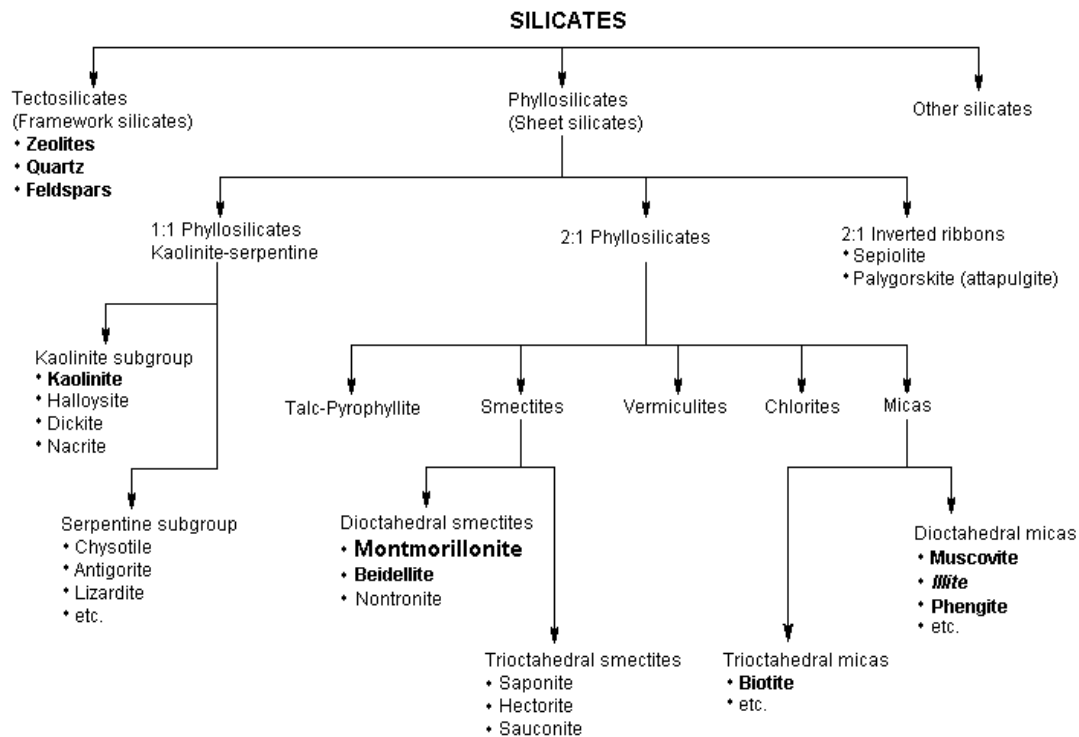
RASSOUL MUD

Rassoul or Ghassoul was created at the piedmont of the Atlas mountains in Morocco, known as "the country where the sun sets". It was formed in deposits during the Jurassic period in the Mesozoic era, 208 to 144 million years ago. This detoxifying clay is mined from 2.5 miles within the Atlas Mountains. Its purity is renowned through out history going back as far as 2,500 BC. Rhassoul contains lithium as well as magnesium and other trace elements, like iron, potassium, copper and zinc. The mud has been used since the XII century, Moroccans used Rassoul as a daily therapeutic source for skin cleansing and purification, dermatitis, sensitivities, smoothing rough or scaly skin, seborrheic skin and scalp and hair treatments. The underground mining of Rassoul originally commenced with ancient North African civilizations.

DEAD SEA MUD

Along the Dead Sea coasts there are deposits of black mud which is characterised as a mineral mud which is supported by the analysis of its chemical composition. In addition to inorganic compounds it contains water and organic compounds. This mud is of alluvial origin. According to popular legend the Queen of Sheba was presented with Dead Sea

salts by King Solomon when she visited the Holy Land. Later in history, the empress Cleopatra, who used Dead Sea formulations in her beauty regimen, urged Marc Antony to conquer the Dead Sea region in his Judean campaign so that she would be guaranteed of bountiful supply of the necessary Dead Sea minerals. Dead Sea Mud is an alluvial deposit from a larger, prehistoric sea which once occupied this section of the Syro-African Rift Valley. Its solid phase contains very fine grains of silicates and carbonates. The watery phase resembles Dead Sea brine but, unlike the brine, contains sulfides from biological sources. It has an extremely high heat-retaining capacity. Mud from the Dead Sea coast has been proven to have great therapeutic value in the treatment of rheumatic diseases and skin disorders, as well as for the stimulation of various biological functions of the human body. In addition, the mud can serve as raw material for the preparation of cosmetic products for the treatment of acne, psoriasis and skin diseases, for improving the elasticity of the skin and also against dandruff (to name but a few benefits).



Classification of silicates (Bailey, 1980b; Rieder et al., 1998). Minerals that can be frequently found in bentonite or kaolin are in bold; the main components are in large typeface. *Illite* is a component of common soil and sediments and is classified as a mica.

KAOLIN

The name "kaolin" is derived from the word Kau-Ling, or high ridge, the name given to a hill near Jau-chau Fu, China, where kaolin was first mined. Kaolin is a clay that

contains 10–95% of the mineral kaolinite and usually consists mainly of kaolinite (85–95%). In addition to kaolinite, kaolin usually contains quartz and mica and also, less frequently, feldspar, illite, montmorillonite, ilmenite, anastase, haematite, bauxite, zircon, rutile, kyanite, silliminate, graphite, attapulgitite, and halloysite. Some clays used for purposes similar to those for which kaolin is used may contain substantial amounts of quartz: "kaolin-like" clays used in South African pottery contained 23–58% quartz and, as the other major constituent, 20–36% kaolinite (Rees et al., 1992). Kaolin is also known as China Clay, Porcelain Clay, Bolus alba, Terra alba, White bole or Argilla. Kaolin is essentially hydrated aluminium silicate. It occurs in several parts of the world (especially in Cornwall) and appears to be derived from feldspar (which occurs in granite). Kaolin is not a primary mineral but is a generic term applied to several hydrated aluminium silicates. However, not all aluminium silicates may be called kaolin. From x-ray and physical studies, it was established that three different groups of clay are classified as kaolin, namely kaolinite, nacrite and dickite which have essentially the same formula ($\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$). Kaolin is used in face powders, liquid powders, powder creams, baby powders, compact rouge, face packs and in some dentifrices. Clinically, *cataplasma kaolini* (kaolin, glycerin, boric acid, methyl salicylate, thymol and peppermint oil) was used in cases of deep-seated inflammation, carbuncles, septic wounds etc. Kaolin possesses good covering power, good grease-resisting properties and adsorbs perspiration. Kaolin is a safe and dermatologically innocuous material that has a sedative and cooling effect on an inflamed and heated skin.

DIATOMACEOUS EARTH or KIESELGUHR

Diatomaceous earth or Kieselguhr is composed of the siliceous shells of fossil diatoms (minute unicellular plants), or of the debris of fossil diatoms. It has similarities and uses to a material known as Fuller's Earth. It is listed in the British Pharmacopoeia and according to the Pharmaceutical Codex of 1923 is used for the preparation of absorbent and emollient dusting powders. Apart from having the ability to absorb essential oils and other active materials, it is also well known as a filtering agent. It is used as an absorbent for nitroglycerin, after which it becomes known as dynamite!

SOAP CLAY

Soap Clay is one of the bentonite family, although the term "bentonite" is ambiguous. Other names include bentonite magma, CI 77004, E558, mineral soap, montmorillonite, soap clay, southern bentonite, taylorite, and wilkinite. The term "montmorillonite" is also ambiguous and is used both for a group of related clay minerals and for a specific member of that group. For the former use, smectite is more appropriate (a group of clay minerals that includes montmorillonite, saponite, sauconite, beidellite, nontronite, etc.) It is a rock formed of highly colloidal and plastic clays composed mainly of montmorillonite, a clay mineral of the smectite group, and is produced by *in situ* devitrification of volcanic ash. The transformation of ash to bentonite apparently takes place only in water (certainly seawater, probably alkaline lakes, and possibly other fresh water) during or after deposition. Bentonite was named after Fort Benton (Wyoming, USA), the locality where it was first found. In addition to montmorillonite, bentonite may also contain feldspar, biotite, kaolinite, illite, cristobalite, pyroxene, zircon, and crystalline quartz. By extension, the term bentonite is applied commercially to any plastic, colloidal, and swelling clay regardless of its

geological origin. Such clays are ordinarily composed largely of minerals of the montmorillonite group.

“There is evidence of mud therapy or treatments with clay in antiquity. For countless generations, peoples living by lagoons, seas and volcanoes, used natural sediments with aesthetic or medicinal purposes, either to eliminate skin imperfections or for body relaxation” (quotation from ColorClay)

COLOURED CLAYS

Some clays have a different composition and morphology depending on their source, but they all have a structure that is predominantly silicates with particles that have a colloidal magnitude and a high absorption rate. The range from ColourClay also have natural colours which can provide an instant marketing benefit and evoke its origins in the warm coasts of the Mediterranean. The colours from ColorClay are numerous (about seven) and there is a source from Argiletz which offers another six shades.

Salts

The search for new ideas in our products is an endless quest. However, we only have to look in an old Pharmacopoeia to find a whole range of salts and minerals that were used in baths and soaks for various skin conditions that dated from the booming spa days of the Victorian era.

Alum or potassium aluminium sulphate. Ming Fan in Chinese.

Glauber’s salts or sodium sulphate. Mang Xiao in Chinese.

Epsom salts or magnesium sulphate.

Rochelle salt is sodium potassium tartrate.

Dead Sea salts, mainly sodium and potassium chloride

Sea salt contains sodium, magnesium, calcium, potassium, and lithium. It has trace elements of aluminium, argon, arsenic, silver, barium, bismuth, boron, caesium, cerium, cobalt, copper, tin, iron, fluorine, gallium, iodine, lanthium, manganese, mercury, molybdenum, nickel, gold, oxygen, phosphorus, lead, radium, rubidium, selenium, silicon, strontium, thorium, uranium, vanadium, zinc, yttrium.

Gypsum salts or calcium sulphate is called Shi Gao in Chinese

SEA SALT

Water that contains sodium chloride in concentrations higher than 5% have been shown to stimulate microcirculation and reduces the electrical activity in muscles of the lumbar spine. This might explain the beneficial effect of spa treatment in soft tissue rheumatism. Sodium chloride also increases sensitivity to ultraviolet light, thus adding to the therapeutic effect of the spa in patients with psoriasis and psoriatic arthritis. Spa water containing magnesium bromide or sulphur has been shown to inhibit fibroblast proliferation, which could account for the beneficial effect of the Dead Sea water in psoriasis.

Therapeutic Gemstone Properties

This is a topic which may either be believed or treated with skepticism. However, the discovery of Scandinavian amber in a Neolithic grave near Stonehenge in Wiltshire shows that precious stones played a significant role in the culture of these early people and would travel vast distances as traded goods or offerings. Even today, a huge monetary importance is placed on these quality mineral forms and there is a revival in some individual groups with the importance of these stones in health and well-being. Stones should not have any chips or fractures, they should be left as found and not irradiated or dyed. They may be polished or rounded. The list is a fraction of the information widely available. **ACD: Perhaps this could be put in a box?**

Amazonite: improves self worth and confidence.

Amber: lift heaviness and depression.

Amethyst: spiritually uplifting, may improve communication and used for stomach problems.

Apatite: to improve communication when there has been a misunderstanding and used to fight virus infections.

Aquamarine: reminiscent of the sea, stands for love and mercy and recommend for those in grief.

Blue Aventurine: good for circulation and to clear congestion.

Green Aventurine: physical healing. It is often used with emerald and frosted quartz. Aventurine that is transparent is believed to be extremely powerful although the immature transparent aventurine may fade.

Cape Amethyst: for inner alignment.

Carnelian: to balance creativity and mental processes.

Citrine: upliftment and help to process energy in work.

Coral: for emotional foundation.

Diamond: is for the increase of personal clarity.

Emerald: for physical and emotional healing.

Green Fluorite: for hormone balance, such as PMS and menopause.

Purple Rainbow Fluorite: for change.

Jade: for relaxation and releasing tension.

Kunzite: for emotional support.

Lapis: to understand the mind and connecting the heart and mind.

Leopardskin Jasper: supposed to bring things that are needed.

Mahogany Obsidian: for decision making.

Malachite: bring harmony into life.

Moldavite: Grounding stone which puts one in their body.

Grey Moonstone: helps the power of other stones powers by cleansing blocks.

Orange Moonstone: similar to white moonstone but less powerful.

White Moonstone: helps effect and understanding of other stones by amplifying their effect. It balances yin/yang.

Moss Agate: to get in touch with nature and have plant knowledge.

Mother of Pearl: protection.

Black Obsidian: a grounding stone, used to gain insight into a problem.

Black Onyx: helps to change bad habits, is a grounding stone.
Mexican Onyx: aids better sleep.
Black Opal: to see inner soul and potential.
Opal: to see possibilities and discover a broader view.
Fresh Water Pearl: enable the acceptance of love.
Peridot: Brings the energies from the aura to the physical body.
Poppy Jasper: for positive outlook.
Frosted Quartz: for balance and soothing.
Rose Quartz: for emotional balance and soothing.
Rhodonite: emotional support.
Rhodocrosite: for change and used to give confidence during change.
Ruby: love; opens the heart, helps to overcome fear.
Sapphire: for mental clarity, clears unwanted mental clutter.
Sodalite: protects from external negative energy.
Sunstone: enhances contemplation, used to remember dreams.
Sugilite: absorbs impurities from the wearer's aura to uplift me and give greater energy.
Tanzanite: for changes, uplifts and opens the heart.
Green Tourmaline: promotes male balance and physical healing (not for females).
Pink Tourmaline: promotes female balance and protection.
Tree Agate: introspection, enables wider view of the world with greater clarity.
Unikite: balances physical/emotions.

Commercially available cosmetic materials

Rhodo'lite (Libiol). The anti-stress stone par excellence, Rhodochrosite encourages intuition and creativity by emitting high frequency vibrations that are actual fields of energy which surround the bearer. When placed directly on the skin, it helps regulate emotions and calm restlessness and anguish. In litho-therapy, it is used to purify the skin and to improve general physical well-being. In the face of everyday pressures imposed by the urban and professional environment, Rhodochrosite prepares our mind and renews our strength and energy. By aiding our memory and mental acuity, it stabilises emotional and energy networks.

Mala'Kyte (Libiol) The effects of malachite have been demonstrated at several levels of the "antioxidant" defence mechanisms in our cells. Through its effect on the superoxide radical, this mineral acts directly on the reactive species by inhibiting the superoxide anion at a rate of more than 95%. At the same time, malachite acts at a more complex level in the body's defence system. Its effect on hydrogen peroxide occurs via reduced glutathione – or more precisely, through the enzyme in charge of regenerating it. This indirect activation effect allows elimination of one of the main factors limiting the reaction between hydrogen peroxide and reduced glutathione: the reduced glutathione itself.

Zin'Cyte (Libiol) or Smithsonite (zinc carbonate) can offer advanced cell protection that encourages natural DNA repair and shields against permanent cell lesions. Metallothioneins have a genoprotective effect that helps prevent DNA lesions. They

can maintain the nuclear redox potential thus making DNA repair easier through the exchange of Zinc atoms. The metallothionein induction capability of Smithsonite makes it a select ingredient for daily application formulation such as day creams and foundations. It provides the best, constant protection for cells in the daily fight against environmental stress. When added to detoxifying serums, zinc carbonate mineral helps fight against the effects of certain pollutants. It has special genoprotective action makes it particularly effective in protecting DNA, the building block of our skin cells.

Rose Quartz (Active Concepts). In ancient Egypt, women wore facial masks carved of pure rose quartz to soften and beautify the skin. Hair was dry shampooed using fine powdered clays and gemstones. The powders were combed through to absorb the grease and dirt. The gem has since become the established stone of all things feminine and goddess-like. Rose quartz can be categorized as one of nature's most energizing minerals. In its powdered form, it may be used to buff away dead skin cells and impurities revealing the soft, fresh and youthful skin beneath. Its light reflective crystals illuminate the skin, softening flaws and boosting radiance. Its restorative and energetic property sweep away impurities, improving dull or flaky skin and opening hair follicles, while protecting against future damage. Powdered Rose Quartz creates a stronger, more potent bio-energy field in formulations.

Hematite (Libiol). Haematite is therefore capable of acting right inside the cells, to stimulate enzymatic activity of prolylhydroxylase, thus increasing fibroblast production of pro-collagen.

Amethysta (Naturactiva / Soliance). Amethysta is a powder of micronized amethyst. It triggers microcirculation through a physical phenomenon. It improves the complexion by fighting against the effects of stress. It also stimulates the combustion of fat and protects the hair against parasites.

Tourmalina (Naturactiva / Soliance) is a powder of micronized tourmaline. Tourmaline triggers microcirculation through a physical phenomenon of far infra-red energy emission. It improves the complexion by stimulating blood flow.

Sapphira (Naturactiva / Soliance) is a powder of micronized sapphire and is excellent for the skin, the hair and the nails. It can be used to fight against skin eruptions and excessive perspiration.

Rubisa Naturactiva/Soliance is a powder of micronized ruby stone. It is a strong stimulator and good regulator of blood circulation. It also has a toning effect.

Emeralda from Naturactiva / Soliance is a powder of micronized emerald and stimulates blood circulation and also has the power to normalize blood pressure. It regenerates the skin.

Citrina (Naturactiva/Soliance) is a powder of micronized citrin. It triggers microcirculation through a physical phenomenon. It improves the complexion by

fighting against the effects of stress. Citrin also stimulates the immune system thus protecting sensitive skin.

Aquamarina (Naturactiva / Soliance) is a powder of micronized aquamarine and triggers microcirculation through a physical phenomenon. It improves the complexion by fighting against the effects of stress.

Other Precious materials

There are numerous other precious materials that have found their way into our skin care products.

PEARL

Pearl has been esteemed for generations, not only as one of the precious stones but also as a medicinal ingredient throughout the Far East. The name in Chinese is "Chin-ju" meaning rare gem. Pearl has been prized as a tonic, sedative and pyretic drug by the established and rich people.

M.E. Fremy named the organic substances left undissolved when pearls were solubilised in dilute acid as conchiolin (sometimes referred to as conchin) in 1855. Legend recalls how Cleopatra dissolved a pearl in a cup of vinegar while entertaining Anthony. This material is a carbonate that dissolves with vigorous foaming, and was demonstrated to be a kind of scleroprotein.

The conchiolin and perlucin secreted by molluscs are complex protein comprising of some 20 amino acids. Conchiolin resembles NMF (natural moisturising factor) that is found in the horny layer of the skin. The polypeptide of conchiolin maintains the moisture of the skin by enforcing the similar polypeptides of NMF found in the horny layer. It also permeates into the dermis of the skin to prevent aging of the skin by giving tonicity to the tissue. Being an amphoteric, it adjusts the pH of the skin.

The pearl is made up nacre a series of alternating layers of conchiolin and crystals of calcium carbonate (which is in the form of aragonite) and it is these nacre layers that give the pearl its typical iridescence. It is the pearls that are rejected by the jewellery trade that goes for use as medicine.

Commercially available materials

Cosmepearl™ Freshwater Pearl Powder: an exciting cosmetic ingredient to add a touch of luxury to personal care products. This is a fine powder made from micronised freshwater pearls coated with jojoba oil. They contain calcium carbonate in form of aragonite crystals & trace elements and natural moisturisers in form of a wide range of amino acids & protein complexes. A water pearl abrasive is also available.

Crodarom have a pearl extract which is described as being anti-inflammatory, stimulating invigorating, antibacterial and detoxifying. It re-energises skin tissue and

strengthens hair and skin.

There are also pearl powders available from A&E Connock, Sino Lion and Eurocostech.