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# AN EXPLORATORY REVIEW ON – PHARMACOGNOSTICAL AND THERAPEUTIC POTENTIAL OF UNANI MINERAL DRUG GERU (RED OCHRE)

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## ABSTRACT

For thousands of years, red ocher, sometimes referred to as "Geru" in South Asia, has been a vital component of human civilization. It is a naturally occurring earth pigment rich in iron oxide. Red ocher is well known for its artistic and ceremonial uses, but it has also been used medicinally in many traditional systems, such as Ayurveda, Unani, Traditional Chinese Medicine, and Indigenous healing methods around the world. This essay examines red ocher's geological characteristics, chemical makeup, pharmacological potential, conventional medicinal use, toxicological issues, and current scientific assessment. This review emphasizes the therapeutic value of red ocher as a mineral-based medicinal agent and explores its applicability in modern integrative medicine practices by fusing historical records with current biomedical knowledge.

**KEYWORDS:** Geru Surkh, Teen-e-Ahmar, Qabiz, Habis-ud-Dam, Mubarrid, Musaffi-e-Dam, Red ocher.

## INTRODUCTION

Red ocher is a naturally occurring mineral earth pigment primarily composed of iron oxide ($Fe_2O_3$), particularly hematite. Known by various names — Geru (Hindi/Urdu), Gairika (Sanskrit), and Hematite (mineralogical term) — it has been used by humans for over 300,000 years. While its artistic and ritualistic applications are well documented, its medicinal significance is less commonly discussed in mainstream literature. It is red-colored soil found in the Gwalior hills. It is referred to as gerū in Urdu and as kaolin and china clay in English. It is made from native hydrated aluminum silicate that has been purified and has a varied composition. Alumina makes up 70% of pure kaolin, followed by silica (26%) and iron oxide (4%).

In traditional healing systems, red ocher has been employed as: A hemostatic agent, an anti-inflammatory substance, A cooling remedy, A treatment for skin disorders, A remedy for gastrointestinal disturbances.[1,2,3,4]

**Synonyms of Red Ocher[3,4,5,6,21]**
**English** Ochre, Reddle
**Hindi** Geru, Gerumitti
**Urdu** Geru (Teen-e-Rumi) (N.F.U.M)
**Arabic** Magraha, Magrata
**Persian** Gile-e-surkh, Mistri
**Sanskrit** Kasayakkal, Kavi, SvarnaGairika
**Gujrathi** Geru, sonageru
**Kannada** Hojatha, Jajoo, Kaavi, Kemmannu
**Bengali** Girima Malyalam Kavimannu
**Marathi** Geru, Sonakava
**Tamil** Seemsikkaviakkallu Kavikkal (SFI)
**Punjabi** Geri Telgu Kavirayi, Kaavi

**Geological and Chemical Composition:** Hematite (Fe2O3), which gives red ocher its color, clay minerals, silica, and trace minerals make up the majority of its composition.[5,6]

**Chemical Structure:** Iron oxide ($FeO_3$) is a stable chemical that is created when iron is oxidized. It is Water-insoluble Thermally stable, and comparatively chemically inert. Both its durability in art and its safety in conventional medical exterior uses are influenced by its stability.[6,7]

**PROPERTIES OF RED OCHER**
**Chemical Composition:** Iron Oxide
**Nature**: Massive Clayey in nature
**Colour:** Reddish Brown in colour
**Streak**: Reddish Brown streak
**Fracture**: Uneven
**Lusture:** Earthy
**Transparency:** Opaque
**Density:** 5.27
**Refractive Index:** 2.78 -3.01
**Hardness:** 5.5 to 6.5 but softer in the early variety.[3,4,5,6]

**1. Red Ocher in Traditional Medicine Systems**
**Ayurveda:** Red ocher is referred to as Gairika in Ayurveda. It falls within the category of mineral substances and possesses the following characteristics: Virya (Potency): Sheeta (cooling), Rasa (Taste): Kashaya (astringent), Guna (Quality): Laghu (light), Ruksha (dry), and Vipaka (Post-digestiveeffect):Katu Raktapitta (bleeding problems), Menorrhagia (heavy menstrual bleeding), burn wounds, skin inflammations, diarrhea, and dysentery are among the Ayurvedic uses. UlcersIt is frequently used as a powder and occasionally combined with ghee, honey, or herbal infusions.[8]

**Unani Medicine:** Red ocher is sometimes classified under mineral-based therapies or called Gil-e-Armani in Unani medicine.[3,4,5,6]

**2. Mizaj (Temperament):** Cold and dry in temperament with 2 in degree.[5]

**3. Actions (Afa'al)**[5,6,7,8,9,10,11]
Muhallil (anti-inflammatory), Habis-ud-Dam (styptic; stops bleeding), Qabiz (astringent), and Mubarrid (cooling agent).

**3.1Therapeutic Indications:** Burns, ulcerative lesions, gastritis, hemorrhage, epistaxis (nosebleeds), and inflammatory skin disorders.

**4. PHARMACOLOGICAL PROPERTIES**
**4.1Astringent Impact:** The drying and protein-precipitating properties of the iron oxide and mineral components may narrow tissues, minimize mild bleeding, and encourage wound healing.

**4.2 Anti-inflammatory Potential:** Traditional treatments mixed red ocher with herbs to enhance therapeutic synergy, despite iron oxide's lack of potent anti-inflammatory properties.

**4.3 Hemostatic Activity:** Its ability to absorb allows Stabilization of blood clots and a decrease in capillary bleeding.

**4.4 Antimicrobial Properties:** According to certain research, iron oxides may have weak antibacterial properties due to oxidative stress processes and surface charge interactions.
Red Ocher in the process of Healing of a dermatological wound.
Historically, red ocher has been used for burn injuries, cuts, and ulcers.
The mineral creates a barrier by absorbing moisture**.**

**5.2 Acne and Skin Inflammation** Because of its drying properties, it lessens local inflammation and sebum production.

**5.3 Cosmetic Uses:** Red ocher has been applied to Conventional cosmetics such as protective skin coverings and face masks.

**6. APPLICATIONS IN THE DIGESTIVE SYSTEM**
Because of its astringent properties, it is used in Ayurveda and Unani medicine to treat diarrhea. used to support peptic ulcers. Its mechanism probably entails: Mucosal protective barrier development and tissue contraction.

**7. Uses in Hematology and Gynecology**[11, 12, 13,1 4,15]
**7.1 Disorders of Bleeding**
Traditionally, red ocher is used to treat menorrhagia, hemorrhoids, and epistaxis. Its styptic activity lessens bleeding.

**7.2 Postpartum Use:** Mineral-based treatments were utilized in some civilizations to reestablish equilibrium following childbirth.

**8. SAFETY AND TOXICOLOGY**[19,20]
**8.1 Safety Profile:** Iron oxide is typically regarded as non-reactive. Low toxicity issues include: Impurities in raw deposits, silica concentration, and heavy metal contamination.

**8.2 Dangers of Inhalation**: Inhaling dust while processing can lead to respiratory discomfort and, if silica is present, silicosis.

**8.3 Caution for Internal Use:** Internal ingestion needs to be overseen by trained professionals and purified (Shodhana in Ayurveda).

**9. Current Scientific Assessment:** There hasn't been much scientific study done on red ocher in particular.

However, iron oxide nanoparticles are used in imaging (MRI contrast agents) and are being researched in the medical field. Investigated for medication delivery: These advancements demonstrate the biological significance of iron oxides, even if they are not the same as crude red ocher.

**SCIENTIFIC STUDIES ON GERU (RED OCHRE / Gile-Armani / $FE_2O_3$)**

**9.1 Antibacterial and Antioxidant Properties.** The biological activities of the Laghu Sutashekhara Rasa (LSR) formulation, which contains Shuddha Gairika Geru, were assessed in a recent study. With a DPPH radical scavenging $IC^2_0$ value of 12.16 ± 1.23 mg/mL, the formulation demonstrated strong antioxidant activity and significant antibacterial activities against Bacillus subtilis, Escherichia coli, Pseudomonas aeruginosa, and Staphylococcus aureus.[187,188] These results imply that Geru's mineral components support its antibacterial and free radical-scavenging properties.[15,16,17]

**9.2 Astringent and Styptic Action in Menorrhagia**

Geru powder's impact on teenage menorrhagia was examined in a clinical research at the National Research Institute of Unani Medicine for Skin Disorders in Hyderabad. According to the Pictorial Blood Loss Assessment Chart (PBAC) score, treatment over two menstrual cycles considerably decreased bleeding volume.[189] The investigation verified the hemostatic (Habis-e-Dam) and astringent (Qabiz) qualities of geru as reported in Unani literature.[9,10 17,18]

**9.3 Physicochemical Profile and Mineral Composition**: According to analytical analysis, the main component of Geru is ferric oxide (Fe2O3), with smaller amounts of silica, alumina, and kaolinite. Its bioavailability and safety were demonstrated to be improved by purification (Shodhana) and levigation (Bhavana) procedures, most likely as a result of pH stabilization and impurity elimination.[15,16,17]

**10. Red ocher and Integrative Medicine:** Red ocher can be investigated in topical wound treatment, herbal-mineral formulations, and cosmetic dermatology. Modern integrative approaches respect natural mineral cures, sustainable sources, and traditional knowledge systems. Standardization and the safety assessment, however, are crucial.[17,18,19]

**11. Cultural and Psychological Aspects of Healing:** Red represents vitality, blood, energy, and protection. The perceived therapeutic benefits of color therapy may be influenced by its psychological component.[18,19]

**12. Sustainability and Ethical Considerations:** Because over-mining harms ecosystems, traditional communities rely on deposits, and ethical extraction promotes sustainable healthcare practices, responsible sourcing is crucial.

**13. study limitations**: it includes a lack of regulated dosage, variable mineral composition, contamination hazards, and a small number of clinical trials. Future study should concentrate on controlled pharmacological studies, toxicology evaluation, and standardization techniques.

**14. Prospects for the Future: Possible field of study**

1. Topical wound treatments containing iron oxide
2. Dermatological powders based on minerals
3. Validation of traditional medicine
4. Applications of nanotechnology

**CONCLUSION**

Red ocher is much more than just a pigment; it is a mineral that has a long history of use in many different cultures' medical practices. Its astringent, cooling, and hemostatic qualities have made it useful in treating inflammatory problems, skin issues, and bleeding disorders, from Ayurvedic system of medicine Gairika to Unani system of mediciene Gil-e-Armani.

Although refined medicines have largely supplanted raw mineral therapies in modern medicine, increased interest in integrative and traditional systems may spur new research into the medicinal potential of red ocher. Prior to wider clinical adoption, proper purification, standardization, and research are crucial.

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