Murdarsang: An effective mineral origin Unani drug

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Abstract

Murdarsang is an exotic inorganic Unani drug whose description is traced to the times of Greco-Roman physicians, such as Hippocrates, Galen and Dioscorides. Dioscorides (circa 1st century CE) mentioned it in detail in his celebrated book 'Kitab al-Hashaish'. Etymologically, it is known as 'Litharge' in English lexicon which is derived from Greek 'Litharguros' (lithos meaning stone and arguros for silver) which forms as a 'waste' during the last stage of silver smelting. It is the mainly used externally, especially in almost all types of marahim (Unani ointments). It is also used in Ayurveda. Several Ayurvedic formulations contain Murdarsang. Chemically, it is monoxide of lead (Plumbi oxidum). Besides its medicinal use, it was used in refining process of silver in the minting technology during the Mughal times. It is one of the mineral forms of lead (II) oxide, PbO. Murdarsang (Litharge) is a secondary mineral which forms from the oxidation of galena ores. During the first century CE, both Dioscorides and Pliny, the Elder, discussed in great detail the preparation of lithargyros 'silver stone' and spuma argenti 'scum of silver'. The golden scum is obtained from the actual vein.

Keywords: Murdarsang, Lead oxide, Plumbi oxidum, Unani classical literature

Introduction

Murdarsang is an exotic inorganic Unani drug whose description is traced to the times of Hippocrates, Galen and Dioscorides, besides other Greco-Romanphysicians. Dioscorides (circa 1st century CE) mentioned it in detail in his celebrated book 'Kitab al-Hashaish'. Etymologically, it is known as 'Litharge' in English lexicon which is derived from Greek 'Litharguros' (lithos meaning stone and arguros for silver) which forms as a 'waste' during the last stage of silver smelting. It is the mainly used externally, especially in almost all types of marahim (Unani ointments). It is also used in Ayurveda. Several Ayurvedic formulations contain Murdarsang. Chemically, it is monoxide of lead (Plumbi oxidum). Besides its medicinal use, it was used in refining process of silver in the minting technology during the Mughal times (Haider, 2009).

Murdarsang is one of the natural mineral forms of lead (II) oxide, PbO. Litharge is a secondary mineral which forms from the oxidation of galena ores. It forms as coatings and encrustations with internal tetragonal crystal structure. It is dimorphous with the orthorhombic form massicot. During the first century CE, both Dioscorides and Pliny, the Elder, discussed in great detail the preparation of lithargyros 'silver stone' and spuma argenti 'scum of silver' for medicinal use of which Pliny in his Naturalis Historia says: “It is used to make an eye-wash and women's skin to remove ugly scares and spots and as a hair-wash. Its effect is to dry, to soften, to cool, to act as a gentle purge and to fill-up cavities caused by ulcers and to soften tumours. It also removes erysipelas and likewise chilblains”. Both authors apparently rely on the same source of information concerning the metallurgical background of its production.

Dioscorides described its three types in his 'Kitab al-Hashaish'. According to him lithargyros is ‘one is made from sand called molybdites which is roasted until it is totally burned, another from silver, a third from lead. The Attic is excellent, the second is from Spain, followed by those from Dikaiaarchia and Sicily” and Pliny notes “The same mines also produce the mineral called spuma argenti (scum of silver). Of this, there are three (3) kinds, with Greek names meaning respectively golden (chrysitima), silvery (argyrigitima) and leaden (molybditima). In silver smelting, silver-bearing...
lead ore is first smelted to gain metallic lead which collects all the silver present, while the gangue minerals form the slags, or skoriai (Rehren et al., 1999).

**Ethno-pharmacological description**


Al Biruni described it as Mudarsanj in detail in his celebrated book titled “Kitab al Saidnah fil al Tib”. According to Al Biruni: “It is litiharusus in Roman and mardakha and yaffyra in Syriac language. It is martsang in Persian. Khalil says that “it is martuj while Hamzah calls it murdahsang”, whereas Dioscorides says: “Some kinds are made from a special variety of sand, some from rasas”. In the Al-Hawi, a statement has been attributed to the Cato the Censor to the following affect: “Muldirina and mulidhana which have been described earlier are cooler and more refrigerant than litharge.” Suhar Bakht says that “it is refined martak and it is white in color” (AlBiruni, 1973).

Murdarsang is a murakkab (compound) drug made from lead, salt, vinegar etc. It is a heavy yellowish stone. It is said to be of best quality having the characteristics of ashfini, bright reddish and brittle (Baghdadi, 2005; Kabiruddin, 2007).

It is made up of rang (galai), silver and gold. Its color is red whereas yellowish-red color while made from silver (Ghani, ynm).

Murdarsang is of two types: syah and zard. Its zard type is best which bitter, charpara in taste and hot (Krishan, ynm). Its color zard and sunhara and baraq and insipid in taste (Fazalullah, ynm).

Ibn Hubal Baghdadi (2005) quoted Jalinoos that it neither does tanqiya nor produces any dirt. It has no role in increase or decrease in flesh. It is just only an ingredient of marham. According to others, it helps growing flesh in wounds. White maghsool murdarsang is used in surna and cleans eyes. It is a muthlik-e-zahar (antidote), and its use causing anuria, ballooning of stomach and ureter, whitening of tongue, causes dyspnoea and suffocation. In the area of madraul-nahar, women used it as a drink to the children for treatment of diarrhoea and colitis. Some people say that these women used murdarsang in a small quantity in water for children (Baghdadi, 2005).

Kushta made up of Murdarsang is effective in amraz-e-barida ratba. It is useful in sual, zeeg-un-nafas, aatishak, suzak, jiryan and fsad-e-khoon. Its kushta is also used as aphrodisiac. It is antidote for summiyat (poisoning).

There are three (3) dosage forms of murdarsang mentioned in ‘Miftah al-Khazain’ by Mohammad Firozuddin as under:

(a). Salaya  
(b). Ehraq  
(c). Kushta (Firozuddin, 1924)

Ibn Baitar quoted Dioscorides regarding types of murdarsang. It has four (4) types as follows:

(a). Moalid neetas: This type is made up by moalid-e-aneetas rage which means resasi. It is prepared after heating to fire.

(b). Arkhusatas: This is prepared by lead.

(c). Aryuneetas

(d). Fleedas: It is prepared from silver.

Another type of Murdarsang is mentioned as red and shiny stone which is called as hoarsatash means sunahir. It is one of the best types of Murdarsang which is used in this study. Ibn Baitar quoted Jalinoos regarding some facts about Murdarsang. It creates dryness like minerals as stones and salts (hajri and arzi), but it has less property of mujaffif (desiccant). It also has property of quwwat-e-qabiz and jila. It is a very effective medicine for sahej-e-ran. Mom is used as an excipient in medicines. White Murdarsang keeps removal of bad smell of sweating of underarms.

According to Balinas, when Murdarsang is dipped into sirka (vinegar), its turshi (acrid) turns into sheerini (sweetness), and when mixed with chuna (lime) applied onthe body, color of the skin is changed to black (Ibn Baitar).

As per Ishaq bin Amran, it is added in various types of haqna used for treatment of is’hal. Murdarsang and kibreet are taken in equal quantity, triturated in sirka and roghan-e-aas till it become viscous like honey, it is used in pitti, aabl-e-jild (Ibn Baitar).

Ibn Baitar quoted Ibn Sina that women used it in quruh-e-ama and khalfi in children. Initially, it is placed into a kooja (crucible) to lower down its toxic effect. It is qabiz and habis-e-baul, it produces nafakh in shikam and halibain (ureters). It causes khunaq and tangee-e-tanaffus (Ibn Baitar, 2003).

According to Mir Mohammad Shirazi, Murdarsang is made by the incineration process of sisa, qalai and faulad. It is in different colors, namely surkh, baniex, or rasasi. Best type is of fair yellow and baraq color. In the procedure of taklees, it is made of tin, silver and gold. It is not used internally (Shirazi, ynm). Murdarsang is a red stone and its powder is yellowish red. It is prepared by takhtyo seesa (Anonymous, 2006).

In Zakhira Khwarzam Shahi, it is mentioned that Murdarsang is effective in female diseases, such as waram-e-rahem and quruh-e-rahem (Jurjani, 1878). Murdarsang used in refining process of silver (Haider, 2009). It is used as a whole in the form of powder (Baghdadi, 2005; Shirazi, ynm). Specimen of Murdarsang is shown in figure 1.
Mizaj (temperament) of this mineral drug described in Unani classics is Dry and weak in Hot & Cold (Baghdadi, 2005), Hot and Dry (Kabiruddin, 2007; Khan, 1907; Singh, 1977), Wet and Dry (Ghani, ynm), Hot and Dry (Shirazi, ynm), Hot and Dry (Ahmed, 2013; Fazalullah, ynm), and 500 mg (Ahmed, 2013).

Chemical description
Lead oxides also known as litharge, it is of a light yellow color mixed with red and has a metallic lustre, and is available in pieces or powder and resembles with mica in appearance (Ahmed, 2013).

Lead (II) oxide or litharge, is a yellow oxide of lead of formula PbO, created by heating lead in air. It can also be formed by heating lead (II) nitrate (\(\text{Pb(NO}_3\text{)}_2\)). Litharge is amphoteric, meaning it reacts with acids to form Pb\(^{2+}\) and with bases to form plumbate (II). PbO=lead (II) oxide=Lead monoxide= CAS (Chemical Abstract Service) # 1317-36-8

Pb3O4=Lead tetroxide=Red lead oxide= CAS# 1314-41-6

IUPAC Name: Lead (II) oxide

Physico-chemical Properties of Murdarsang:

- Appearance: Red or Yellow powder
- Atomic weight: 207.2
- Chemical formula: PbO
- Molar mass: 223.20 g/mol
- Density: 9.53 g/cm\(^3\)
- Melting Point: 888 °C (1,630 °F; 1,161 K)
- Boiling Point: 1,477 °C (2,691 °F; 1,750 K)
- Specific Gravity: 9.53
- Solubility in water: 0.017 g/L
- Solubility: Insoluble in dilute alkalis, alcohol soluble in concentrated alkalis soluble in HCl, ammonium chloride (Ahmed, 2013)

Chemical classification
Litharge (Lead (II) Oxide), Lead Monoxide TSCA (SARA Title III) Status:

(a). It is a poisonous yellow or reddish-yellow solid
(b). RTECS (Registry of Toxic Effects of Chemical Substances) Number : OG1750000

Litharge (Lead (II) Oxide), Lead Monoxide Chemical Abstract Service (CAS) Number: 1317-36-8

a) PbO = Lead (II) oxide = Lead monoxide = CAS# 1317-36-8
b) Pb3O4 = Lead tetroxide = Red lead oxide = CAS# 1314-41-6

Litharge (Lead (II) Oxide), Lead Monoxide EINECS (European Inventory of Existing Chemical Substances) Number: 215-267-0

Actions and therapeutic uses of murdarsang
Muhallil-e-Waram (Anti-inflammatory): Ghani, ynm; Shirazi, ynm; Krishan, ynm; Fazalullah, ynm2002; Khan, 1874
Mugharri (Emollient): Baghdadi, 2005; Shirazi, ynm
Akkal (Corrosive): Kabiruddin, 2007; Ghani, ynm; Ahmed, 2013; Fazalullah, ynm; Singh, 1977
Qabiz(Astringent): Baghdadi, 2005; Nadkarni,1976; Ibn Baitar, 2003; Ghani, ynm; Shirazi, ynm; Ibn Sina, 2007; Ahmed, 2013; Fazalullah,ynm; Khan, 1874
Jali (Detergent): Baghdadi, 2005; Ibn Baitar, 2003; Kabiruddin, 2007; Ghani, ynm; Shirazi, ynm; Ibn Sina, 2007; Fazalullah, ynm; Singh, 1977
Muhallil (Resolvent): Baghdadi, 2005; Shirazi, ynm
Munaqqi (Expellant): Ibn Sina, 2007
Mualatiff (Demulcent): Ibn Sina, 2007
Munaffis-e-Balgham (Expectorant): Kabiruddin, 2007; Ibn Sina, 2007; Krishan,ynm
Munaffis-e-Balgham (Expectorant): Kabiruddin, 2007; Ibn Sina, 2007; Krishan,ynm
Munaqqi-e-Zakhm: Shirazi, ynm; Singh, 1977
Mujaffiff (Desiccant): Kabiruddin, 2007; Shirazi,ynm; Ibn Sina, 2007; Fazalullah, ynm;Khan, 1874
Laza (Irritant): Ibn Baitar, 2003
Insecticide: Nadkarni, 1976


*Manay-e-Kasrate Tahlul wa Takkul*: Baghdadi, 2005

*Moallid-e-Laham Salah*: Shirazi, ynm

*Musaddud*: Shirazi, ynm

*Samm-e-Qatil* (Fatal Poison): Baghdadi, 2005

*Mundamil/Khatim* (Cicatrizant): Ahmed, 2013


Therapeutic uses with their references

*Amraz-e-Rahem* (Uterine disorders): Tabri, 2010

*Waram-e-Rahem* (Metritis): Al Razi, 2001; Jurjani, 1878

*Quruh-e-Rahem* (Uterine ulcer): Jurjani, 1878; Anonymous, 1987


*Sartan* (Cancer): Aslam, 1981


*Muattir* (Aromatic): Baghdadi, 2005; Ghanvi, ynm; Shirazi, ynm


*Qatay-e-Laham Jayed*: Shirazi, ynm

*Jarb* (Scabies): Shirazi, ynm; Khan, 1874


*Jaampan* (Baldness): Fazalullah, ynm; Nadkarni, 2007; Ghani, ynm


*Charab*: Ghani, ynm; Shirazi, ynm

*Kalaf* (Melasma): Baghdadi, 2005; Ghani, ynm; Shirazi, ynm; Ibn Sina, 2007; Singh, 1977

*Kharish* (Itching): Nadkarni, 2007; Baghdadi, 2005; Ghani, ynm; Shirazi, ynm; Ibn Sina, 2007; Fazalullah, ynm; Nadkarni, 2007

*Amraz-e-Jild* (Skin diseases): Nadkarni, 2007; Ghani, ynm; Shirazi, ynm; Krishan, ynm; Fazalullah, ynm; Nadkarni, 2007

*Bastoor-e-Ras*: Fazalullah, ynm

*Ganjpan* (Baldness): Fazalullah, ynm; Nadkarni, 2007; Ghani, ynm

*Amraz-e-Shikam* (Intestinal disorders): Krishan, ynm

*Hikka* (Pruritus): Khan, 1874

*Qatil-e-Joo*: Ghani, ynm

*Kharish-e-Ama*: Baghdadi, 2005; Ghani, ynm; Fazalullah, ynm


Spots of chicken pox and jhayiya: Baghdadi, 2005; Ghani, ynm; Ibn Sina, 2007; Shirazi, ynm

*Is’hal* (Diarrhoea): Baghdadi, 2005; Ghani, ynm; Shirazi, ynm; Fazalullah, ynm

*Zakhm-e-Ama*: Ghani, ynm; Shirazi, ynm

*Surkh Bada*: Shirazi, ynm

*Sahej-e-Ama*: Shirazi, ynm

*Suul* (Cough): Ahmad, 2013; Firozuddin, 1924

*Zeeq-un-nafas* (Asthma): Ahmad, 2013; Firozuddin, 1924

*Quruh* (Ulcer): Ahmad, 2013

*Aatishak* (Syphilis): Firozuddin, 1924

*Suzak* (Gonorrhoea): Firozuddin, 1924

*Fasad-e-Khoon*: Firozuddin, 1924

*Jiryan* (Spermatorrhoea): Firozuddin, 1924

*Tipyaq* (Antidote): Firozuddin, 1924

Lead Poisoning: Moknatjou et al., 2012

Non-medicinal Uses

Glazing pottery; Glass flux for painting; Lead glass; Metal cement with Glycerol; Storage batteries; Ointments and Plasters; Preparing lead sub acetate solutions. Producing iridescent colours on brass and bronze; Colouring sulfur-containing substances; Pigment for rubber; Oil refining; Varnishes, Paints, and Enamels; Assays for precious metal ores.

Different formulations

(1) External Use


*Qairooti Quruha Anaf* (Anonymous, 2006)

(2) Internal Use

*Habb-e-Leemun* (Anonymous; 2016)

*Kushta-e-Mudarsang*, *Salaya Mudarsang* (Firozuddin, 1924)

Toxicity

Ibn Baitar (2003) quoted Dioscorides regarding toxicity of Mudarsang’s oral intake which causes severe spasmodic pain. Occasionally, intestines gain heaviness, and rupture and body gains aamas. Ibn Baitar mentioned Al-Razi for the management of its poisonous effects.
Physico-chemical studies

Appearance : Solid
Color : Yellowish Brown
Smell : Odorless
Loss in weight on drying at 1050 (%): 0.90, 0.80, 0.90
Total ash (%): 7.50, 8.80, 8.75
Solubility in water (%): 5.00, 5.50, 5.00
Solubility in acid (1N HCl) (%): 9.50, 10.00, 10.00
Lead (%): 46.50

Clinical study

Anti-scarbys study

Rahman et al. (2015) carried out a clinical study to compare the efficacy of a herbominera Unani formulation with benzyl benzoate in scabies. Litharge was also an ingredient of the composition of this Unani formulation. In the present study, 86.67 and 90% patients were cured in the test and control group respectively. In this clinical study, no adverse effects were noted. The test formulation was as effective as benzyl benzoate in alleviating scabies. Thus, it was concluded that litharge was useful in the treatment of scabies.

Conclusion

Most of the population prefers usage of Unani medicines for their health in India. In Unani classical literature, there is vast experience-based evidence present for many of these drugs. It is widely used as a medicine especially in marahim (Unani ointments). Unani physicians had also described various uses of Murdarsang for cosmetic purpose. The drug extensively has been used for various human disorders as is evident from Unani classical literature. In current scenario scientific studies have been performed on Murdarsang namely, physicochemical and clinical studies. More researches can be done to exploit the unexplored potentials of Murdarsang which have already been mentioned in Unani classical literature.

Conflicts of interest

There is no conflict of interest.

References


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