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 CuSO4. 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 disease), Amrad Nizam Hadm (GIT diseases), Amrad Tansuliya (sexually transmit diseases), Amrad Dimag (brain diseases), Amrad Tanfus (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 ‘CuSO4’, literature of Neela Thotha was also collected from the renowned Unani text book viz. Khazins-ul-Advia, Mohit-e-Aazam, Mushkan-ul-Mufradat, and Mufradat-e-Razi 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; CuSO4; 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 disease 1. Unani system of medicine originally derived from Greek based on seven natural factors that contributes to build up living body including Human viz. Ark (element), Mizj (Temperament), Akhlat (Humours), Aza (Organs), Awah (Sprit), Qawa (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 Kafiyat (Quality) and Kiniyat (Quantity) 6, 5. If imbalance occurs in between them either in Kafiyat or in Kiniyat leads to varieties of Amrad (diseases) based on culprit Akhlat (humors) viz. Amrad Damvi, Amrad Balghami, Amrad Safrawi, and Amrad Saudawi 2, 5. In USM, Amrad successfully treated through different modalities viz. Ilaj bi’l-Ghiza (Dietherapy), 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), Haimwanat (Animals), and Jamdat (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 dose 8. 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 drug 10.

Neela Thotha is mineral origin drug that widely described in USM with respect to their uses, toxicity and antidote in numerous conditions 11. It has several pharmacological actions like Qabid (Constitiative), Muqit (emetic), Habis al-dam (Coagulant), Muqawumi Dam (erythropoietic), Musaffi Khoon (Blood Purifier), Daf-i-Tussanaj (Antispasmodic),
Aakal (Corrosive), Muhallil (resolvent), Mufajif (Desiccant), Muqawwi A’sab (Nervine tonic), Mukhri Balgham (Expectorant), Daf-i-Tau’afun (anti-infective). Neela Thotha with therapeutic dose used in various diseases like Qaroor (Ulcer), Qaroor-i-Atashak (syphilitic ulcer), Qula (stomatitis), Ishal (diarrhoea), Zujam (leprosy), Atshahak (syphilis), and Zeequan Nafas (Asthma). 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’azam, Khazain-Al-Adva, Qarabadin Najm-Al-Ghani, Bustan-al-Mufradat, Makhanz-Al-Mufradat, Kitab-al-Taklees, Almukhtarat Fi’l-tib, Musfa-ul-Khazain, Bayaz-e-Khas Al Maruf Ilaj-ul-Amraz, National Formulary of Unani Medicine, Al-Jamiul Mufradat al-Adva wa al-aghzia, Ilmul Adva Nafisi, Kitab Al-fath fi Al-Tadawi, Adva Mu’ad’ana, India Medicinal Paint, 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 astrignent 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 Taijib-i-Gandhak. Metallic Copper is non-poisonous substances but certain compound viz. Nila Tutia (Blue Vitriol or copper sulphate), Zangal (Verdigris), Arsenite and Aeto 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 use 14. In low doses it acts as Qabid (Constitutive) and Mugi (emetic) in high dose 13, 14. It is two types namely Neela Thotha and Tootiya sab 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, methemoglobinæmia, 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, 1 grain=15.58mg) in cases of poisoning due to Afeem (Papaver somniferum), Jojmathi (Datura stramonium) and Tambaku (Nicotiana tabacum) 11. Neela Thotha is also used in poisoning of Sambuyat Mukhadar (purulent induration) and Thoteh (Bacterial Infection). 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 defecation 11. 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. Pickhari (Irrigation) of Neela Thotha is beneficial in the treatment of acute or chronic Aatshak (Syphilis), Jazum (Leprosy), and white discharge from uterus viz. kucchormaha 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 beneficial 11. Marham of Neela Thotha is apply on Khbarb Goast (Morbid meat), chronic ulcer and ulcers caused by syphilis. Its solution also used to wash surfaces of ulcers 13, 14, 15. Akal (Corrosive) property of Neela Thotha is claim to be used in Kikrow (Trachoma) and Sulaaq (Tarstis / Blepheritis) and ulcer of Aatshak 13, 15. Batti (A long strip) is prepared by using Neela Thotha and Phtikkar (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 Warnam (swelling), Bad (axillary lymphadenopathy), eliminate intestinal worm, removed morbid Balgham, to clean eyes and remove redness and to reduced pain. Recommended Neela Thotha and halooasted Sahaga (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 Magaji-karanja (one piece) and Neela Thotha Sabj Kham or Neela Thotha (1gm) along with jiggery prepared and used asthma. Sahab Majma al-jawamee claims that Neela Thotha used in Aatshak (syphilis), Jazum (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, Jazum and Amrad Damwi due its Musaffi Khoon (Blood Purification). Mukhri Balgham (Expectorant) property is used in several respiratory disorders viz. Khnaaq (Diphtheria), Zabha (pneumonia), Waram Hanjra (Laryngitis) and Waram sa’ab (Bronchitis) 13, 14, 15. Hakim Kabeeruddin in his book Kitab-al-taklees and Ilmul Adva Nafeeshi claims that Kushta of Neela Thotha is used in Bawaseer (Pile), Aatshak (syphilis), Nasur (fistula), Dana (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-Dahan (Oral ulcer) 15. Hakim Karim Bakhs state in his book Muskuf-ul-Khazain that Neela Thotha and its compound formulation claimed to be used in Asthma, Daba asful (Pneumonia), Suzak (gonorrhoae), Nasur (fistula), Bawaseer (Piles), Aatshak (Syphilis), non-healing ulcer, Amrad-e-Chasm (eyes disease), Tsaw (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     | Qurs        | Neela Thotha (7 gm) and Qand Shiya | 1 with warm water for 7 days | Asthma |
| 2     | Hab (Tablet) of mill size | Tutiya Sabj (1 part) and Suhaga (0.5 part) | 1-3 with mother milk | Childhood pneumonia |
| 3     | Safoof (Powder) | Tutiya Sabj (1tola) and Dhoop safaid (1tola) | 1 Chutki with Rogan-i-zard | Gonorrhoea and Fistula |
| 4     | Zumad (Paste) | Neela Tutiya (1gm), Murdar sang (1gm), Khar Mohra zard and Chikni supari (1 adad) | Local application | Pile |
| 5     | Sanoon (Tooth Powder) | Neela Tutiya, Phitkari, Sang Zararat, and Supari Sokhta in equal quantity | Local application | Loosen Teeth |
| 6     | Safoof | Tutiya Sabj (4gm), Sangraf Biryan (8gm) and Murdar sang (8gm), Phitkari Zard Sokhta (8 no), Supari Sokhta (8 no), Zangar (8gm) and Raal (8gm) | 0.5-1 ratti, Orally | Sujak, Aatshak, Quruh Khabisha, Nasur Mujmin |
| 7     | Hab of Gram size | Tutiya Sabj (1tola), Kamaila (1tola), Kath Safaid (1tola), Supari mujin (1tola), Raskapoor (1tola), Ilaichi (1tola) | 1 tablet with fresh water | Aatshak and Suzak |
| 8     | Safoof | Neela Tutiya and Nishasta in equal quantity | One Pinch | Margajida |
| 9     | Kushta | Titiya Sabj (1tola) and Sang Zararat (1tola), | Local application | Bawaseer |
| 10    | Kushta | Neela Tutiya (2 tola), and Post Reetha (250gm) | Orally, 1 ratti with butter | Aatshak |
| 11    | Kushta | Neela Tutiya (1tola) and Sheera Zaqum | Orally, 0.5 ratti with Butter | Aatshak, Suzak, Bawaseer and Nasoor |
| 12    | Kushta | Tutiya Sabj (2 tola), Tambaku (250gm) | 1 ratti with Balayi | Asthma |
| 13    | Kushta | Tutiya Sabj (6gm), Kaphor (2 tola), | 2-4 Chawal with butte | Aatshak, Suzak and Bawaseer |
| 14    | Kushta | Tutiya Sabj (2 tola), Sankh (2 tola), and Hadtal darqiya(2 tola) | 1 ratti with malayi | Chronic fever, Humma Arba' |
| 15    | Kushta | Neela Tutiya (2tola) and Barg Neem | 0.5 ratti | Aatshak Mujmin and Amrad Jild |

3.4 Properties of Neela Thotha in Unani Medicine

a. Vernacular Name

Verdigris, Crude Copper sulphate, Blue Copper, Blue Stone, Zajul-akhzar, Totia akhazar, Zake-Sab, Totia sabz, Neela Thotha, kabood, Nila Thotha, Totia hindi, Blue Vitriol, Tutne, Tuniya, 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, 19.

c. Pharmacological Actions

Muqi (Emetics), Qabid (Astringent), Habis al-dam (Coagulant), Muqawwi Khoon (Blood tonic), Muassfi Khoon (Blood Purifier), Daf-i-Tasannuj (Antispasmodic), Dafi-Tajfun (Anti-infective), Akkal (Corrosive), Tiryaq (Antidotes), Muqawwi A’sab (Nervine tonic), Mujaffif (Desiccative), Mukhrjj Balgham (Phlegmogague), 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, Juzzam (Leprosy), Kikrow (Trachoma) and Sulquaq (Tarsitis / Blepharitis), Dabba Atfa‘l, Zeequn Nafas, Khunaq wabayee (Diptheria), Jabha, Waram Khanjara, Sa’ab Ria / Waram Sa’ab (Bronchitis), Neela Thotha is especially used in Suzak Mujmin (Chronic Gonorrhoea) and Sailan al-Rhern Mujmin (Chronic leucorrhoea), Aatshak (Syphilis), Amrad Pasad-i-Khoon, Sara (Epilepsy), Ra’asa (Tremor) , Ahetenaq al-rhan (Hysteria). It is also used in Qula (Stomatitis), Lisha Damwia (Pyorrhoea), Bhagandar (Fistula), Dysentery, Diarrhoea, Bawaseer Khooni, Gum Ulcer, Qula Dahren, and Akala Dahren. 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).

1. 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.

2. Muscleh (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 effect is reduced by combining it with Roghan or Butter 13, 14, 20.

b. 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 minimize up to some extent by using of Milk, Ghee or Luda'iyat 13. 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, Aluminate copper by using albumin, use of demulcent fluids, and antidotes viz. Penicillamine, British Anti-Lewisite (BAL), and Ethylenediamine tetra acetic acid (EDTA) 10.

i. Dosage

In powder form of Neela Thotha or in Kushta (calks) form, it is used in the dose of 2-4 Chawal (30-60gm) 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 Kafouri, Kahal al-jawahar, Kahal chikni dawa, Shiyaq Akseer Chasm, Shiyaq Naranji, Shiyaq zarab, Zamad jabar, Kahel Chikni Dawi, Kushta Tootia, Marham Aatshak, Habbe-e-Dad, Marham Nasoor, Marham Jangar, Marham Khanazeer, Hab-e-Daba atfal, Manjan Mufeed, Marham Sa'afa Kushta Tootia, Zaroor Parsi Zaroor ramadi, Zaroor sabal and Zaroor Mimarqir 13,12,20, 28, 29,30.

m. MudQabbar 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), Muasfi Khoon (Blood Purifier) and Daj-i-Istannya (Antispasmodic) properties. It is used for the treatment of various ailments 11,12,13.

a. Hab-i-Dad

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 pleural of Hab is called as Habub. The detailed ingredients, scientific name and their quantity are mentioned in table 2.

| S.No | Unani Name | Scientific name | Family | Part use | Quantity |
|------|-------------|-----------------|--------|----------|----------|
| 1    | Neela Thotha| Copper Sulphate |        |          | 25 gm    |
| 2    | Sohaga      | Sodium Borate   |        |          | 25 gm    |
| 3    | Gandhak Amla Sar | Processed sulphur |        |          | 25 gm    |
| 4    | Para        | Mercury         |        |          | 25 gm    |
| 5    | Ab-e-Limun  | Citrus lemon    | 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. Kusha Tutiya (Calced copper sulphate):

The word Kusha derived from Kushan in Persian meaning to kill or conquered. In Unani Kusha 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 Kusha are oxidized by process of heating 32. The detailed ingredients, scientific name and their quantity are mentioned in table 3.
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 5 kg 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.

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

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

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 melted 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 Azadirachta indica decoction poultice of Marham Aatshak is applied. It is mainly used in syphilitic wound and chronic wound 31.

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

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

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, 65.75 ± 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*

Kotranavar and Badgar was done a study and concluded that Tutttha 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.

Vaishag 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 49.

4. Conclusion

Neela Thottha 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 Amrod (Disease) viz. Humna (Fever), Bad (Axillary lymph node, swelling), Qura (Ulcer), Juzam (Leprosy) Kikrow (Trachoma), Salaaq (Tarsitis/Blepharitis), Dabba Atfa’i (Pneumonia), Zeequn Nafas (Asthma), Khuonaq Wabayeey (Diphtheria), Waram Khanjira (Laryngitis), Waram Sa’ab Ria (Bronchitis), Suyak Muyjin (Chronic Syphilis) and Sailan al-Rherm Muyjin (Chronic leucorrhoea), Amrad Fasad Khoon, Sara (Epilepsy), Ra’asa (Tremor), Ahetenaq al-Rahem (Hysteria), Qala (Stomattis), Lista Damvia (Pyorrhoea), Bhagandar (Fistula), Dysentery, Bawaseer (Pile) and Snake bite. But efficacy and safety of Neela Thottha are under proved. Therefore, in Unani system of medicine, it is a need of both preclinical and clinicial trial on Neela Thottha to evaluate and validate the properties on scientific parameters.

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Conflict of Interest

No conflict of interest

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