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Amazonite- A Styptic Astringent- An Ointment to Be used during Radiotherapy

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ABSTRACT

Olive- Green Amazonite, $KAlSi_3O_8$, a microcline feldspar from Brazil has been diluted in order to form a Styptic Astringent in the form of an Ointment that can help one while going through the procedures during Radiotherapy.

Keywords- Amazonite[1], Rocks[2], Crystals[3], Gemstones[4], Ointment[5]

INTRODUCTION

A river is known as Nadi and rock as Shila in Sanskrit.

HOW GEMS FORM-
Gemstones are manufactured as rocks form in Earth. These can be the rock itself, crystals that are part of the rock structure, or that form from residual fluids or as a result of the alterations that change one rock into another. There are three types of rock- SEDIMENTARY, METAMORPHIC and IGNEOUS- and each creates GEMS.

SEDIMENTARY ROCKS- They form from the fragmentary remains of any or all of the three rock types, the remains of plants and animals, or chemicals dissolved in freshwater or seawater. Further, they are made from other materials like sand or shells. The layers gather and over time, turn into rock. Celestine, Alabaster and Calcite are some of the gems that form from these processes.

METAMORPHIC ROCKS- They are the kind of rocks that are altered by temperature and pressure without remelting. The original rocks can be sedimentary, igneous, or any other metamorphic rocks. Sapphire and Ruby are created by metamorphic processes.

IGNEOUS ROCKS- They form from molten rock called MAGMA. They are formed from the heating and cooling of magma or lava. GEMS such as Diamond and Peridot crystallize directly from the magma as part of the rock. Others, such as topaz, crystallize from residual fluids given off by magmas, and form in veins called hydrothermal veins.

ALTERATION OF ROCKS-
As Earth formed, all rocks originated as igneous rocks- that is, rocks formed from molten rock. Over time, these rocks have been broken down, altered, melted, remelted, and ground down as part of an endless reprocessing of Earth's mineral matter. These processes are referred to as the rock cycle. At each stage of the cycle, different gems form as reprocessed minerals stabilize in a new set of geological conditions, Some gemstones are recovered from gravels, called placer deposits, before those gravels are reconstituted into new rocks.

ORGANIC GEMS-
They fall into two general categories- those that contain crystalline matter and those that do not. Pearl, mother-of-pearl, shell, and coral are all partly made up of crystalline minerals that are created by biological, rather than geological, processes. The minerals in pearl, mother-of-pearl, and shell are calcium carbonate, which occurs either in the form of calcite or aragonite secreted by cells in the mantles of many molluscs. In hard corals, the mineral is secreted by coral polyps. In no crystalline organic gems, the material is organic and includes tree sap (copal and amber), wood(jet), dentine(ivory), and conchiolin (black coral).

CRYSTALS

Almost all gems are cut from crystalline minerals- solids in which the component atoms are arranged in a particular, repeating, three-dimensional pattern. When these internal patterns produce a series of external flat faces arranged in geometric forms, a crystal is formed.

CRYTAL SYMMETRY- Crystals are placed in systems according to their geometry or symmetry. In the following systems, crystals are grouped as per their axes of rotational symmetry- axes around which a shape can be rotated and still appear the same once or more in a complete rotation. For example, a crystal has a fourfold axis of symmetry if it appears identical four times as it is turned 360 degrees around that axis.

CUBIC- The cubic system is sometimes known as the isometric system, Crystals forming in this system have three fourfold axes of symmetry at right angles to each other. The main geometric forms within this system are- cube, octahedron, and dodecahedron. Gemstone minerals and precious metals that crystallize in the cubic system include silver, gold, diamond, platinum and spinel.

TETRAGONAL- Crystals forming in the tetragonal system have one fourfold axis of rotation. They have the look of elongated square prisms, appearing square in cross section and elongated in the third direction. Relatively, few gemstone minerals crystallize in this system: some of them are vesuvianite, rutile, scapolite, and zircon.

HEXAGONAL and TRIGONAL- Some crystallographers separate the hexagonal and trigonal crystal systems, as hexagonal and trigonal crystal systems, as hexagonal crystals have sixfold symmetry and trigonal crystals have threefold symmetry. However, other crystallographers regard them as comprising a single system because they share some geometrical properties. Gemstone minerals in the hexagonal system include aquamarine, emerald and apatite. Quartz, Calcite and tourmaline are trigonal minerals.

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MONOCLINIC- The term monoclinic means, “having one incline’’. Crystals forming in this system have one twofold axis of rotation. The largest numbers of mineralscrystallize in the monoclinic system, including many gemstone minerals. Some examples are gypsum(alabaster and satin spar), orthoclase(moonstone), jade(both jadeite and nephrite), azurite, malachite, spodumene(hiddenite and kunzite), serpentine, diopside, meerschaum, and sphene.

ORTHORHOMBIC- The name orthorhombic means “shaped like a perpendicular parallelogram”. Crystals in the orthorhombic system have three twofold axes of rotation, and have a shape like that of a cereal box. Gemstone minerals that crystallize in this system include olivine(peridot), chrysoberyl(alexandrite), aragonite, iolite, staurolite, zoisite(tanzanite), topaz, and baryte.

TRICLINIC- Gemstone crystals forming in the triclinic system have the least symmetrical shape of all crystals. They have no rotational axes of symmetry and no symmetry in any of the crystal’s three dimensions. The orientation of a triclinic crystal is thus arbitrary. Gemstone minerals that crystallize in this system include oligoclase(sunstone), microcline(amazonite), albite(some moonstones), and turquoise.

MICROCLINE- A common feldspar, microcline is a colourless, white, cream to pale yellow, salmon pink to red, or bright green to blue- green mineral.

The bright green variety of microcline is called AMAZONITE or AMAZONSTONE, and is prized as a GEMSTONE. Although deep blue- green is the most sought- after colour, amazonite varies from yellow-green to blue-green and may also exhibit fine such, cut en cabochon. Being relatively brittle, amazonite is rarely used for carvings or beads.

AMAZONITE crystals often have two sets of fine lines set at right angles to each other, an effect called cross-hatch twinning that creates a “plaid” effect. This distinguishes them from other feldspars and from green jade. Single crystals from granite pegmatites can weigh several tonnes and be tens of metres long. Although named after the River Amazon, no deposits of AMAZONITE have been found there. The Pikes Peak district of Colorado, USA, is the primary source of AMAZONITE in the southern front range of the Rocky Mountains at well over 4000 metres. In an archaeological dig undertaken in Southern Jordan more than 2000 fragments of amazonite jewellery were discovered dating back to neo- lithic times(stone- age man) perhaps 10,000 years ago! These days amazonite is mostly to be found in China and Mongolia in East Asia, in the Ural Mountains of Russia, southern and eastern

Africa. Deep green amazonite has been found in the Kola Peninsula, Russia and the famous mines of Minas Gerais, Brazil as well as Mogok in Burma or Myanmar and Sidamo- Borana Province in Ethiopia.

It is one of the oldest used gemstones.

AMAZONITE – GEMOLOGICAL PROPERTIES

CHEMICAL FORMULA	$KAlSi_3O_8$: Potassium Aluminium Silicate
CRYSTAL STRUCTURE	Triclinic, Prismatic
COLOUR	Green, Blue, Gray, Multicolour (White Colour of Streak)
HARDNESS	6- 6.5 on Mohs Scale
DENSITY	2.56-2.58
CLEAVAGE	Perfect
REFRACTIVE INDEX	1.522-1.530
TRANSPARENCY	Translucent to Opaque
LUSTER	Vitreous, Dull
DOUBLE REFRACTION OR BIREFRINGENCE	-0.008
FLUORESCENCE	Weak, Olive- green

AMAZONITE GREEN- For most of its long life, it was thought that amazonite was green because of the presence of copper in its makeup however when scientist investigated it was decided that lead impurities were the reason behind its lovely green hue, unfortunately more scientists had sometime on their hands and the latest theory is iron impurities!

It is a type of feldspar which is a mineral which makes up a full half of the world's crust! Other types of feldspar include moonstone, sunstone and labradorite which are also well-known gemstones.

AMAZONITE HISTORY- It is a modern or trade name for microcline. The name was coined by German mineralogist Johann Breithaupt in 1847 but we are not sure why he came up with the name since this gemstone is not found in Amazon River or Forest. Perhaps the name sounded a bit more exotic than microcline or its other name, Green Feldspar. This gemstone, using different names, has been in use since at least the time of the Pharaohs of Ancient Egypt as cut and polished jewellery and beads have been found in tombs of the period, including King Tutankhamun around 1300 BC. In 2006, two ancient amazonite or microcline mines were discovered in the mountains of the Eastern Desert in Egypt which were the earliest mines found so far, dating back to 1800 BC.

MEDICINAL IMPORTANCE OF AMAZONITE- The gemstone is not only used for centuries as an amulet, carved ornament and decoration, but too as an antidote for one of the modern world's most potent disorders- electromagnetic pollution. With all the smartphones, laptops, computers, WiFi, Bluetooth devices, GPS circling around us everywhere we go are constantly exposed to electromagnetic radiation. This lead to an increase in biological effects on every one of us such as lack of concentration and sleep disorders, an unbalanced nervous system, mental issues, stress, metabolic disturbances, weakened immune system and many more.

SPIRITUAL IMPORTANCE- Amazonite is an amazing energy filter, if you work with a laptop, computer, tablet, smartphone, x ray equipment, microwave etc., one of these gemstones can help cleanse you of their electromagnetic pollution. In addition, it is a balancing gemstone, for your masculine and feminine sides or yin and yang, and will enable you to see opinions or feelings from both sides. It will help you clear your mind of cluttered thoughts and help you focus on achieving your goals and dreams. It is also an aid to your creative and imaginative side and is perfect for anyone with ambitions in the artistic pursuits. It is the 'Stone of Success and Abundance'. Legend has it that the Amazonians, a tribe of fierce warrior women decorated their battle gear with this gemstone.

HEALTH BENEFITS OF AMAZONITE so predicted- As it is connected to the throat and heart chakra, Amazonite has a direct connection with this area of the body on a physical level including lung and liver issues. It can boost your metabolic rate and aid you in getting good night's sleep. It has a direct effect on anything to do with calcium in the body, so will help prevent osteoporosis, tooth decay and any form of calcium deficiency.

What is an OINTMENT- They are meant for external use, intended for application to theskin. Literally, they have an oily or greasy consistency and can appear stiff as they are applied to the skin. They are of many semisolid preparations which includes jellies, creams and pastes. They were earlier introduced as LINIMENT, used to relieve stiffness and pain, such as from strains, arthritis and muscular aches, formulated from acetone, alcohol, or similar evaporating solvents and contain aromatic chemical compounds such as capsaicin, menthol, benzoin resin or methyl salicylate that produces a feeling of warmth within the muscle area.

Liniment or Ointment or Embrocation, is a medicated topical preparation for application to the skin. Sometimes called a heat rub, they maybe water like in viscosity or formulated as a lotion or balm and are usually rubbed in to allow for penetration of the active ingredients. Sticks, Sprays and Patches are also available. As for reference, ABC Liniment was used from approximately 1880 to 1935. It was named for its three primary ingredients : belladonna, aconite, and chloroform. Similarly, Amrutanjan is an analgesic balm owned by Amrutanjan Healthcare. It was founded in 1893 by journalist and freedom fighter, Kasinathuni Nageswara Rao. Bengey, spelled Ben-Gay before 1995, was developed in France by Dr Jules Bengue, and brought to America in 1898. It was originally produced by Pfizer Consumer Healthcare, which was acquired by Johnson & Johnson. IcyHot is a line of liniments produced and marketed by Chattem, now a subsidiary of Sanofi.Mentholatum Ointment, branded Deep Heat outside of US was introduced in December 1894 and is still produced today with numerous variations. Minard's Liniment: Dr Levi Minard of Nova Scotia, branded as THE KING OF PAIN, created his well known liniment from ammonia, camphor, and medical turpentine. Nine Oils: A 19th century preparation used on both horses and humans. Although druggists' books sometimes specified recipes, street doctors often promoted any kind of oil as the "nine oils". Tiger Balm was developed during the 1870s in Rangoon, Burma by herbalist Aw Chu Kin, and brought to market by his sons. It is composed of 16% of menthol and 28% oil of wintergreen.

This article is about the Balm making using Amazonite rock in order to cure the skin that becomes dull during Radiation or Radiotherapy.

DISCOVERY OF RADIOTHERAPY-

Madam Curie has left a great deal to the world. Her work led to the development of nuclear energy and radiotherapy (RT) for the treatment of Cancer. She also improved the image of science. Radiotherapy can be traced back about 125 years to the discovery of X-rays (1895) by a Germany physicist named W.C. Roentgen. How playing with dangerous x-rays led to the discovery of radiation treatment for cancer. When the German physicist Wilhelm Conrad Roentgen announced his discovery of the X-rays in December of 1895, he was lauded on the front page of just about every newspaper in the world.

RADIOTHERAPY-

Radiation therapy (also called radiotherapy) is a cancer treatment that uses high doses of radiation to kill cancer cells and shrink tumours. At low doses, radiation is used in x-rays to see inside your body, as with x-rays of your teeth or broken bones. At high doses, radiation therapy kills cancer cells or slows their growth by damaging their DNA. Cancer cells whose DNA is damaged beyond repair stop dividing or die. When the damaged cells die, they are broken down and removed by the body. Radiation therapy does not kill cancer cells right away. It takes days or weeks of treatment before DNA is damaged enough for cancer cells to die. Then, cancer cells keep dying for weeks or months after radiation therapy ends.

There are two types of Radiotherapy- EXTERNAL BEAM and INTERNAL.

EXTERNAL BEAM RADIATION THERAPY- It comes from a machine that aims radiation at the cancerous area. The machine is large and noisy. It does not touch you, but can move around you, sending radiation to the parts of your body from many directions. Its' a local treatment treating specific part of your body. For example, if you have cancer in your breast, you will have radiation only to your breast, not to entire body.

INTERNAL RADIATION THERAPY- Its' a treatment in which a source of radiation is put inside your body. The radiation source can be solid or liquid. Internal radiation therapy with a solid source is called BRACHYTHERAPY. In this type of treatment, seeds, ribbons, or capsules that contain a radiation source are placed in your body, in or near the tumour. Like external beam radiation therapy, brachytherapy is a local treatment and treats only a specific part of your body. With brachytherapy, the radiation source in your body will give off radiation for a while. Internal radiation therapy with a liquid source is called systematic therapy. Systematic means that the treatment travels in the blood to tissues throughout your body, seeking out and killing cancer cells. You receive systematic radiation therapy by swallowing through a vein via an IV line, or through an injection. With systematic radiation, your body fluids, such as urine, sweat, and saliva will give off radiation for a while.

CANCER TREATMENTS CAUSING SKIN-

Cancer treatments usually causes skin and nails as part of side effects. While skin problems caused by radiation therapy and chemotherapy are often mild, they maybe more severe if you are receiving a stem cell transplant, targeted therapy, or immunotherapy.

Sometimes, radiotherapy can cause the skin on the part of your body receiving radiation to become dry and peel, itch called pruritus, and turn red or darker. Your skin may look sunburned or become swollen or puffy. You may develop sores that become painful, wet, and infected. This is called a moist reaction. Further, some types of chemotherapy can cause your skin to become dry, itchy, red or darker, or peel. You may develop a minor rash or

sunburn easily; this is called photosensitivity. Some people also have skin pigmentation changes. Your nails maybe dark and cracked, and your cuticles may hurt. If you receive radiation therapy in the past, the area of skin where you received radiation may become red, blister, peel, or hurt. This is called radiation recall. Signs of an allergic response to chemotherapy may include a sudden or severe rash or hives or a burning sensation. Stem cell transplants can cause graft vs host disease (GVHD), which may cause skin problems such as a rash, blisters, or thickening of the skin. Some type of immunotherapy can cause a severe and sometimes an extensive rash. Your skin maybe dry or with blister. Some types of targeted therapy may cause dry skin, a rash and nail problems.

For all that, one need to use some recommended skin product like mild soaps, creams, lotions, ointments or balm.

CONCLUSION

Here is the Styptic Ointment made with AMAZONITE in order to heal outer cracks, peels, dark skin effects while going through Radiation Therapy- THE AMAZONITE BALM

Made in the Department of Earth Sciences, Annamalai University, Tamil Nadu, India on NOVEMBER 30th, 2021.

Speciality of this Balm is that it contains $KAlSi_3O_8$ with Au(edible Gold) traces that will help in soothing of outer skin so damaged during radiation therapy. All ingredients applied in the process of making are approved ones.

Its composition-

NAME	WEIGHT in GRAMS/ MILLILITRES
AMAZONITE	7.4
24K EDIBLE GOLD SHEET	0.01
BEES WAX	121.814
CAMPHOR	9
PEPPERMINT OIL	3
COCONUT OIL	4
ARSENIC ALBUM 30C	1

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REFERENCES

[1]. DK Nature Guide GEMS by Ronald Louis Bonewitz, UK ISBN 9781409364634, 2013.
[2]. Petrological reviews from online data.
[3]. DK Nature covering Amazonite, Diaspore, Pollucite, Sunstone and Moonstone, ISBN 9781409364634.
[4]. www.google.com