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Review Paper

Neela Thotha (Copper sulphate): An important mineral drug of Unani medicine to be used in the management of various ailments

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Abstract

Neela Thotha (Copper sulphate) is a mineral origin drug in Unani system of medicine (USM). Chemically, it is known as copper sulphate that formulated as CuSO_4 . It is used by various Unani scholars to manage different ailments in effective and safe manner as *Mufrad* (single) and *Murakkab* (compound) form viz. *Amrad Jild* (skin disease), *Amrad Chashm* (eyes diseases), *Amrad Nizam Hadm* (GIT diseases), *Amrad Tansuliya* (sexually transmit diseases), *Amrad Dimag* (brain diseases), *Amrad Tanffus* (respiratory disease) and Poisoning of certain substances. A review was done by bibliographic database from ScienceDirect, Medline, PubMed, Embase, Scopus, Ebsco Publishing's Electronic Databases, and Scirus. Search was done by using key words viz. '*Neela Thotha*', 'Copper sulphate', '*Tootiya*', and ' CuSO_4 ', literature of *Neela Thotha* was also collected from the renowned Unani text book viz. *Khazain-ul-Advia*, *Mohit-e-Azham*, *Makhzan-ul-Mufradat*, and *Mufradat-e-Azizi* and also from standard conventional books viz. Indian Medicinal Plants, and Parikh's Textbook of Medical Jurisprudence Forensic Medicine and Toxicology. In conventional medicine *Neela Thotha* considered as poisonous substance characterized by colicky abdominal pain, vomiting, diarrhoea, severe headache, albuminuria, dyspnoea, circulatory failure, coma and death and avoids its use in human being. While in USM after proper detoxification of *Neela Thotha* is used in various ailments. *Neela Thotha* and its formulations have been claimed by Unani scholars to be useful in the management of various ailments. In this article authors have an attempt to explore properties and used of *Neela Thotha* in several ailments.

Keywords: *Neela Thotha*; *Tootiya*; CuSO_4 ; Copper sulphate; Copper

1. Introduction

The traditional system of medicines viz. Unani, Ayurvedic, Siddha and Chinese medicine exist since antiquity. The principles of all alternative system of medicine are based on history and philosophical relationship between nature, life, health, and disease¹. Unani system of medicine originally derived from Greek based on seven natural factors that contributes to build up living body including Human viz. *Arkan* (element), *Mizaj* (Temperament), *Akhlat* (Humours), *A'aza* (Organs), *Arwah* (Sprit), *Quwa* (Power) and *Afal* (functions)^{2, 3, 4, 5}. Hippocrates (*Buqrat*) purpose most acceptable theory that "the disease and health of individual mainly depend on equilibrium between *Akhlat-i-Arba* viz. *Dam* (Blood), *Balgham* (Phlegm), *Safra* (Yellow bile) and *Sauda* (Black bile) with respect to *Kaifiyat* (Quality) and *Kimiyat* (Quantity)^{6, 5}. If imbalance occurs in between them either in *Kaifiyat* or in *Kimiyat* leads to varieties of *Amrad* (diseases) based on culprit *Akhlat* (humours) viz. *Amrad Damwi*, *Amrad Balghami*, *Amrad Safrawi*, and *Amrad Saudawi*^{2, 5}. In USM, *Amrad* successfully treated through different modalities viz. *Ilaj bi'l-Ghiza* (Dietotherapy), *Ilaj bi'l-Tadbir* (Regimental therapy), *Ilaj bi'l-Dawa* (Pharmacotherapy) and *Ilaj bi'l-Yad* (Surgery) based on

principle of *Ilaj bi'l-Zid* (Hetrotherapy). *Ilaj Bil Dawa* is one of the most popular and acceptable method of treatment that includes drugs of *Nabatat* (Plants), *Haiwanat* (Animals), and *Jamadat* (Minerals) origin^{3, 5, 7}. Mineral origin substances used in pharmacy or medicine since long time by all existing system of medicine including USM. These substances (chemical entity or drug) may contain their therapeutic uses either intrinsic or extrinsic form but may causes toxicity in higher dose⁸. Chemical substances is either work as a drug or poison (depends on dose), world health organization (WHO) define as "Drug is any substance or product that is used or is intended to be used to modify or explore physiological system or pathological states for the benefit of the recipient"⁹. Any substances that produce toxic effect in human body after administration are called poison. Therefore, a medicine in their toxic dose is a poison and a poison in low dose is may be a drug¹⁰.

Neela Thotha is mineral origin drug that widely described in USM with respect to their uses, toxicity and antidote in numerous conditions¹¹. It has several pharmacological actions like *Qabid* (Constipative), *Muqi* (emetic), *Habis al-dam* (Coagulant), *Muqawwi Dam* (erythropoietic), *Musaffi Khoon* (Blood Purifier), *Daf-i-Tasannuj* (Antispasmodic),

Akal (Corrosive), *Muhallil* (resolvent), *Mujafif* (Desiccant), *Muqawwi A'sab* (Nervine tonic), *Mukhrij Balgham* (expectorant), *Daf-i-Ta'affun* (anti-infective). *Neela Thotha* with therapeutic dose used in various diseases like *Qarooh* (Ulcer), *Qarooh-i-Atishak* (syphilitic ulcer), *Qula* (stomatitis), *Ishal* (diarrhoea), *Zujam* (leprosy), *Atishak* (syphilis), and *Zeequn Nafas* (Asthma).^{11, 12, 13}. In high or non-therapeutic dose of *Neela Thotha* is associated with toxic effect, characterized by nausea, vomiting, abdominal pain, diarrhoea, jaundice, muscle cramps, circulatory collapse, convulsion, coma, and even may death occurs^{10, 14, 13}.

Since literature available on this important drug is very scant therefore, in the present paper authors have an attempt to compile the available information on *Neela Thotha* and its different formulations so as to bring to light the therapeutic potential of this lesser known drug of Unani system of medicine.

2. Methodology

A review of literature on *Neela Thotha* was done based on bibliographic database viz. Science Direct, Scopus, Pub Med, and Google Scholar. Important informative data were also collected from classical and conventional textbook like *Muhit-i-Azam*, *Qarabadin-i-A'zam*, *Khazain-Al-Advia*, *Qarabadin Najm-Al-Ghani*, *Bustan-al-Mufradat*, *Makhzan-Al-Mufradat*, *Kitab-ul-Taklees*, *Almukhtarat Fi'l-tib*, *Mufta-ul-Khazain*, *Bayaz-e-Khas Al Maruf Ilaj-ul-Amraz*, National Formulary of Unani Medicine, *Al-Jamiul Mufradat al-Advia wa al-aghzia*, *Ilmul Advia Nafisi*, *Kitab Al-fath fi Al-Tadawi*, *Advia Ma'dania*, India Medicinal Plant, Essentials of Medical Pharmacology, Parikh's Textbook of Medical Jurisprudence Forensic Medicine and Toxicology, and Casarett and Doull's Toxicology and the Basic Science of Poisons.

3. Result and Discussion

3.1 Description of Neela Thotha in ancient literature

Neela Thotha is a crystallized blue color salt that soluble in water^{11, 12, 13, 14, 15, 16}. It is odourless, bitter, salty or astringent in taste and changes the color water into blue.¹¹. Roughage of Copper surfaces is produces *Neela Thotha* on heating while without heated roughage called as *Moor Thotha*¹⁷. *Moor Thotha* or *Moor Tuth* resembles with feather color of Peacock and also prepared from *Taijab-i-Gandhak*. Metallic Copper is non-poisonous substances but certain compound viz. *Nila Tutia* (Blue Vitriol or copper sulphate), *Zangal* (Verdigris), Arsenite and Aceto arsenite^{10, 11}. *Moor Thotha* is more toxic than *Neela Thotha* in respect to toxicity^{11, 14}. *Neela Thotha* may produce their toxic effect on its internal administration and precaution should be taken before and after use¹⁴. In low doses it acts as *Qabid* (Constipative) and *Muqi* (emetic) in high dose^{13, 14}. It is two types namely *Neela Thotha* and *Tootiya sabj*¹⁷. One of the chemical compounds of copper is Copper sulphate (CuSO₄)¹⁰. In Unani System of Medicine, Copper sulphate is described under name of *Neela Thotha*¹¹. General population are exposed from copper that largely present in nature in the form of food, beverages and drinking water. The Oral intake of copper sulphate rapidly release copper that produces varieties of toxic effect viz. Metallic taste, Salivation, Thirst, Nausea, Vomiting, Burning Stomach, Abdominal Pain, Diarrhoea, Jaundice, Hepatic necrosis, haemolysis, methaemoglobinaemia, acute kidney injury, urine with albumin and casts, circulatory collapse, Muscles cramps, convulsion, Coma and death^{10, 18, 19}.

3.2 Ethnomedicinal Uses of Neela Thotha

In USM, *Neela Thotha* after detoxification used to treat several adverse condition of body. Emesis process is induced by *Neela Thotha* (in 5-10 grain dose, 1grain=15.58mg) in cases of poisoning due to *Afeem* (*Papaver somniferum*), *Jojmathil* (*Datura stramonium*) and *Tambaku* (*Nicotiana tobacum*)¹¹. *Neela Thotha* is also used in poisoning of *Samiyat Mukhaddira* for induction of emesis^{13, 15, 20}. Diarrhoea and dysentery is managed by mixture of *Afeem* (0.5-1 grain) and *Neela Thotha* (0.25-2 grain) to reduced the frequency of defecation¹¹. Due to astringent properties of *Neela Thotha* our renowned physician Hakim Kabeeruddin is mentioned it's used in diarrhoea and dysentery in low dose but act as emetic agent in high doses^{13, 14}. *Neela Thotha* (0.25grain) along with *Qunain* (*Cinchona officinalis*) also used in treatment of *Sara* (Epilepsy)¹¹. *Pichkari* (Irrigation) of *Neela Thotha* is beneficial in the treatment of acute or chronic *Aatshak* (Syphilis), *Juzam* (Leprosy), and white discharge from uterus viz. leucorrhoea^{11, 13, 15}. Application of *Neela Thotha* (2-3 ratti, 1ratti=124.62mg) on weak ulcer, oral ulcer, and throat ulcer due to Syphilis is beneficial¹¹. *Marham* of *Neela Thotha* is apply on *Kharab Goast* (Morbid meat), chronic ulcer and ulcers caused by syphilis. Its solution also used to wash surfaces of ulcers^{13, 15, 14}. *Akal* (Corrosive) property of *Neela Thotha* is claim to be used in *Kikrow* (Trachoma) and *Sulaaq* (Tarsitis / Blepharitis) and ulcer of *Aatshak*^{13, 15}. *Batti* (A long strip) is prepared by using *Neela Thotha* and *Phitkari* (alum), or *Shora* (potassium nitrate) and apply it slowly and softly on inner surface of eyelids in case of *Kikrow* and *Sulaaq*¹⁴. In several text books of Unani Medicine also indicate that *Neela Thotha* is used to resolve *Waram* (swelling), *Bad* (axillary lymphadenopathy), eliminate intestinal worm, removed morbid *Balgham*, to clean eyes and remove redness and to reduced pain. Roasted *Neela Thotha* and half roasted *Suhaga* (Boric acid) in equal quantity are taken to prepare tablets of pearl millet size and 1-3 tablets are used in children with *Zabha* (Pneumonia), vomiting and diarrhoea. Prepared mustard grain size tablet by using *Magaj-i-Karanjwa* (one piece) and *Neela Thotha Sabj Kham* or *Neela Thotha* (1gm) along with Jiggery prepared and used asthma. *Sahab Majma al-jawame* claims that *Neela Thotha* used in *Aatshak* (syphilis), *Juzam* (Leprosy) and *Phoda* (abscess). *Neela Thotha* is also used in purification of water in 1:40, 00, 000 respectively by some Unani scholar like *Ibn-i-Zohar*¹¹. *Neela Thotha* used internally in syphilis, *Juzam* and *Amrad Damwi* due its *Musaffi Khoon* (Blood Purification). *Mukhrij Balgham* (Expectorant) property is used in several respiratory disorders viz. *Khunaq* (Diphtheria), *Zabha* (pneumonia), *Waram Hanjra* (Laryngitis) and *Waram sa'ab* (Bronchitis)^{13, 14, 15}. Hakim Kabeeruddin in his book *Kitab al-taklees* and *Ilmul Advia Nafeeshi* claims that *Kushta* of *Neela Thotha* is used in *Bawaseer* (Pile), *Aatshak* (syphilis), *Nasur* (fistula), *Dama* (asthma), chronic fever, Ulcer, and *Amrad Jild* (Skin disorders)^{12, 15}. The *Sanoon* (Tooth powder) of *Neela Thotha* is used in teeth disorders viz. ulcer on gingiva, and unstable teeth. It combines with other drugs for treatment of *Qula* (stomatitis) and *Akal-i-Dahen* (Oral ulcer)¹⁵. Hakim Karim Bakhs state in his book *Muftah-ul-Khazain* that *Neela Thotha* and its compound formulation claimed to be used in Asthma, *Daba atfal* (Pneumonia), *Suzak* (gonorrhoea), *Nasur* (fistula), *Bawaseer* (Piles), *Aatshak* (Syphilis), non-healing ulcer, *Amrad-e-Chasm* (eyes disease), *Taun* (Plague), *Amrad Ishal* (Diarrheal disease), and *Waram litha* (gingivitis),^{14, 15, 17}

3.3 Unique preparations of Neela Thotha for various ailments:

Unique preparations of *Neela Thotha* for various ailments mentioned below in table No. 1^{12, 17}.

Table 1: Showing different dosage form and composition of *Neela Thotha* (copper sulphate)

S.No.	Dosage form	Composition	Quantity	Diseases
1	<i>Qurs</i>	<i>Neela Thotha</i> (7gm) and <i>Qand Shiya</i>	1 with warm water for 7 days	Asthma
2	<i>Hab</i> (Tablet) of millt size	<i>Tutiya Sabj</i> (1 part) and <i>Suhaga</i> (0.5 part)	1-3 with mother milk	Childhood pneumonia
3	<i>Safoof</i> (Powder)	<i>Tutiya Sabj</i> (1tola) and <i>Dhoop safaid</i> (1tola)	1 Chutki with <i>Rogan-i-zard</i>	Gonorrhoea and Fistula
4	<i>Zumad</i> (Paste)	<i>Neela Tutiya</i> (1gm), <i>Murdar sang</i> (1gm), <i>Khar Mohra zard</i> and <i>Chikni supari</i> (1 adad)	Local application	Pile
5	<i>Sanoon</i> (Tooth Powder)	<i>Neela Tutiya</i> , <i>Phitkari</i> , <i>Sang Zarahat</i> , and <i>Supari Sokhta</i> in equal quantity	Local application	Loosen Teeth
6	<i>Safoof</i>	<i>Tutiya Sabj</i> (4gm), <i>Sangraf Biryani</i> (8gm) and <i>Murdar sang</i> (8gm), <i>Phitkari Zard Sokhta</i> (8 no), <i>Supari Sokhta</i> (8 no), <i>Zangar</i> (8gm) and <i>Raal</i> (8gm)	0.5-1 ratti, Orally	<i>Sujak</i> , <i>Aatshak</i> , <i>Quruh Khabisha</i> , <i>Nasur Mujmin</i>
7	<i>Hab</i> of Gram size	<i>Tutiya Sabj</i> (1tola), <i>Kamaila</i> (1tola), <i>Kath Safaid</i> (1tola), <i>Supari mujmin</i> (1tola), <i>Raskapoor</i> (1tola), <i>Ilaichi</i> (1tola)	1 tablet with fresh water	<i>Aatshak</i> and <i>Suzak</i>
8	<i>Safoof</i>	<i>Neela Tutiya</i> and <i>Nishasta</i> in equal quantity	One Pinch	<i>Margajida</i>
9	<i>Kushta</i>	<i>Tutiya Sabj</i> (1tola) and <i>Sang Zarahat</i> (1tola),	Local application	Bawaseer
10	<i>Kushta</i>	<i>Neela Tutiya</i> (2 tola), and <i>Post Reetha</i> (250gm)	Orally, 1 ratti with butter	<i>Aatshak</i>
11	<i>Kushta</i>	<i>Neela Tutiya</i> (1tola) and <i>Sheera Zaquim</i>	Orally, 0.5 ratti with Butter	<i>Aatshak</i> , <i>Suzak</i> , <i>Bawaseer</i> and <i>Nasoor</i>
12	<i>Kushta</i>	<i>Tutiya Sabj</i> (2 tola), <i>Tambaku</i> (250gm)	1 ratti with <i>Balayi</i>	Asthma
13	<i>Kushta</i>	<i>Tutiya Sabj</i> (6gm), <i>Kaphor</i> (2 tola),	2-4 <i>Chawal</i> with butte	<i>Aatshak</i> , <i>Suzak</i> and <i>Bawaseer</i>
14	<i>Kushta</i>	<i>Tutiya Sabj</i> (2 tola), <i>Sankh</i> (2 tola), and <i>Hadtal darqiya</i> (2 tola)	1 ratti with <i>malayi</i>	Chronic fever, <i>Humma Arba'</i>
15	<i>Kushta</i>	<i>Neela Tutiya</i> (2tola) and <i>Barg Neem</i>	0.5 ratti	<i>Aatshak Mujmin</i> and <i>Amrad Jild</i>

3.4 Properties of *Neela Thotha* in Unani Medicine

a. Vernacular Name

Verdigris, Crude Copper sulphate, Blue Copper, Blue Stone, *Zajul-akhzar*, *Totia akhzar*, *Zake-Sab*, *Totia sabz*, *Neela Thotha*, *kabood*, *Nila Thotha*, *Totia hindi*, Blue Vitriol, *Tutne*, *Tuntiya*, *Tutia*, *Neela Thotha* ^{11, 13, 21, 22, 23, 24, 25}

b. Mizaj (Temperament)

Temperament of *Neela Thotha* has been described to be *Har* and *Yabis* (Hot & Dry) in third degree ¹¹. According to another statement, the temperament of *Neela Thotha* has been described to be *Har* and *Yabis* (Hot and Dry in 4th degree) ^{13,14, 15, 20}.

c. Pharmacological Actions

Muqi (Emetics), *Qabid* (Astringent), *Habis al-dam* (Coagulant), *Muqawwi Khoon* (Blood tonic), *Muassfi Khoon* (Blood Purifier), *Daf-i-Tasannuj* (Antispasmodic), *Daf-i-Taffun* (Anti-infective), *Akkal* (Corrosive), *Tiryaaq* (Antidotes), *Muqawwi A'sab* (Nervine tonic), *Mujafif* (Desiccative), *Mukhrif Balgham* (Phlegmagogue), *Munaffis* (Expectorant) ^{11,12,13,14,15,20,26}

d. Therapeutic Uses

Neela Thotha is used after making it *Mudabbar* (detoxified). It is used in *Humma* (Fever), *Amrad Jild* (Skin disease), unplegent smell, *Quruh Khabisha*, *Juzam* (Leprosy), *Kikrow* (Trachoma) and *Sulaaq* (Tarsitis / Blepharitis), *Dabba Atfa'l*, *Zeequn Nafas*, *Khunaq wabayee* (Diphtheria), *Jabha*, *Waram Khanjra*, *Sa'ab Ria* / *Waram Sa'b* (Bronchitis). *Neela Thotha* is especially used in *Suzak Mujmin* (Chronic Gonorrhoea) and *Sailan al-Rherm Mujmin* (Chronic leucorrhoea), *Aatshak* (Syphilis), *Amrad Fasad-i-Khoon*, *Sara* (Epilepsy), *Ra'asa* (Tremor), *Ahetenaq al-rhem* (Hysteria). It is also used in *Qula* (Stomatitis), *Listha Damwia* (Pyorrhoea), *Bhagandar* (Fistula), *Dysentery*, *Diarrhoea*, *Bawaseer Khooni*, *Gum Ulcer*, *Qula Dahan*, and *Akala Dahan*. Emesis induces by *Neela Thotha* in poisoning of *Afeem* (Opium), *Dhatura* (*Dhatura stramonium*), Tobacco, *Samiyat Mukhadira* and Snake bite ^{11, 12, 14, 15, 17, 20}.

e. Substitute

Abdal-e-Advia (interchange of drugs) is one of the important principles that govern the rules pertaining to interchange of drugs. In case of non-availability of a drug like *Neela Thotha*,

Unani scholars have suggested substitutes of this drug namely *Zangar* (Copper disulphide).

f. *Nafah Khas* (Main action)

Neela Thotha is used in the treatment of Ulcer, kidney diseases and also in the treatment of poison ^{13, 14, 20}.

g. *Musleh* (Corrective)

Neela Thotha has been described as being harmful to gastrointestinal tract. *Roghan* and Butter are used as corrective agents to reduce its harmful effect on gastrointestinal tract. The corrective agents are supposed to modify the *Mizaj* of *Neela Thotha* to reduce its untoward effects on gastrointestinal tract. Since it possesses hot and dry temperament in third degree, therefore its desiccative property is reduced by combining it with *Roghan* or Butter ^{13, 14, 20}.

h. Adverse Effects

The adverse effects of *Neela Thotha* are mentioned in various classical books of Unani system of medicine like nausea, vomiting, gastritis, Dysuria, and corrosive to body organs and death. Its adverse effects minimized up to some extent by using of Milk, *Ghee* or *Lua'biyat* ¹¹. Poisoning of *Neela Thotha* is treated by gastric lavage of stomach content and use of egg white along with milk is also neutralized the toxic effect of *Neela Thotha* ^{13, 14}.

Poisoning of *Neela Thotha* is also managed through stomach washing with 1% solution of Potassium ferrocyanide to form insoluble cupric ferrocyanide, Albuminate copper by using albumin, use of demulcent fluids, and antidotes viz. Penicillamine, British Anti-Lewisites (BAL), and Ethylenediamine tetra acetic acid (EDTA) ¹⁰.

i. Dosage

In powder form of *Neela Thotha* or in *Kushta* (*calx*) form, it is used in the dose of 2-4 *Chawal* (30-60mg) ^{11,13,20}.

j. Fatal Dose

The fatal dose of *Neela Thotha* is mentioned 30 gm in different classical books of Unani as well as book of conventional medicine ¹⁰.

k. Fatal Period

The fatal period of *Neela Thotha* is mentioned 12-24 hours in classical books of Unani as well as modern books ¹⁰.

l. Advantages of Compound Formulation of *Neela Thotha*

A well-prepared *Kushta* (calcined) form or other dosage form (like *Hab*, *Qurs* and *Marham*) of *Neela Thotha* offers many advantages over plant medicines due to its longer shelf life, lesser dose, easy storability and better palatability ²⁷. A lot of compound formulation of *Neela Thotha* (copper sulphate) is mentioned in Unani system of medicine viz. *Akseer-i-Deedan*, *Barood Hasram*, *Barood Kafoori*, *Kahal al-jawahar*, *Kahal chikni dawa*, *Shiyaf Akseer Chasm*, *Shiyaf Naranji*, *Shiyaf zarab*, *Zumad jabar*, *Kahel Chikni Dawa*, *Kushta Tootia*, *Marham Aatshak*, *Habbe-e-Dad*, *Marham Nasoor*, *Marham Jangar*, *Marham Khanazeer*, *Habb-e-Daba atfal*, *Manjan Mufeed*, *Marham Sa'afa Kushta Tootia*, *Zaroor Parsi Zaroor ramadi*, *Zaroor sabal* and *Zaroor Mamiran* ^{11,12,20, 28, 29,30}.

m. Mudabbar of *Neela Thotha* (Detoxification of copper sulphate)

It is clearly mentioned in classical literature of Unani system of medicine and also in other traditional system of medicine that *Neela Thotha* in raw form is very toxic drug. Before administration of *Neela Thotha* in human beings it should be detoxify. Impurity of *Neela Thotha* removed through recrystallising process in aqueous solution and toxicity reduces by heating it after rubbing with honey and ghee in a crucible then dry in sunlight after mixing in whey (*Mattha*) or water for 3 days. ¹⁶

3.5 Commonly used formulations of *Neela Thotha* in Unani medicine

Kushta (solid), *Hab* (solid), and *Marham* (semi solid) are three important formulations of *Neela Thotha*. Since *Neela Thotha* is a metalloid origin drug, therefore it is preferred to be used in calcined form. The *Kushta* (*calx*) is prepared by heating *Neela Thotha* at a high temperature to oxidize it. The crude drug is however pretreated with some catalytic agents (particular herbal juice) to make it more efficacious. *Kushta Neela Thotha* possesses *Muqi* (Emetics), *Qabid* (Astringent), *Habis al-dam* (Coagulant), *Muqawwi Khoon* (Blood tonic), *Muassfi Khoon* (Blood Purifier) and *Daf-i-Tasannuj* (Antispasmodic) properties. It is used for the treatment of various ailments ^{11, 12, 13}.

a. *Hab-i-Dad* ³¹

Hab (pills) is defined as "any medicine having one or more drugs and mix together with water or a liquid in sufficient quantity to form into pills called *Hab*". The plural of *Hab* is called as *Habub*. The detailed ingredients, scientific name and their quantity are mentioned in table 2.

Table 2: Showing ingredients, scientific name and quantity of *Hab-i-Dad*

S.No	Unani Name	Scientific name	Family	Part use	Quantity
1	<i>Neela Thotha</i>	Copper Sulphate			25 gm
2	<i>Sohaga</i>	Sodium Borate			25 gm
3	<i>Gandhak Amla Sar</i>	Processed sulphur			25 gm
4	<i>Para</i>	Mercury			25 gm
5	<i>Ab-e-Limun</i>	<i>Citrus lemon</i>	Rutaceae	Fruits	40 ml

Method of preparation of *Hab-i-Dad*; Initially, *Para* and *Gandhak Amla Sar* mix together and triturate till powder is formed. After that powder of *Neela Thotha* and *Sohaga* is added and sieved with mesh number 100 and kneaded with *Ab-e-Limun*. *Hab* (Pills) of size number six is prepared, dried and preserved in a bottle. One pill converts into paste by using water or Lemon juice and applied on the dry lesion of Herpes and Taeniasis.

b. *Kushta Tutiya* (Calcined copper sulphate):

The word *Kushta* derived from *Kushtan* in Persian meaning to kill or conquered. In Unani *Kushta* define as "a medicine that is used in small quantity and effective immediately". It is a mixture of metals, metallic oxide, non-metals and their compounds ³¹. The contents of *Kushta* are oxidized by process of heating ³². The detailed ingredients, scientific name and their quantity are mentioned in table 3.

Table 3: Showing ingredients, scientific name and quantity of *Kushta Tutiya*

S.No	Unani name	Scientific name	Family	Part use	Quantity (gm)
1	<i>Neela Thotha</i>	Copper sulphate			60gm
2	<i>Ritha</i>	<i>Sapindus trifoliatus</i>	Sapindaceae	peels	125gm
3	Camphor	<i>Cinnamomum camphora</i>	Lauraceae	Terpenes	25

Method of preparation of *Neela Thotha*; initially pieces of *Neela Thotha* were spread out between the powders of *Ritha* (*Sapindus trifoliatus*) peel in earthenware. This mixture was dried by heating in an airtight Pyrex flask of *Gil-e-Hikmat*. It also burned again in a pit filled with 5kg cow-dung cakes. After that this mixture place between equal layer of camphor in a cup and heated after *Gil-e-Hikmat* with 5 kg of cow-dung. The light greenish-white *Kushta* of *Neela Thotha* is prepared, sieved and store in air tight bottle ³¹.

c. *Marham Aatshak*

Marham is a semisolid mixture of more than one ingredient with wax and oil. It is usually indicate by Unani scholar in the treatment of external inflammation, swelling, abrasions, wounds, cuts, boils, and pustules. The detailed ingredients, scientific name and their quantity are mentioned in table 4 ³¹.

Table 4: Showing ingredients, scientific name and quantity of *Marham Aatshak*

S.No	Unani name	Scientific name	Family	Part use	Quantity (gm)
1	<i>Neela Thotha</i>	Copper Sulphate			12gm
2	<i>Chobchini</i>	<i>Smilax china</i>	Smiliaceae	Bark	25gm
3	<i>Murdar sang</i>	Lead Oxide			25gm
4	<i>Arandi</i>	<i>Ricinus communis</i>	Euphorbiaceae	Oil	260ml
5	<i>Mom</i>	wax			25gm

Method of Preparation of *Marham Aatshak*; initially oil of *Arandi* (*Ricinus communis*) along with Lead oxide was placed in pan and heated it till color changed into black. Then wax was melt and mixed with this black color substances. After that discontinue heat and copper sulphate then *Chobchini* (*Smilax china*) was added and stirred, sieved with mesh number 100. After washing of affected area with *Azadirectha indica* decoction poultice of *Marham Aatshak* is applied. It is mainly used in syphilitic wound and chronic wound ³¹.

3.6 Morphological, Physicochemical and Clinical Studies on *Neela Thotha* (copper sulphate):

In this study Javed et al., was concluded that mixed powder of *Sheetraj Hindi* (*Plumbago zeylanicum*) in 100gm and *Neela Thotha* (Copper sulphate) 25 gm was used for duration of three month and observe as achieved cured in 6.37%, very good response in 7.00%, good response 26.33%, fair response in 25%, poor response in 16.47%, slow response in 15.5%, and no response in 3.33% of patients ³³

Haque et al., was stated that *Zimad-e-Jarb* composed of *Neela Thotha* (Copper sulphate); (*Gandhak Aamla Saar* (sulphur); *Kameela* (*Mallotus philipensis*); *Murdar-e-Sang* (litharge), and *Roghan-e-Zard* (Ghee). *Zimad-e-Jarb* and 5% Permethrin lotion was given to the Group A (n=20) and group B (10) for 7 days locally with the follow-up at 7th, 14th, and 21st days from onset of the treatment respectively. Assessments were carried out on subjective (erythema and papules) & objective viz. VAS (pruritus) parameters weekly three times. On Statistical analysis both the intervention had significant effect on objective parameters (p<0.01). However control drug has shown more pronounced effect than test drug and. The study revealed that *Zimad-e-Jarb* is effective in *Jarb* (Scabies) in terms of itching, erythema, papules and number of lesions without any side effect. ³⁴

Wang and Borison were concluded a study that copper sulphate has emetic property ³⁵.

Pullar et al., was concluded that treatment group (Copper sulphate 20 mg/day capsules with D-penicillamine 1000 mg/day) and placebo group (placebo 20 mg/day with D-penicillamine 1000 mg/day). Urinary copper was increased in the copper treated patients but no statistically significant difference occurred in Plasma viscosity, Haemoglobin, C-reactive protein, Caeruloplasmin, Articular index, Grip strength, Morning stiffness and Visual analogue pain scale (mm) in either group ³⁶

Tariq et al., (2014) were conducted a study on Preliminary physicochemical evaluation of *Kushta tutia* (KT); a Unani Formulation. Finished product was evaluated for physicochemical characteristics including preliminary tests mentioned in classical literature. Floating and finger test were positive. Curd test showed no discoloration after 48 h. These findings indicate correct preparation of *KT* according to classical literature. Bulk density (0.96 ± 0.00 g/ml); tapped density (1.53 ± 0.00 g/ml); Hausner ratio (0.62 ± 0.00), compressibility index (37.52 ± 0.19%); loss of weight on drying (0.08 ± 0.00%); pH of 1 and 10% (5.20 ± 0.00) and 5.62 ± 0.00, respectively; total ash, acid insoluble ash, and water soluble ash values 95.75 ± 0.09, 6.57 ± 0.02, and 45.02 ± 0.20%, respectively; and extractive values 0.85 ± 0.02% were reported in *KT*. Since this work has not been reported earlier, the results obtained could be considered as the standard for *KT* for future studies ³⁷

3.7 Pharmacological Studies on *Neela Thotha*

Kotrannavar and Badgar was done a study and concluded that *Tuttha Drava* (Copper sulphate solution) produced a significant antibacterial activity viz. *Tuttha Drava* exhibits good Minimum inhibitory concentration (MIC) affect on *Streptococcus pyogenes*, *Pseudomonas aeruginosa* ³⁸.

Vaishagh et al., were stated *Tuttha Bhasma* (copper Sulphate [CuSO₄.7H₂O]) is showed more antifungal properties than anti-bacterial properties ³⁹.

Mahapatra and Mahapatra were stated that *Shodhita Tuttha* was found to be more effective as compared to crude have antimicrobial properties viz. *Escherichia coli*, *Bacillus subtilis*, *Salmonella typhi*, *Staphylococcus aureus* bacteria's, *Candida albicans* and *Trichophyton rubrum* ⁴⁰.

4. Conclusion

Neela Thotha is a mineral origin drugs that described well in classical literature of Unani system of medicine. It has several properties and uses in varieties of topical and systemic *Amrad* (Disease) viz. *Humma* (Fever), *Bad* (Axillary lymph node swelling), *Quruh* (Ulcer), *Juzam* (Leprosy) *Kikrow* (Trachoma), *Sulaaq* (Tarsitis/Blepharitis), *Dabba Atfa'l* (Pneumonia), *Zeequn Nafas* (Asthma), *Khunaaq Wabayee* (Diphtheria), *Waram Khanjra* (Laryngitis), *Waram Sa'ab Ria* (Bronchitis), *Sujak Mujmin* (Chronic Syphilis) and *Sailan al-Rherm Mujmin* (Chronic leucorrhoea), *Amrad Fasad Khoon*, *Sara* (Epilepsy), *Ra'asa* (Tremor), *Ahetenaq al-Rahem* (Hysteria), *Qula* (Stomatitis), *Listha Damwia* (Pyorrhoea), *Bhagandar* (Fistula), *Dysentery*, *Bawaseer* (Pile) and Snake bite. But efficacy and safety of *Neela Thotha* are under proved. Therefore, in Unani system of medicine, it is a need of both preclinical and clinical trial on *Neela Thotha* to evaluate and validate the properties on scientific parameters.

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Conflict of Interest

No conflict of interest

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