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Review Article

Role of Unani Medicines in Oro-Dental Diseases: A Comprehensive Review and Scientific Evidence

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Abstract

Background: Unani system of medicine originated in ancient Greece, with the teachings of Buqrat (Hippocrates, 460-377 BC); and was introduced in India by the Mughal emperors. In Unani medicine, diseases and drugs are classified on the basis of *mizaj* (temperament) which is one of the fundamental

concepts of Unani medicine. Oral health is given special emphasis in Unani medicine due to the understanding that diseases of the mouth affect eating and nutrition which may affect all systems of the body. Oro-dental diseases are described extensively in Unani literature in a systematic manner and many drugs such as *Aqar Qarha* (*Anacyclus pyrethrum* DC.), *Kaat safed* (*Acacia catechu* Willd.) etc are described which have shown promising results in recent scientific studies.

Methodology: First, a review of Unani classical books was completed and the drugs to be further researched were selected. Then, a search was made on major scientific search engines regarding scientific evidence of their efficacy and safety.

Conclusion: The Unani drugs mentioned in classical literature have shown promising results as anti-inflammatory, antipyretic, antiseptic, anti-bacterial, anti-fungal and anti-ulcerative agents in many oral disorders. Also, most of the drugs have a multi-dimensional action which is both curative and preventive.

Key words: *Amraz-e-lissa wa dandan*; Oro-dental; Caries; Stomatitis; Mouth; Teeth

1. Introduction:

Unani system of medicine is a traditional system of medicine which has its origin from Greece and is widely known as *Greeko Arab* medicine and practiced on the basis of principles given by *Jalinoos* (Galen); a *Greek physician* [1]. Around 500 B.C., Unani Medicine was practiced by *Buqrat* (*Hippocrates*) who is well known as the father of medicine [2]. It was introduced in India by Mughal emperors in tenth century. Presently, Unani system of medicine enjoys an official status as one of the alternative systems of medicine in India [1,2,3]. As claimed by a survey, about 70-80% of the population in the developing countries is dependent upon the traditional system of medicines for their basic healthcare needs [4,5]. These medicines may be derived from plant, animal or mineral source, of which plant origin drugs are most commonly used in Unani drugs [6,7].

Unani drugs have been used in both single as well as compound formulations to manage numerous health problems. Numerous single and compound drugs have been mentioned in Unani medicine which in a variety of oro-dental disorders [8,9]. Various ailments of oral cavity can be treated by Unani medicines like toothache, gingivitis, stomatitis, bleeding gums, plaque, tooth decay and dental caries etc. *Al-Qanoon fil Tibb* (The Canon of Medicine) of the legendary Unani physician Ibn Sina (980-1037 AD) is considered the most comprehensive textbook of Unani medicine. In *Al-Qanoon*, the chapter on oral diseases is divided into three sections, viz (i) diseases of tongue, (ii) diseases of teeth and (iii) diseases of gums and lips. In the section of teeth disorders, Ibn Sina first describes the measures to prevent teeth disorders. Then, there is a description of the general line of treatment of teeth disorders. He states that teeth have a *barid* (cold) temperament. Therefore, the medicines used should be such that they restore the original temperament. In addition, most of the drugs prescribed in teeth disorders have a *mujaffif* (desiccant) action. Drugs are prescribed for both oral and local use [10].

***Mizaj-e-Advia* (temperament):** Of Unani drug is of 5 types; *Har ratab* (hot and wet) *Har yabis* (hot and dry) *Barid ratab* (cold and wet) *Barid yabis* (cold and dry) and *Mo'tadil* (normal). *Mo'tadil* is further divided into 4 categories; *Har mo'tadil* (normal but slightly dominant towards heat), *Barid mo'tadil* (normal but slightly dominant towards cold), *Yabis mo'tadil* (normal but slightly dominant towards dryness) and *Ratab mo'tadil* (normal but slightly dominant towards wetness).

Degrees of Mizaj-e-Advia: Known as *Darajaat e Advia* in Unani system of medicine are as follows; 1- *Darjah awwal* (1st degree). In this degree, the drug has very mild action and shows no effect externally and prolonged use or high doses have a little chance of disturbance in the function of the body. 2- *Darjah sani* (2nd degree). In this degree, the drug has moderate action and shows its effect after first (therapeutic) dose. In high doses or on prolonged use, these drugs have no adverse effect or disturbance. 3- *Darjah salis* (3rd degree). In this degree, the drugs have strong action and may have side effects even with single dose. In high doses, even in short-term use, they may have severe adverse effects, but are unlikely to be fatal. 4- *Darjah rabe* (4th degree). In this category, the drugs are commonly poisonous in nature and may be fatal on first use. These types of drugs should be used only after *tadbeer* (purification process) [8].

2. Methodology: Unani classical literature was first searched extensively for single drugs prescribed in dental diseases. Author also visited the Library of School of Unani Medical Education and Research, Jamia Hamdard, Delhi, India regarding ancient and recent Unani literature. In the next step, we searched for scientific evidence on the use of drugs in dental diseases. The keywords 'teeth', 'dental', 'caries', and 'oro-dental' were searched with the name of each drug on major scientific websites like Scopus, PubMed, Google Scholar and Science Direct. After the literature search, twenty drugs were included in the present review on the basis of availability, cost-effectiveness and scientific evidence of efficacy. No time limit was set to gather maximum information on the traditional and contemporary use of drugs.

3. Selected drugs in the management of oro-dental diseases

Many drugs described in Unani literature have been used since centuries as folk and traditional medicine in various oral health problems. They are used as anti-inflammatory, antipyretic, antiseptic, anti-bacterial, anti-fungal and anti-ulcerative agents. Interestingly, recent scientific researches have generated strong evidences which provide irrefutable evidence that the philosophy behind diagnosis and prescription in Unani medicine is based on rational thinking and reasoning, rather than mere unsubstantiated theories. The details of some of the selected drugs used in oral disorders are discussed below in the light of Unani medicine and contemporary knowledge. The important details of these drugs are summarized in Table-1.

3.1 Aqar Qarha

Aqar Qarha (*Anacyclus pyrethrum* DC.) is a useful medicinal drug which is used in Unani system of medicine and Ayurveda. This drug is obtained from Arabs in Ayurvedic literatures under the name of *Akarakarbha* a word of Sanskrit [11,12]. It is found in North Africa, cultivated in Arabian countries and also cultivated in northern part of India [13]. The part

of this drug used medicinally is the root under the name of *Aqar Qarha* [14].

***Mizaj* (Temperament):** *Har Yabis* (hot and dry) in 3rd degree [15,16,17,18].

Action and Uses: Almost all Unani scholars mentioned its efficacy in teeth, gums and throat related illnesses like toothache, dental caries [19]. instability of teeth, pyorrhea, *Luknat* (stammering in speech) and *Waja ul lisan* (flaccidity of tongue). They used it in various forms like *sufoof e sinoon* (tooth powder), *ghararah* (gargle), and *qurs* or *hab* (tablet and pill) in combination of other related drugs [18].

The root of *Aqar Qarha* is reported for anti-inflammatory activity [20]. immune-stimulating activity [21]. and antioxidant property [22]. A study was done on cancer cells which proved its anti-cancer activity [23]. *Aqar Qarha* has antibacterial effect against some of the oral bacteria as shown in an in-vitro study [24].

3.2 Aqaqia (*Babool*)

Aqaqia (*Acacia arabica* Lam) is a famous tree in India, known as babool, used in Unani System of Medicine for treatment of different health problems and belongs to the family Leguminaceae [6,25,26].

***Mizaj* (Temperament):** Most of the unani physicians mentioned it *Har yabis* (Hot and Dry) in 2nd degree, while few other unani scholars considered its temperament as *Barid yabis* (Cold and Dry) in 3nd degree [6,11,27].

Action and Uses: In Unani literature *Aqaqia is used as Qabiz* (Astringent) [11,15,17]. *Habis e dam* (Haemostatic), *Mujaffif e rutoobat* (Desiccant), *Mubarrid* (cooling), *Muqawwi aam* (General tonic) [18]. *Mufatteh e sudad* (Deobstruent), *Muqai* (emetic), *Mundamil e qurooh* (wound healer) [11]. Crushed leaves are very effective as gargle in mouth ulcer, sore throat cleaning mouth and have good medicinal use in bleeding gums and provide strength to teeth [11]. Small branches are very beneficial for strengthening of teeth in *miswak* form (traditional twig brush) [18,28].

It has very potent antibiotic property against four types of bacteria: *Bacillus subtilis*, *Staphylococcus albus*, *Streptococcus faecalis*, *E. coli* and two types of fungal strains: *Candida albicans and Aspergillus flavus* [29]. Bark powder of this plant has antioxidant property because it can scavenge the free radicals. A study revealed that *A. nilotica* (*A. arabica*) has natural antioxidants, which is used in cancer, diabetes, inflammation, etc [30,31]. In a study the potential of wound healing and haemostatic properties have also been reported [32]. Anti-plaque and anti-gingivitis efficacy of *Acacia arabica* has been proven in a study where it was used as toothpaste [33].

3.3 Gil e Armani

Gile-Armani (Armenian Bole) is an earthy substance (clay material) and one of the drugs obtained from the mineral source, which is used in Unani System of Medicine since early times. It is a reddish-black or reddish brown, smooth and clear earthy material [11,14,18,34].

***Mizaj* (Temperament):** *Barid and Yabis* (cold 1^{o} and dry 2^{o}) [11,18].

Action and Uses: Major actions of *Gile-Armani are -Qabiz* (astringent), *mujaffif* (desiccant), *habis e dam* (haemostatic), *dafe e ishal* (anti-diarrhoeal), *habis e nazf al dam* (anti-haemorrhagic), *mudammil e qurooh* (anti-ulcer), *muhallil e auram* (anti-inflammatory), dafe e humma (antipyretic) and *dafe e ta'affun* (antiseptic) [6,11,18,35]. It is very beneficial in *kasrat e luab* (excessive secretion of saliva) and *sailan fi al naum* (drooling of saliva in sleep) and also effective in *qula e dahen* (stomatitis) and *qrooh e muta'affana fi al fam* (septic ulcer of mouth) [36].

3.4 Filfil Siyah

Filfil e Siyah (*Piper nigrum* Linn., Family: Piperaceae) is derived from Persian literature and it is one of the oldest spices widely used in Indian subcontinent and the world. It is used in Unani system of medicine due to its efficacy in various health problems. It is commonly known as *Black Pepper* in English, *kali mirch* and *golmirch* in Urdu and Hindi while *Filfil e aswad* is mentioned in Arabic literature. India is the largest producer (about 25%) of *Filfil siyah* [13,25,26].

***Mizaj* (Temperament):** *Haar-Yabis* (Hot & Dry) 3^{o} [11,37].

Action and Uses: *Filfil e Siyah* is known for its *Muhallil e Auram* (Anti-inflammatory) [1]. *Muqawwi e jigar* (Liver tonic) [1,11,22]. *Muharrik e qalb* (cardiac stimulant) [18]. *Jaali* (Cleanser) [14,18,34]. *Dafe e dard* (Pain Reliever) properties. *Filfil Siyah* can be given as *Muksir e luab e dahan* (saliva producer) [18]. It is very effective in *Waja ul asnan* (Toothache) [6].

A study reported that antibacterial activity of black pepper (*Piper nigrum* Linn.) to inhibit the growth of Gram positive as well as Gram negative bacteria. Some in-vivo and in-vitro studies have revealed that *Piper nigrum* has a good potency for anti-oxidant activity and reducing free radicals [38,39]. Its antioxidant efficacy has been shown in *Alzheimer's disease* in an in-vivo study [40]. Some in-vitro and in-vivo studies have confirmed the anti-cancerous activity of this drug [41,42].

3.5 Gul e Surkh

Gul-e-Surkh (rose) is the flower of the plant *Rosa damascena* Mill [26]. It is commonly known as *gulab* in India and an aromatic and medicinal herb used for several health problems. It is called "king of flowers" due to its fragrance. It is very important medicine described by the Unani physicians from early times. Various types of this flower are found throughout the world, those with strong fragrance and reddish in color have more potential than others [14].

Temperament: Ibn Sina described it to be of *Mo'tadil* (medium) temperament [11]. whereas, it is considered *Barid* and *Yabis* (cold 1^{o} and dry 2^{o}) by some other scholars [14].

Action and Uses: *Muhallil e awarm* (anti inflammatory), *musakkin e safra* (relieving in bilious problems) [17] *mufarreh* (exhilarant), *rade* (repellant), *muqawwi-e-meda* (stomachic), *muqawwi-e-jigar* (liver tonic) [43]. *Habis* (desiccant), *qabiz* (astringent), *muhallil* (resolvent), *mufatteh* (deobstruent) [11].

Gul-e-Surkh is used in many health problems like *dard e sar* (headache), *dard e chashm* (eye pain), *dard e gosh* (pain in ear), *dard e maqad* (pain in ano), *kharish*, wound, *nafas ul dam* (haemoptysis), *sudad e jigar* liver obstruction, *amraz-e-halaque* (throat ailments), *qurooh e lissa* (wound of gums), *qula e dahen* (stomatitis) and *dard-e-lissa wa dandan* (pain in gums and toothache) [14]

Some in-vivo studies, the Analgesic property have been reported in Hydroalcoholic and ethanol Extracts [44,45]. Essential oil and absolute extracts of *Gul e Surkh* revealed the Antibacterial activities [46,47,48]. Hydroalcoholic, ethanol extracts of fresh flower, spent flower and essential oil has been reported for their antioxidant effects [49,50,51]. Hydroalcoholic extract is also reported for Anti-inflammatory property [52].

3.6 Gulnar Farsi

Gulnar is the flower of *Punica granatum* Linn**.** **(**Family: *Punicaceae*.) used in Unani system of medicine [53,54]. Egyptian physicians used it as medicinal drug as written in *Eber's papyrus* of Egypt about 1550 BC [55].

Temperament: Its temperament is *Barid* and *Yabis* (cold and dry) [18].

Actions and uses: The whole plant of *Gulnar Farsi* (rind, flower, leave, fruits, and bark) is used in Unani system of medicine, in various forms like *joshanda* (decoction), *sufoof* (powder), *qurs* (tablet) etc. The Unani physicians used to use the Gulnar Farsi as *qabiz*, *habis*, *mujaffif*, *jazib* etc. In the form of powder it is effective in cough, haemoptysis, bronchitis, tuberculosis [11,56,57].

The juice of flowers is effective in sore throat [25]. It is useful in gingivitis, toothache, bad smell and bleeding gum in the form of *Sinoon* (tooth powder), paste and gargle [11,25,56]. The paste of flowers is used with vinegar for healing of wounds and ulcers [14].

Peel, rind and seed extract in a significant dose orally given in diabetic rats produced antiulcer effect [58]. An in-vitro study showed that Hydro-alcoholic extract of its fruit is effective in removing dental plaque [59].

3.7 Heel e Khurd

Heel e khurd (Cardamom) is commonly known as 'queen of spices' is widely used in Indian foods. *Elettaria cardamomum* is a member of family *Zingiberaceae* [26]. Small cardamoms are popularly known as '*chhoti elaichi*' and it is medicinally important drug used in Unani system of medicine [11,60]. It is widely cultivated in India and Sri Lanka and is native to these countries [61].

***Mizaj* (Temperament):** *Har* and *Yabis* (Hot and Dry) in 2nd degree [6,18].

Actions and Uses: *Heel e khurd* used in *nafakh e shikam* (Flatulence), *zo'f e hazm* (indigestion). It is used as *carminative*, *diuretic* and *digestive* medicine. It can be given in renal problems [11,60]. It is effective in infections of teeth and gums and ilaichi oil is used in toothache [36,62]. It has Anti microbial property and very effective against the pathogens responsible for oral candidiasis [63].

Hepatoprotective Activity has been confirmed in an in-vivo study [64]. A study claimed that it has broad spectrum anti biotic properties in which Albino mice has been used for study [65]. Cardamom oil showed antioxidant efficacy in an in-vitro study [66]. In local application, its efficacy has been reported for tumors of the uterus [67].

3.8 Kaat safed

Acacia catechu Willd. (*Mimosaceae*) is commonly known as *Khair* in northern parst of India. In Unani system of medicine, the name of this plant is *kaat safed*. In India, several varieties of *kaat safed* is found and used for medicinal purposes, like; *Catechu*, *Catechuoides* and *Sundra* etc. In North India, it is commercially used to obtain *Katha* (extracted form of khair wood) [11,13,68,69,70].

***Mizaj* (Temperament):** *Barid and Yabis* (cold and dry) in 2nd degree [71].

Action and uses: *Habis* (desiccant), *Qabiz* (astringent), *Dafe e ta'affun* (anti septic), *Musaffi e dam* (blood purifier), *Mujaffif e qurooh* (desiccative for ulcer) and *Qatil e kirm e shikam* (anthelmintic). The decoction of bark can be given in cold and cough. The decoction is more potent to treat severe diarrhea. *Sinoon* (powder) is can be useful in mouth ulcer. It gives strength to roots of teeth and gums and applied in mouth to cure *waram e lissa* (gingivitis), *lissa damia* (bleeding gums) and *Qula e dahen* (stomatitis) in *Zaroor* (dusting powder) form, it is useful in different types of ulcers [11,36,70]. *Kat safed* is very effective in bleeding gums and ulcers as disinfectant [71].

Ethanol and aqueous extract of *Kat Safed* are reported as anti-bacterial drug due to presence of toxifoline in this plant [72].

Another study showed the efficacy of *Acacia catechu* against microbes responsible for dental caries [73]. Claimed by a study that a significant decreasing in *plaque*, *gingivitis* and *dental calculus* [74]. Antiulcer activity of this drug has been explained by an in-vivo study [75].

3.9 Kabab Chini

Kabab chini (*Piper cubeba*) is distributed in tropical and subtropical areas and it has medicinal properties for various purposes. It is imported from Singapore, and cultivated in India, especially in the Mysore region. The genus *Piper* belongs to the family Piperaceae [25,26].

***Mizaj* (Temperament):** According to Ibn-Sina is *Har Yabis* (Hot and dry 2nd Degree) and some other Unani physicians considered it in 3rd Degree of *Har Yabis* [11].

Action and Uses: *Habis* (Astringent), *Dafa-e-Taaffun* (Antiseptic), *Mutayyibe Dahan* (Mouth Refreshner), *Muqavvi Jigar* (Hepatoprotective), *Kasir-e-Riyah* (Carminative) and *Muqavvi-e- Medah* (Gastrotonic), *Muhallil* (Anti inflammatory), *Musakkin* (Sedative) [34,76,77]. *Kabab chini* is used in the treatment of various diseases such as *Amraz-e-Aaza e Tanasul wa Baul* (Genito urinary disease), *Hasaat e Gurdah wa Masana* (Kidney and Bladder stones), *Waram* (Inflammation), *Khafqaan* (Palpitation), *Dard e sar* (Headache), *Quroohe fam* (Mouth ulcer), *Bukhoor e fam* (Halitosis), *Sudad-e-Jigar* (Hepatic obstruction), *Waram-e-Masana*

(Cystitis), *Qurooh-e-Majari e Baul* (Urogenital Ulcer), *Waram e lissa Mut'affinah* (Septic Gingivitis), *Qulaa-e-Dahen Mut'affina* (Septic Stomatitis), *Qurooh* (Ulcers), *Taqtir-ul -Baul* (Dribbling of urine) [16,36,10].

Kabab chini has good antimicrobial activity against the bacteria like *S. aureus* and *K. pneumonia* and fungi like *Aspergillus niger* [78]. *Kabab chini* has potent antioxidant activity due to presence of free radical scavenging activity in ethanolic extracts [79]. *Kabab chini* has been experimented for Anti inflammatory and analgesic activities in vivo [80]. Ethanolic extract was studied for prevention of CCl4-induced hepatic damage in rats and proved as hepatoprotective medicine [81].

3.10 Kababa Khandan

Kababa Khandan is locally known as *Nepali Dhania* in Hindi, *Tumbru* in Sanskrit and *Toothache plant* in English. It is the fruit of *Zanthoxylum armatum* DC [11,25]. It is used in Unani system of medicine and one of the active parts of "*Majoon-e-suranjan*" and "*Zuroor-e-Qula"* [36,82].

***Mizaj* (*Temperament*):** *Har and Yabis* (Cold and Dry) 2^{o} [70].

Action and uses: *Kababa Khandan* can be given in gastric problems, piles, cardiac diseases, respiratory diseases and rheumatism. It is useful in dental ailments [11,36]. The massage of the bark powder adjoin with honey is very effective in *Lissa damia* (bleeding gums) [36,56]. In *Qula e dahen* (stomatitis), decoction can be useful as a gargle. Chewing of bark is beneficial for *waja ul asnan* (toothache).

Fruit's essential oil has antibacterial properties against *E. coli*, *S. typhi*, *S. aureus* and *V. cholerae* [83]. Essential oil of Z. *armatum* was tested for antifungal activity [84]. It has good anti-helminthic activity as tested against cestode in ethanol extract of the stem bark with alcoholic and chloroform extracts. Essential oil has good results for anti-helminthic properties and found more potent than piperazine phosphate [83]. *Kababa Khandan* was tested for anti proliferative activity and its bark is potent to decrease the human keratinocytes proliferation [85]. It was also studied in vitro for Antioxidant activity in ethyl acetate extract [86].

3.11 Kafoor

Kafoor is an Arabic word. In India, it is available in the market under the name of *Kapur* and 'chalk' due to its white colour [87]. Historically, it is evident that it was first described by the Arabs. No evidence of its description as a medicinal agent is found before the advent of Islam. It has been used in India from the period of 5th or 6th century A.C [88]. It is found in India, China and Formosa and widely cultivated in India [89].

***Mizaj* (Temperament):** *Barid and yabis* (cold and dry) in 3^{rd} degree [17,90,91].

Actions and Uses: *Kafoor* is *musakkin e alam* (analgesic), and effective in management of pain [6,11,18].

Kafoor is *mufarreh* (exhilarant) and *dafe e humma* (antipyretic), it is used to reduce the temperature and having efficacy for treating spasmodic pain. It is given for vaginal wash due to its anti itching property [18,92].

Kafoor is useful in *amraaz-e-harrah* (hot aliments) of the whole body especially in brain. It is because of *barid and lateef* (cold and subtle) property [91].

Kafoor is a *lateef* (light) drug and removes *ufoonat* (sepsis) and *maddah e haarah* (hot materials) [90]. *Kafoor* is effective in *waja ul asnan* (toothache) and *bakhr ul fam* (halitosis) [70]. It is very beneficial in *Qula e dahen* (stomatitis) and *busoor e fam* (oral ulcers) [36].

In vitro antimicrobial activity has been proved against the tested microbes compared with *ampicillin* by the *disc diffusion method*. The methanol extract was found more potential on *Staphylococcus aureus* than on *Escherichia coli* [93]. In that study, it was tested that the antioxidants found in this plant were able to inhibit the DPPH radicals at room temperature. Results revealed that 1- butylalcohol fraction of peel showed very good radical scavenging activity. Thus it also has antioxidant properties [93]. Another in vitro study has explained that *C. camphora* total extractions showed anti-inflammatory properties [94].

3.12 Neem

Neem (*Azadirachta indica* A. Juss) [26]. is the most widely used traditional medicinal plant in India. It is very useful drug in oral disorders due to its diverse medicinal actions. Each part of the neem tree have a medicinal value. It is native to India and found in tropical and subtropical region having great medicinal properties [11].

Mizaj (Temperament) : *Har and Yabis* (Hot and Dry) in first degree [70].

Action and Uses: *Dafe e dard* (analgesic), *Qatil e deedan* (anti-helminthic), *Qatil e jaraseem* (antibacterial), *Mudammil e qurooh* (antiulcer), *antifungal*, *Muhallil e auram* (anti-inflammatory), *Dafe e vairusi* (antiviral), *Dafe e humma ujamia* (antimalarial), *Mudirr e baul* (diuretic), *dafe e bukhar* (antipyretic), *dafe e ghudood e khabisa* (antitumor), *nafe e ziyabetis* (hypoglycaemic), *Muharrik e mana'at* (immunomodulator) [55,95]. *Neem* has been used medicinally for thousands of year. It has been in Ayurveda before 4000 years. All parts of *Neem* have been used by the Unani physicians like fruits, seeds, oil, leaves, roots and bark [96]. A solution or gel prepared by neem-extract can be given in *Hafr ul asnan* (plaque) and *iltihab e lissa* (gingivitis) for removing of bacteria [97]. and inhibited bacterium causing tooth decay and treats primary dental caries [98].

Wound healing activity of *Neem* was experimented in a study in vivo and a significant result displayed [99]. The free radical scavenging activity (antioxidant capacity) has been proved due to inhibitory action on stable radical 1, 1-diphenyl -2-picrylhydrazyl (DPPH) [100]. A moderate anti-malarial efficacy of the bark and leaf of *Neem* was revealed as a result in vivo on *Plasmodium yoellinigeriensis* infected mice [101]. Another in vivo study revealed the anti tumor efficacy of *Neem* [102].

3.12 Miswak (Peelu)

Peelu is dried root and branches near ground of *Salvadora persica* Linn, family *Salvadoraceae.* It is one of the oldest plants mentioned in Unani literature under the name of *Miswak* or *Siwak* and also mentioned in Islamic holy books. Its roots and

branches are used as toothbrush sticks for cleaning of the teeth [103].

"The Prophet (S.A.W.) said, It (i.e. siwak) is a purification for the mouth and it is a way of seeking Allah's pleasures." [104].

Action and Uses: It prevents candidiasis due to antifungal properties [105]. Miswak is very efficient to reduce *waram e lissa* (gingivitis) and *hafr ul asnan* (plaque) [106]. It decreases inflammatory condition of gums [107]. It is a good herb for treating *dental caries* and many companies used its extracts in toothpaste. The chemical present in this plant is very beneficial for treating *gingivo-stomatitis*. The bark of stem is very effective in all types of gastropathy [108].

Miswak extracts was studied for antimicrobial and antifungal activities [109]. The result of an in vitro study revealed that diluted acetone extract of dry *Miswak* has antifungal activity against oral Candida albicans, Candida glabrata, and Candida parapsilosis strains (zone of inhibition range: 10.33–15 mm) using the extract concentration of 300 mg/ml [105]. A clinical trial found that the dental carries decreases after using *Miswak* and this might be because of antimicrobial property [110]. Miswak decoction possesses very good antiulcer and anti-inflammatory properties as found in vivo studies [111,112].

3.13 Podeena

Podeena (*Mentha arvensis* Linn) is a herb belonging to the family *Lamiaceae* [25]. and is an aromatic plant cultivated in India. It is broadly used in pharma, and cosmetic industries [113].

It is used in Unani System of Medicine while few Unani physicians used it under the name of *Misni* [114]. According to the Unani physicians it has three types '*jungli*, *pahari* and *bustani*. In Arabic literature it is of three more varieties *barri*, *kohi* and *nahri*. It is also mentioned in classical literature of Ayurveda [11].

***Mizaj* (temperament)** *Har and Yabis* (Hot and dry) 2^{o} [11].

Action and Uses: Anti-bacterial, antiseptic, antifungal, antipyretic, anti emetic, anti inflammatory, anti ulcer, mouth freshener, anti-hemorrhagic etc [115,116]. *Podeena* can be given in the patients suffering from inflammatory conditions of gums. It can be used as mouth freshener and also used in mouth ulcers and toothache [117,118]. *Podeena* is a drug which inhibits the causative pathogens responsible for the oral candidiasis.

Mentha arvensis extract experimented in vitro as antimicrobial effects against streptococcus mutans [119]. The anti-oxidant activity of the aqueous extract of *Podeena* was better than the other extracts and strongly associated with the phenolic compound i.e. the efficacy is dependent on the phenolic content in the fractions [120,121]. An in vivo study in rats has been done for anti inflammatory activity of *Podeena*; acute as well as chronic models. Result displayed a decreasing effect in *carrageenan-induced inflammation* and *cotton pellet-induced granuloma* [122].

3.14 Qaranfal (Laung)

Qaranful is the flower bud of *Syzygium aromaticum* (Linn) of *Myrtaceae* family [26]. This plant is

broadly cultivated throughout the world and also its cultivation in India especially in South Indian people cultivated in a large scale. In the months of October and February, the flower buds are picked up from the plant (i.e. two times in a year) after changing the colour from green to brown [11,123,124].

Mizaj (Temperament) *Har and Yabis* (Hot and Dry) 3^o [18].

Action and Uses: *Mohallil-e-Waram* (anti-inflammatory), *Daf-e-Taffun* (anti septic), *Mufarreh*, *Musakkin-e-Alam* (analgesic), *Maqawwi-e-Qalab* (cardiac tonic), *Muqawwi-e-Dimagh* (brain tonic), *Munaffis e Balgham* (expectorant), *Daf e Tashannnuj* (anti spasmotic), *Muqawwi-e-Meda* (stomachic), *Muqawwi-e-kabid* (hepatoprotective), *mudammil e qurooh* (wound healing property). It is useful in *Zof e Meda* (Weakness of the stomach), *Zof e jigar* (Hepatitis), *Su e Hazm* (Dyspepsia), *Nafakh e Shikam/ Qulanj* (Flatulence/ colicky pain) [60,125]. *Qaranfal* is very beneficial drug used by the many unani physicians to treat the *Bakhrul Fam* (Halitosis), *Waj-ul Asnan* (Toothache), *qurooh e lissadamia* (septic gingivitis) and *qula e dahen* (stomatitis) [36,70]. Anti thrombotic activity has been shown in a study experimented on white male rabbits in vivo [126]. *Qaranfal* has antimicrobial potential against some bacteria resistant to certain antibiotics. It was found to be very effective against *Staphylococcus species* [127]. Laung oil and its active constituent *eugenol* have been tested for significant antifungal activity against *Candida Aspergillus* and *Dermatophyte* species [128]. *Qaranfal and its content Eugenol* show considerable antioxidant properties, comparable to the efficacy of the synthetic antioxidants, *BHA* (butylated hydroxyl anisole) and *Pyrogallol* [129].

3.15 Sandroos

Sandroos (*Trachylobium hornnemannianum* Hayne.) [130]. is a type of gum, which is found in Africa and India, but Najmul Ghani states the Sandroos is exudates of a *Sal tree* or *Saaj tree*. *Sandroos* is also known as a *chandroos* [8]. It is generally accepted to be a gum of a plant, but some scholars mentioned that it is obtained from the Indian Ocean [5].

Mizaj (Temperament): According to different Unani physicians, different status of temperaments is mentioned in their books. It is because of different mizaj of human being and quality of drugs.

Har and Yabis (Hot and Dry) 3^o [131].

Har and Yabis (Hot and Dry) 2^o [77].

Har and Yabis (Hot 2^o and Dry 3^o), *Har and Yabis* (Hot 3^o and Dry 2^o), *Har and Yabis* (Hot 1^o and Dry 2^o), *Har and Yabis* (Hot 2^o and Dry 1^o).

Action and Uses:

Qabiz (Astringent) *Habisud dam* (Haemostasis) *Mujaffif e qurooh* (Anti ulcer) *Mujaffif e rutubat* (Dessicant) [6,77,10,132,133]. *Muqawwi e dandaan wo lisaa* (Strengthens tooth and gums) *Jali* (Detergent) [11]. *Sinoon* (tooth powder) of this drug is very useful for strength of teeth and treats bleeding from gums and also relieves toothache. [134]. *Sandroos* with the combination of *roghan e gul* (rose oil) is effective as *mujaffif e qurooh* (healing of ulcers and wounds) [135]. *Sandroos* is beneficial for *qurooh e lissa* (septic gingivitis) and *qula e dahen* (stomatitis). *Sandroos* is more effective in pyorrhea than any other Unani drug [36].

3.16 Shibb e Yamani

Shibb e yamani is the Persian name of *phitkiri* used in Unani system of medicine acquired from the mineral sources [91]. It is known as *Zaj-e-Abyaz* in Arabic, *Shibb-e-Yamani* in Persian and *Alum* in English [14]. Firstly *Alum* was prepared in Asian countries, it is very ancient medicine. According to author of *Umdatul Muhtaj*, Hippocrates narrated about *shibb e yamani* [11].

***Mizaj* (Temperament):** *Har and Yabis* (Hot & Dry) 3° [17,28,136]. *Har and Yabis* (Hot 2° & Dry 3°) [137,138].

Action and Uses: *Dafe' ta'ffun* (antiseptic), *jali* (detergent), *qabiz* (astringent) *Muhallil e auram* (resolvent), *Mundamil e qurooh* (healing agent), *muqawwi dandan wa lissa* (strengthen the teeth and gums), *Nafe e lissa damia* (useful in bleeding gums). Water solution of *shibb e yamani* is used as gargle in *qula e dahen* (stomatitis), *lissa damia* (bleeding gums), *waram e lissa wa dandan* (inflammation of gums and teeth) and having good medicinal property in *kasrat e lu'ab* (excessive salivation). With the combination of *Roghan e gul* and *sirka* (vinegar), it is very useful in *qurooh e lissa* (gum ulcers). *Phitkiri* provides strength to teeth in *sinoon* (toothpowder) form. [6,11,28,34,35,77,136,139].

The anti-cariogenic effect of alum was tested in a study using mouth rinses by measuring the salivary *S. mutans* levels of children displayed significant decreasing in *S. mutans* levels in children [140]. Antibacterial efficacy was studied for alum against various enteric pathogens like *Vibrio cholerae* 01, V. cholera 0139 and *Shigella dysenteriae* [141]. In clinical evaluation containing 52 patients in 5 groups, this drug is reported having potent antiulcer property [142].

3.17 Sumaq

Sumaq (*Rhus coriaria* Linn.) is a drug which has medicinally importance and used in unani system of medicine. It is well known plant in western countries as well as in the East. It is also found in northern parts of India like Himachal Pradesh and Jammu and Kashmir. It belongs to the family *Anacardiaceae.* The rind of the plants fruit is very effective as a drug having astringent property and is medicinally used under the name of *Post e Sumaq* [25,28,143].

Mizaj (Temperament): *Barid Yabis* (Cold and Dry) 2^{o} [1,11].

Actions and uses: *Qabiz* (astringent), *habis e dam* (styptic), *muqawwi e medah* (stomachic), *hazim* (digestive) *musakkin* (sedative), *rade* (repellent), *mushtahi* (appetizer) and *dafe e ta'affun* (antiseptic). In Unani system of medicine, it is a good drug for nausea, *safrawi qai* (biliary vomitting) and *ishal e safrawi* (biliary diarrhea).It is preventive medicine for *Nafas ul dam* (haemoptysis). It gives strength to the gastric mucosa due to its astringent effect. It is used in *jiryan e dam* (haemorrhage) because of styptic property. It is very effective in warts of piles. It is very beneficial in *amraz e dandan* (dental ailments) The *Sinoon* (powder) is also used in *Qula e dahen* (stomatitis) and *Qurooh e lissa* (Pyorrhea) [6,11,18,36,60,144].

In an in vivo study in rats, *Sumaq* extract produces significant anti ulcer activity [145].

The hydro alcoholic extracts of *Rhus coriaria* experimented against selected bacterial strains and the results showed that *Rhus coriaria* was more potent against Gram-positive bacteria than Gram-negative [146].

3.19 Sumbul ul Teeb

Sumbul-ul-teeb (*Nardostachys jatamansi* DC) Family *Valerianaceae* [26]. is a plant used medicinally in Unani system of medicine. According to Unani physicians, there are various types of this plant like; *Balchar* (It is known as *sumbul ul teeb* or *sumbul ul asafeer*), *Sumbul e Roomi* (It is known as *sumbul e iqliti*), *Sumbul e juhi* (It is also called *sumbul e suri*). *Balchar* is more potent and more efficient than *sumbul e roomi* or any other type of this plant. Balchhar is sharp in odour, colour is brown or reddish black, having large amount of fibres, soft in upper surface but hard from inside and taste is bitter [11,14,10].

Parts used: Roots and rhizomes [18,77,10].

***Mizaj* (Temperament):** *Har and yabis* (Hot 1^o Dry 2^o) [1,5,38], *Har and Yabis* (Hot 2^o Dry 2^o) [77].

Action and Uses: *Muhallil* (resolvent) *Muhallil e auram* (anti inflammatory), *Matayyib-e-dahan* (mouth freshner), *Mujafif e qurooh* (cicatrizant), *Mufattih e Sudad e kabid wa meda* (deobstruent for liver and GIT), *Muqawwi e Meda wa jigar* (stomachic and hepatotonic), *Musakhkhin* (calorific), *Jali* (detergent) and *Mujaffif* (desiccant) [11,14,10]. *Sinoon* of Balchhar is effective in toothache after rubbing over teeth [5]. *Sumbul-ul-teeb* removes *bakhrul fam* (halitosis) [18].

It was found in an in vivo study in rats that *Sumbul Ul Teeb has antioxidant* and stress relieving properties by measuring the free radical scavenging activity [147]. *Sumbul ul Teeb* was tested for antimicrobial activity [148]. The roots of *Sumbul ul Teeb* was tested for *in vitro* anti proliferative property against neuroblastoma human cancer cells. It indicates that this drug has anti cancerous properties [149].

3.20 Tabasheer

Tabasheer is called as *Bansalochan* in India, especially in Hindi region a *dull white, brittle, chalky, translucent,* extract of the stems of *Bambusa bambos* Druce related to family *Gramineae* [25]. It is also called as *Indian thorny bamboo. Tabasheer* can be easily differentiated from other species of this family due to its branches present in every nodes. It has 1200 species throughout the world and 33 varieties come from India [155].

***Mizaj* (Temperament):** *Barid and Yabis* (cold 2^o and dry 3^o) [14,28]. *Barid and Yabis* (cold and dry) 3^o [11]. *Barid and Yabis* (cold 1^o and dry 2^oC) [18].

Action and Uses: *Muqawwi e qalb* (Cardiac tonic) [137]. *Mufarreh* (Exhilarant) [11,18]. *Mujaffif* (Desiccative), *Qabiz* (Astringent) [11,18,28,60]. *Mubarrid shadeed* (Refrigerant) [60]. *Muqawwi e meda* (Stomachic) [11,91,137]. *Mohallil e auram* (Anti-Inflammatory) [91]. *Fad e zaher* (Antidote)[18]. *Habis e Dam* (Styptic) [61]. Tabasheer is used in *Sailan e rahem* (Leucorrhoea) [18]. *Khafqaan e qalb* (Palpitation) [11,14,91,137]. *Qula e dahen* (mouth ulcers) [18]. Inflammatory Conditions of oral cavity, Bleeding Gums [26]. Stomatitis, Wounds of mouth, Eruptions,

Tuberculosis, Ulcer, General weakness, piles [11,26,150,151]

Anti-oxidant activity: *Tabasheer* has many phenolic contents; like *phenolic acids*, *flavonoids*, *tannins* which are responsible for anti-oxidant property of the plant [152].

Anti-inflammatory and anti-ulcer effect: *Bambusa arundinaceae* leaves produces anti inflammatory efficacy and also it has antiulcer activity in paw edema and also, its antiulcer property in albino rats has been tested and found to be beneficial in comparison to the standard drugs [153].

Antibacterial activity: *Tabasheer* has significant antimicrobial effects against *Staphylococcus aureus*, *Escherichia coli*, *Penicillin citrinium*, *Bacillus subtilis*, *Aspergillus niger* and *saccharomyces cerviase* [152].

Table 1: Summarizing the Unani medications according to their pharmacological actions and uses in oral diseases

S. No.	Unani drugs	Scientific Name	Actions	Uses
1	*Aqar Qarha*	*Anacyclus pyrethrum* DC.	Diaphoretic, analgesic, deobstruent, diaphoretic, Diuretic, Emmenagogue, Sialogogue and anti inflammatory [1, 7, 8, 14]	Toothache, dental carries, instability of teeth, pyorrhea stammering in speech and flaccidity of tongue [9].
2	*Aqaqia* (Babool)	*Acacia Arabica* Lam.	Wound healer, Astringent [1, 8, 12, 14], *Habis e dam* [Haemostatic], Desiccant	In mouth ulcer, sore throat cleaning mouth, weakness of teeth and bleeding gums [1, 8].
3	*Gile-Armani*	Armenian Bole	Astringent, desiccant, haemostatic, anti-diarrhoeal, anti-inflammatory, anti haemorrhagic, anti ulcer and antiseptic [1, 8, 12, 15, 16].	Excessive secretion of saliva, drooling of saliva in sleep, stomatitis and septic ulcer of mouth [17].
4	*Filfil e Siyah*	*Piper nigrum* Linn.	Anti-inflammatory, Liver tonic, Cleanser, saliva producer and Pain Reliever [4, 8, 15]	Dryness of mouth and Toothache [8, 12].
5	*Gul-e-Surkh* (rose)	*Rosa damascena* Mill.	anti inflammatory, exhilarant, stomachic, desiccant, astringent and deobstruent [1].	Wound of gums [septic gingivitis], stomatitis, gingivitis and toothache [4].
6	*Gulnar Farsi.*	*Punica granatum* Linn.	Antiulcer, pain reliever and anti-inflammatory [1, 4, 10, 25, 26].	gingivitis, toothache, bad smell and bleeding gum [1, 4, 10, 25, 26].

7	*Heel e khurd* (*Chhoti Ilaichi*)	*Elettaria cardamomum* L (Maton)	*carminative*, *diuretic* and *digestive*, *antiseptic*, anti inflammatory, exhilarant, mouth freshner, analgesic, antifungal [1, 17, 27, 29, 30].	Infections of teeth and gums, toothache. oral candidiasis [17, 29, 30].
8	*Kaat safed*	*Acacia catechu* Willd.	Desiccant, astringent, anti septic, blood purifier and desiccative for ulcer [1, 33].	Mouth ulcer, weakness of teeth and gums, gingivitis, bleeding gums and stomatitis [17, 33, 34].
9	*Kabab chini*	*Piper cubeba*	Astringent Antiseptic Mouth Refresher, Anti inflammatory Sedative [15, 35, 36].	Mouth ulcer, Halitosis, Septic Gingivitis, Septic Stomatitis [6, 17, 37].
10	*Kababa Khandan*	*Zanthoxylum armatum* DC	Antiseptic, antiulcer, anti-inflammatory [17, 25].	Bleeding gums, Stomatitis, toothache [17, 25].
11	*Kafoor*	*Cinnamomum camphora*	pain reliever exhilarant antipyretic, antiseptic, anti-itching [1, 8, 12, 43].	Toothache, halitosis, stomatitis pimples in oral cavity [33, 17].
12	*Neem*	*Azadirachta indica* A. Juss	Analgesic, antibacterial, antiulcer, antifungal, anti-inflammatory, antiviral, antitumor, immunomodulatory [23, 45].	Plaque, gingivitis tooth decay dental caries [47, 48].
13	*Miswak* (*Peelu*)	*Salvadora persica* Linn	Antifungal, anti-inflammatory [51, 52].	Candidiasis, gingivitis plaque dental caries, gingivo-stomatitis [51, 52, 53, 54].
14	*Podeena*	*Mentha arvensis* Linn	Anti-bacterial, antiseptic, antifungal, antipyretic, anti emetic, anti inflammatory, anti ulcer, mouth freshener, exhilarant anti-haemorrhagic [57, 58].	Inflammatory conditions of gums mouth freshener mouth ulcers and toothache halitosis candidiasis. [58, 59, 60].
15	*Qaranfal* (*Laung*)	*Syzygium aromaticum* (Linn)	anti inflammatory anti septic sedative anti spasmotic stomachic anti-ulcer [62].	Halitosis septic gingivitis stomatitis toothache [17, 33].
16	*Sandroos*	*Trachylobium hornnemannia num* Hayne.	Astringent Haemostatic, Anti ulcer, Dessicant Strengthens tooth and gums Detergent [1, 12, 36, 37, 65, 66, 67].	Weakness of teeth bleeding gums and toothache. [68], septic gingivitis, stomatitis pyorrhea [17].
17	*Shibb e yamani*	*Alum*	Antiseptic detergent astringent strengthen the teeth and gums anti	Stomatitis, bleeding gums, inflammatory conditions of gums

	(*phitkiri*)		inflammatory, anti ulcer, anti septic	and teeth, excessive salivation, Weakness of teeth, gingivitis
18	*Sumaq*	*Rhus coriaria* Linn.	Astringent styptic sedative repellent, appetizer and antiseptic [15, 27, 74].	Septic gingivitis, Stomatitis, pyorrhea
19	*Sumbul-ul-teeb*	*Nardostachys jatamansi* DC	Resolvent, anti-inflammatory, mouth freshner, cicatrizant stomachic and hepatotonic detergent and desiccant [1, 4, 8, 36, 37, 75].	Toothache, halitosis.
20	*Tabasheer* (*Bansalochan*)	*Bambusa bambos* Druce	Cardiac tonic [4, 14, 27, 70], Exhilarant [1, 8, 14, 70], Desiccative, [8, 14, 27], Astringent, [1, 8, 14, 27], Refrigerant [14, 27], Stomachic [1, 44, 70], Anti-Inflammatory [44], Antidote [1], Styptic [28].	Mouth ulcers, Inflammatory Conditions of oral cavity, Bleeding Gums [11], Stomatitis [80, 81].

4. Conclusion

Natural origin drugs are widely used in folk medicine and traditional systems of medicine for oral and dental problems around the world. The twigs of trees such as neem are used as toothbrush since centuries which are natural toothbrushes with soft bristles. In addition, they contain volatile oils, tannins, and vitamins which help in prevention and treatment of many dental diseases. As discussed in the above review, many Unani drugs have promising results in many oro-dental diseases, with most drugs having multi-dimensional effects such as analgesic, anti-inflammatory, anti-microbial, anti-ulcer activities. In addition, the drugs are affordable with simple administration and hence, are specifically beneficial in low-resource settings.

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