

Utkal University

Indian Knowledge System

From the Perspective of
Rocks and Minerals



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INTRODUCTION

Geology could seem unrelated to human health. However, because they are rich in vital minerals and chemical components, rocks serve as the primary building blocks of the Human Health. The majority of elements enter the human body through food, drink, and air. Weathering processes break down rocks to create the soils used to nurture plants and animals. As part of the water cycle, drinking water passes through rocks and soils, and much of the dust and some of the gases in the atmosphere have geological origins. The topic of "Earth and Health" focuses on how natural geological variables affect both human and animal health.

It has long been understood that minerals, rocks, and human health are related. Both the numerous medicinal advantages of different rocks and minerals as well as the numerous health issues they may create are described in several Vedic writings, in particular the *Brukshya Ayurveda & Krushi Parashara* written by Parashara Muni; the *Charak Samhita* (a book on medicine) written by Maharshi Charak.

Brihat-Samhita (6th-century Sanskrit-language encyclopedia) written by Varāhamihira enumerates uses of rocks and minerals, *Susruta Samhita* (a book on all types of surgery including plastic

surgery) written by Sushruta describes uses of powdered minerals for surgery. The King Bhoja (1010–1055 CE) has described use of minerals in *Sammohini Churna* (Anesthesia) in his book *Bhoja Prabandha*. Our ancient literature suggest health benefits of taking bath in hot springs, wearing gemstones, taking nutritionally essential minerals etc. Hot spring water contains many elements and compounds (appended below) which are good for skin health and other diseases.

There is nothing that isn't a poison; everything is poisonous. An effective dose distinguishes a treatment from a toxin. Thus, both rising and falling concentrations of different trace elements might have a deleterious impact on biology. The study of internal routes and the application of geochemical and mineralogical methods to pathology are described in many Vedic scriptures. The connections between Earth's resources and human health, both good and bad, is necessary and are described in these scriptures. This rich Indian Knowledge System certainly will help earth scientists and specialists in community health to demonstrate many aspects of health science.

Elements, Minerals are being used in Pharmaceuticals and Healthcare products since time immemorial (Table 1). Elements beneficial to animals and plants and function and action macro- and micro-nutrients are discussed in this article (Tables 2-5).

Table 1 Elements, Minerals used in Pharmaceuticals and Healthcare products since time immemorial

| Element/Mineral | Use | Element/Mineral | Use |
|---------------------|---|-----------------|---|
| Arsenic | <i>Pharmaceuticals</i> | Bismuth | <i>Cure stomach upset</i> |
| Mercury | <i>Mercurochrome, dental amalgam</i> | Calcite | <i>Used for Vitamin D, calcium deficiency</i> |
| Calcium | <i>Antacids</i> | Rutile | <i>Toothpaste</i> |
| Boron | <i>Boric Acid</i> | Gypsum | <i>Plaster of Paris</i> |
| Selenium | <i>Skin Treatment</i> | Talc | <i>Talcum powder</i> |
| Sulphur | <i>Drugs used for skin disease</i> | Kaolin | <i>Kaopectate (medicine used to treat diarrhea)</i> |
| Magnesite | <i>Milk of Magnesia used as antacid</i> | Coal Tar | <i>Skin products</i> |
| Barium | <i>Enemas for constipation</i> | Pumice | <i>Lava soap</i> |
| Bauxite (Al) | <i>Anti perspirant, Toothpaste</i> | Halite | <i>Preservative</i> |
| Zinc oxide | <i>Skin ointments</i> | Fluorite | <i>Fluoridation</i> |

Table 2 Essential elements to Animals and Vegetation

| TO ALL | TO SEVERAL CLASSES | TO SOME CLASSES | TO SOME SPECIES | POSSIBLY ESSENTIAL |
|--|--------------------|-----------------|----------------------|--------------------|
| H, C, N O, Na, Mg P, S, K, Ca, Cl, Mn Fe, Cu, Zn, Se | Si, V, Co Mo, I | B, F, Cr Br | Li, Al, Ni Sr, Ba | Rb, Sn |

MAJOR ELEMENTS TRACE ELEMENTS

Table 3 Action of Macronutrients

| | |
|-----------|--|
| <i>P</i> | One of the constituent of bone is apatite. Excess apatite turns hair and bones brittle |
| <i>Na</i> | Active in hydrosaline equilibrium; transmission of nervous impulses and transport of metabolites |
| <i>Mg</i> | In bones, activation of muscular contractions; body temperature control; component of several enzymes |
| <i>K</i> | Maintenance of corporeal fluids; muscular contractions and nervous impulses |
| <i>Cl</i> | Maintenance of blood pressure; vital as acid constituent during digestion |
| <i>Ca</i> | Strengthening of bones and teeth; muscular activity; blood coagulation; cellular permeability. Excess may originate liver and bladder stones and renal insufficiency |

Table 4 Action of Micronutrients

| | |
|-----------|---|
| <i>I</i> | Required by thyroidal hormones, temperature control, body growth, reproduction etc. Deficiency causes abnormal growth of the thyroid |
| <i>F</i> | Give strength to teeth and bones, avoiding dental caries and osteoporosis. Excess causes fluorosis of teeth and bones |
| <i>Cu</i> | Component of oxidizing enzymes during metabolism of energy sources; active in the synthesis of haemoglobin, in keratization and in skin and hair pigments. Deficiency leads to osteoporosis and low number of white blood cells |
| <i>Cr</i> | Needed for metabolism of sugar. Deficiency may cause diabetes, intolerance to glyucose etc. Excess may result in renal failures. Excess of Cr ⁶ is carcinogenic |
| <i>Co</i> | Active in vitamin B ₁₂ and in chemical reactions. Deficiency causes anaemia. Excess causes hearth failures |

Table 5 Functions of Micronutrients

| | |
|-----------|---|
| <i>Zn</i> | Occurs in all tissues, mostly in bones, muscles and skin; active in the immunological system; regulates body growth; protects the liver. Deficiency reduces body growth |
| <i>Se</i> | Prevention of vascular and other diseases; neutralizes cells oxidation and aging action of free radicals. Excess turns nails and hair brittle |
| <i>Mn</i> | Promotion of growth and development; cellular functions; in bones and cartilages; takes part in metabolic reactions. Excess leads to excess of blood. May cause neurological diseases if inhaled into the lungs |
| <i>Fe</i> | Essential component of haemoglobin and enzymatic complexes required for energy generation and immunological system |

TALISMANS & AMULETS: GEMSTONES

Unlike the rock-derived Pharmaceuticals, Talismans and Amulets do not have known physical effects, but do have certain psychological effects. Talismans have been used for hundreds of years, more common than now, and were believed to ward off evil and heal certain medical conditions. These talismans were composed of various rocks and minerals, with each crystal having its own unique healing powers.

For example, Haematite (Fig.1), a stone commonly used in the healing of cardiovascular and circulatory diseases, and detoxification.

Quartz, Along with Rose (Fig.2) and Smoky –Quartz, this crystal is used in mood related diseases such as depression.



Fig. 1 Haematite



Fig. 2 Rose Quartz



Fig. 3 Photographs of different gemstones (Talismans & Crystal Amulates)

Talismans are thought to give the person wearing them more powerful. Whereas, Amulets have the power to ward off illness, negative energies, and evil spirits.

Talismans and Crystal Amulets are composed of a great variety of rocks and minerals (Fig.3). A selection of these are shown on the chart, along with a list of the conditions each treats (Table 6).

Table 6 List of conditions each gemstone (Talismans & Crystal Amulates) treats (see Fig.4)

| | Arthritis/ Joints | Bleeding/ Blood | Circula- tory Sys- tem | Depres- sion | Detoxifica- tion | Eye- sight | Head- ache | Heart |
|-----------------------------|----------------------|--------------------|------------------------------|-----------------|---------------------|---------------|---------------|-------|
| Amethyst | | | | x | x | x | x | |
| Aquamarine | | | | | | | x | |
| Aventurine | | | | x | | | x | |
| Black Tourmaline | x | | | x | x | | | |
| Bloodstone | | x | | | | | | |
| Camelian | x | x | | | | | | |
| Chalcedony | | | | | | | | |
| Citrine | | | | | | | | |
| Flourite | x | | | | | x | | |
| Hematite | | x | x | | x | | | |
| Lapis Lazuli | | | | | | | | X |
| Moonstone | | | | | | | | |
| Quartz | | | | | | | | |
| Rose Quartz | | | | x | | | | |
| Smoky Quartz | | | | x | | | | |
| Green Tourmaline | | | | | | | | x |
| Turquoise | | | | | | | | |

Continued...











| | |
|---|--|
| <p style="text-align: center;">Amethyst</p>  | <p style="text-align: center;">Aquamarine</p>  |
| <p style="text-align: center;">Citrine</p>  | <p style="text-align: center;">Moonstone</p>  |
| <p style="text-align: center;">Green tourmaline</p>  | <p style="text-align: center;">Black tourmaline</p>  |
| <p style="text-align: center;">Blood stone</p>  | <p style="text-align: center;">Aventurine</p>  |
| <p style="text-align: center;">Rosy quartz</p>  | <p style="text-align: center;">Smoky quartz</p>  |

Fig. 4 Photographs of gemstones (Talismans & Crystal Amulates) enumerated in Table 6.

Gemstones are also used for different Planets and Sun in Astrology for better fortune (Fig. 5)


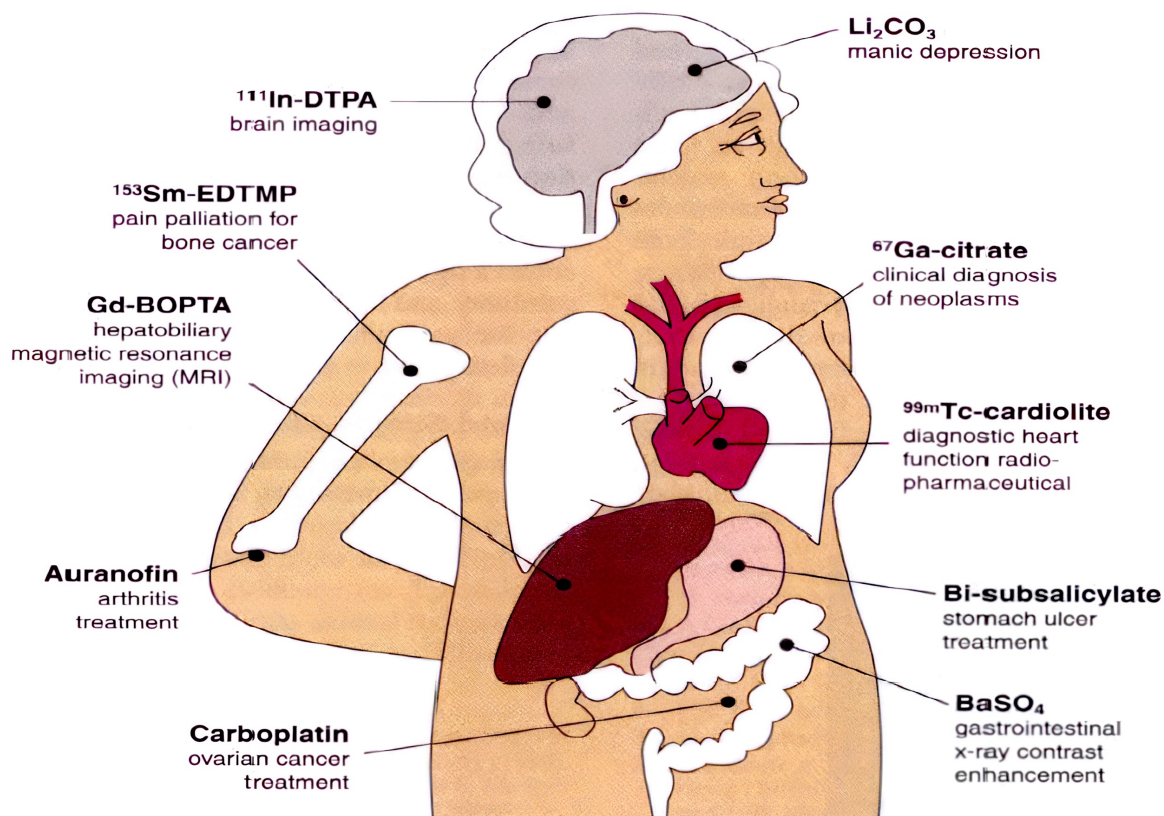
| | |
|---|--|
| Ruby (māṇikyam) is used for Surya (Sun) | Pearl for Chandra (Moon) |
|  |  |
| Red coral for Mangala (Mars) | Emerald for Budha (Mercury) |
|  |  |
| Yellow sapphire for Bṛhaspati (Jupiter) | Diamond for Shukra (Venus) |
|  |  |
| Blue sapphire for Shani (Saturn) | Hessonite for Rahu (Rahu) |

Fig. 5 Gemstones worn for different Planets

Different elements and minerals are generally taken as supplements/medicines for treatment of human beings (Fig.6).



Metal ions are important in diagnosis and therapy of a host of different human pathologies. Gd, ¹¹¹In, and ^{99m}Tc are used in medical imaging; ¹⁵³Sm and Au to relieve pain in bone cancer and arthritis, respectively; Bi to soothe upset stomach; and Li to calm bipolar psychosis. ⁶⁷Ga-citrate is used in clinical diagnosis of neoplasms (by SPECT imaging), and Pt is used for cancer treatment.

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Fig.6 Elements/Minerals used for treatment of different organs of our body

Diseases at state of deficiency of an element and toxicity caused by the same are presented in Table 7 and Trace elements and endemic diseases caused by them are described in Table 8.

Table 7 Diseases at state of deficiency of an element and toxicity caused by the same

| <i>Elements</i> | <i>Deficiency</i> | <i>Toxicity</i> |
|------------------|--|---|
| <i>Iron</i> | Anaemia | Haemochromatosis |
| <i>Copper</i> | Anaemia "Sway back" | Chronic copper poisoning Wilson-, Bedlington-disease |
| <i>Zinc</i> | Dwarf growth Retarded development of gonads Akrodermatitis enteropathica | Metallic fever Diarrhoea |
| <i>Cobalt</i> | Anaemia "White liver disease" | Heart Failure Polycythaemia |
| <i>Magnesium</i> | Dysfunction of gonads Convulsions Malformation of the skeleton Urolithiasis | Ataxia |
| <i>Chromium</i> | Disturbances in the glucose metabolism | Kidney damage (Nephritis) |
| <i>Selenium</i> | Liver necrosis Muscular dystrophy ("White muscle disease") | "Alkali disease" "Blind staggers" |

Table 8 Trace elements and respective diseases caused by them

| Element | Disease |
|------------------|--|
| Selenium | Kashin-Beck Disease, Degenerative osteoarthropathic disease, Chronic heart disease (cardiomyopathy) |
| Iodine | Goiter and Cretinism |
| Fluorine | Dental and Skeletal (It is essential for healthy and strong teeth and bones, and to avoid osteoporosis. The excess causes fluorosis, with mottled and harder teeth and bone calcification.) |
| Manganese | Manganism |
| Chromium | Cancer |
| Arsenic | Skin lesions, skin, lung, bladder, liver, kidney cancer, Peripheral vascular disease, Diabetes Mellitus, Hearing loss, Portal fibrosis of the liver, Lung fibrosis, Hematological effects (e.g., anemia) |

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