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Tasfiyaal- dam (Blood purification) in unani perspective: A comprehensive review

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Abstract
Unani system of medicine, blood considered as a mixture of four akhlāt (humours) dam, balgham, ṣafrā and saudā. These humours are of a different colour, appearance, composition, physical properties, and proportion. Out of them khilt-e dam is accounts for significant mixture of components, so its red colour dominates and called dam (Blood). Due to infilteration and accumulation of fasidmadda its quality and quantity altered. The body has a natural property to clear itself but when it is in excess and simultaneously the excretory system becomes sluggish at that time blood does not purify properly. In this way kidney, liver and lymphatic system work together and help to purify the blood. In this review article a possible mechanism of taṣfiya al-dam under the concept of Unani medicine and different Unani remedies which are known for their blood purification activities discussed.

Keywords: Unani system of medicine, blood purifiers, humours, Tasfiya al -Dam

Introduction
Blood is a fluid connective tissue which is essential for life and composed of cells surrounded by a liquid extracellular matrix [1]. Functions of blood could be falls into three categories: transport, defence, and regulation. Blood transport oxygen and nutrients and removes waste and toxin from the body to keep healthy. It also transports hormones, which control the body's organ. Blood defense pathogens such as bacteria and viruses and it clots, which prevents the loss of blood. In regulatory functions, blood helps maintain body temperature. The blood in the body does have a way of purifying itself, that time it needs a little extra help. The kidney, liver, spleen and lymphatic system work together to eliminate unwanted toxins and impurities from the body system, but sometimes it is too much, and the toxins start to build up which can affect the blood and muscle tissues in a negative way.

On the basis of available evidence and the detailed descriptions mentioned in classical Unani text, Unani system of medicine is advocated deep philosophical insights and scientific principles, including the Empedoclean theory of four Elements i.e. Air, Water, Fire and Earth; four proximate Qualities (*kayfiyāt*) i.e. Hot, Cold, Wet and Dry described by Pythagoras, and Hippocratic said that the human body is composed of three parts i.e. (i) Solid known as organs (*aza),* (ii) Liquid known as humours (*akhlat) and* (iii) Gas known as pneuma (*arwah)* and also postulated theory of Humours (*Akhl*āt).Blood (*Dam*) as 'hot and moist, Phlegm (*Balgham*) as 'cold and moist', Yellow Bile (*Ṣafra'*) as 'hot and dry' and Black Bile (*Sawdā'*) as 'cold and dry' [2]. These four humours are different about colour, appearance, composition, physical properties, and proportion. Since one of its important components i.e. dam accounts for a significant quantity of the mixture, therefore, its red colour dominates and the whole mixture is broadly called a dam (Blood) [3, 4].

Ibn senna (Avicenna), the philosopher and physician has, in his monumental work *Qānun Fil Tib* (Canon of Medicine) says that" The humour (a*khl*āt) is a moist fluid and mobile body capable to dissolve or mix with blood by which it can be carried to different organs." So, in this regard, we say that the humours are the liquid fundamental substance of living things, made up of by the mixing and organic transformation of elements and thereby obtaining the ability to support biological process i.e. life, nutrition and growth, sensation and movement and reproduction [5].

Abu Sahal Masihi (960-1000 AD) has defined that tabi'ikhūn (normal blood) is one in which all humours are distributed in normal proportion, both in terms of kayfiyat (quality) and kammiyat (quantity).*Ibn Rushd* (1126-1198 A.D) mentioned that *Mizāj al- uzo* (temperament of organ) remains in its normal proportion when the blood which provides nutrition to it remains normal. This is only possible when all the digestive faculties of organ remain within the normal limit. Proper functioning of liver, stomach, kidney and spleen is necessary for the

production of normal blood. When the function of the liver does not work properly due to alteration in its temperament, it ultimately impaired the production of humour and also alters the quality and quantity of them and blood get impure.[6]The humours are formed within the various organs, primarily in *kabid* (liver) and run together with*siryān* (blood vessel). Normal blood (Dam) is one in which these four humours (*akhlāt-e arbā*) are in equal proportion with respect to their quantity and quality which is specific to each healthy individual.It is normal in colour, free from bad odour and moderate in viscosity [6, 7].

It is believed in Unani Tibb that, any imbalance in the quality and quantity of any of four humours predisposing the human body to various diseases by producing, the whole blood becomes imbalance within the body. Unani medicine endorses cleansing the blood as a healthy measure against the extraction of toxins and to improve heart health, boost immunity, prevent from diseases, can lower the levels of cholesterol from the blood, reduces the risks of cancer and also help to decrease inflammation caused from harmful toxins from the body.

2. Concept of formation of *akhlāt* (Humour)

Humours is the essence of the practice of Unani medicine, holds that all the four humour are derived from nutrient components of the ingested food and liquid in the liver.

According to Avicenna, *Akhlāt-e arbā (*Humours*)* are generated from the metabolism of food and used as nutrient components for growth, maintenance and repair of the organ and to yield energy for the work. Digestion starts from mouth, teeth help to crush it and tongue mixing with saliva and passes to the stomach where *ḥarārat-i-gharīziyya* (innate heat) acts upon foodstuff and converts into *Kailus* (chyme) and liquid substance. Qalb (heart) also plays an important role though indirectly in digestion through its harāratgharīziyya (innate heat/natural heat). It helps not only in distribution of food particles to the body parts but also helps in their assimilation (tagairāh). After gastric and intestinal digestion, food turns into chyme and chyle. *Hazm Awwal*take place and *Ajzae Laṭifā* (diluted substances) absorbs from stomach and intestine through *warīdmāsārīkā* (mesenteric vein)and enters into the portahepatis carry it into the liver where complete *Nuzj* (ḥazmsāni) occurs properly and chyle is converted into *Akhlātarba* in variable quantities, blood (Dam) is formed [8] and being the largest [9]. The waste products of primary digestion in the stomach are eliminated through intestines. Waste of second digestion which occurs in liver eliminated mostly through urine but a small quantity is disposed towards gall bladder and spleen and waste of third and fourth digestion are eliminated through small pores of body in the form of sweating, secretion of ear and nose [10, 11]. The physicians of Unani system of medicine give the opinion that most of the metabolic functions take place in the liver while in the modern medicine argues that various useful substances are formed in the liver which directly or indirectly controls the haematopoiesis [12]. According to the Northern blot analysis, the liver and kidneys appear to be the major sites of thrombopoietin mRNA expression [13]. The findings of a study demonstrate that liver is the major site of thrombopoietin (Tpo) production and altered hepatic Tpo production will lead to a significant reduction in platelet levels [14]. Further, a biological assay of the human liver in various types of anaemia also showed conspicuous differences in the concentration of haemoglobin producing factors [15]. The sinuses of the liver can release several hundred millilitres of blood into circulation. Now it is clear that most part of the blood and its components like black bile, yellow bile and phlegm are produced in the liver that is why Nafis (15th cent AD) stated that, "Normal blood is one which is formed and processed to purity in the liver". However, presently it may explain the haemopoiesis during mid-trimester of gestation. Guyton describes hepatic macrophage system as the blood-cleansing system which is also carried at a hepatic level. Blood flowing in intestinal capillaries picks up many bacteria from the intestines. A sample of blood taken from the portal veins, before it enters the liver, almost always grows colon bacilli when cultured, Kupffer cells, the large phagocytic macrophages cleanse blood in less than 0.01 second; the bacterium inward through the wall of the Kupffer cell to become permanently lodged inside until it is digested. Blood is mostly produced with hot and moist food such as Lahm (meat). This has been accepted by the contemporary physiology, that meat contains first-class proteins i.e. essential amino acids which are essential for formation of haemoglobin and help in the production of plasma protein. The stomach protein and nucleoprotein of the blood corpuscles are also formed with these first-class proteins [16]. The liver is the principal producer of the blood through a long process. Spleen, kidney and gall bladder keeps the blood clean. Proper functioning of these organs is necessary for the production and maintenance of normal blood. When the function of the liver is disturbed it ultimately affects the production of blood and also alters its quality and quantity. A pathological change that occurs in morbid blood also depends upon surplus addition of other humour and changes the morphology of blood [17].

3. Causes of blood impurities

There might be several reasons of becoming the blood in the body impure. It is the environment that we live in, our dietary habits and the lifestyle that we adopt that makes our blood in certain senses impure and full of harmful toxins. The toxins are usually stored in our blood every day from the various foods, the pollution and also due to stress. These entire poisonous elements are entering inside our body make prone and giving invitations to several diseases. People adopt short cut methods to keep off hunger and make use of junk foods which causes a shortfall in the nutritional elements in the body which lowers down the stamina of the persons. Regular uses of junk foods pose a great danger to the health which directly affects the immune system of our body [18]. The *sue mizāj-e kabid* (altered temperament of liver) is the major factor is responsible for the derangement of the liver function, which directly affects the quality (kaifiyat) production as well as the consistency (kammiyat) of Humours (*Akhl*āt). Health is a state of body in which all the humors are in equilibrium both in quantity and quality, any alteration in the equilibrium leads to disease. Disharmony in quantity is called as *Imtala Ba Hasbul Auhia* while disharmony of quality is known as *Imtala Ba Hasbul Quwa* [19-21].

3.1. Imtala Ba Hasbul Auhiā

It is due to increase in *kammiyat* (quantity) of *akhlāt*. That is presented by reddish skin, laziness, hyperemic vessels, sleepiness, yawning, fatigue ness, headache and hyper pulsation etc. A famous Unani physician and scholar Ibn Sina says that if there is an excess accumulation of a*khlāt-e ghairsaleha* (morbid matter) in *urūqdamwiahwatajawif* (blood vessels and cavity) it may result in obstruction.

3.2. Imtala Ba Hasbul Quwā

This is the result of the imbalance in *kaifiyat* (quality) of *akhlāt* is called as *imtala Ba hasbul*quwā. This condition is vulnerable to infectious diseases and decreased appetite; that may be associated with changes in pulse and urine.

4. Mechanism of taṣfiya al-dam (blood purification)

Blood purification means the removal of toxin and toxic metabolites from the blood so that it comes in a bio-stat that works at its optimal level. Following reinforcing innate heat through Physical activity, digestion faculty will be enriched; so, abnormal humours will not be produced and toxin and impurities both will be prevented. Moreover, production of normal humours will take place without any alteration. When we went through the biochemistry of body particularly related with the function of liver and kidney, infinitely these organs did a great work of Bio- purification and ultimately do purification of blood by removing and breaking down waste products. So, our best for purifying the blood naturally would be to find ways to help these essential organs function most efficiently purifier's helps in increasing the bowel activity and helps in clearing the bowel. It also helps in maintaining the good health of Liver and Kidney. They helps in balancing the *Akhlāt* (humours)in its normal level so that it does not affect the blood so it helps in maintaining the normal quality of the blood [18-22].

5. Benefits of blood purifier drugs

While going through the Unani literature it was noted that nearly all the blood purifying drugs are bitter in taste and hot and dry in the second degree. These drugs are characterized by lenitive, detergent, laxative, deobstruent, alterative and irrigator properties. Because of these properties, they may act as a digestive, tonic to stomach and liver and also act as diuretic, antiseptic, antipyretic and tonic to vital organs. Whereas elucidating its mechanism of action it was considered that blood purifying drugs cause necessary changes in blood and remove its waste material so that the blood is purified from its impurities. Blood purifying drugs restore the normal viscosity of blood by their moderate heat, cold, dry and wet properties. Thus these drugs help in the quality and quantity of humours or blood in equilibrium. Therefore, these act to produce and maintain normal blood by neutralizing the excessive heat of blood due to their alterative and moderate hot (*laṭeefharārat*) and dry properties [23]. These drugs are considered to strengthen the defensive mechanism and prevent the body from toxins. They boost the immune system; normalize the blood composition and tone up the sluggish liver and kidney for its normal function. Blood purifying drugs eliminate the toxicity of blood via sweat, urine, faeces etc. and internally cause some changes in blood; eliminate the morbid matters and purify the blood [24-26]. Herbs have been in use for centuries for many purposes which include cleaning our blood and also removing toxins through lymph system, liver, and kidney. It promotes the sluggish activity of liver and kidney to makes it healthy and more active. The Unani medications which are helpful to solve these problems with less side effects by the using of single remedies as well as polyherbal formulation. Blood purifier is helpful in increased the bowel movement at the beginning which is a temporary phase. It takes two or three days, which is recommended because it is very supportive of the blood cleaning process. Either take small doses in the beginning and increases after two or three days or starts the recommended dose and clear the bowel movement. It activates the sluggish liver and kidney to makes it healthy and more active. With the purification of our system, our skin gets more healthy, lustrous, smooth and silky with natural glow. Healthy skin is less prone to diseases and infections [27].

6. Single unani drugs considered as blood purifiers

6.1. Chirayita (*Swertiachirata)* Family: Acanthaceae

Mizāj (Temperament): Hār 2º Yābis 2º (Hot 2° and Dry2°)

Chirayita, an ethnomedicinal plant that has been effectively used in traditional Asian medicines for eras. In Unani system of medicine, it is commonly used as blood purifying drug and due to its "blood purifying" activity it is recommended in various ailments i.e in leprosy, gonorrhoea, scabies, boils, skin eruptions, and chronic and seasonal fevers [28].

S. chirayita has been partly attributed to the biological activity of major phytoconstituents including amarogentin, swertiamarin, mangiferin, swerchirin, sweroside, amaroswerin and gentiopicrin. Swerchirin, Sweroside, is known to be antimalarial, hypoglycemic, hepatoprotective, pro-haematopoietic with blood glucose-lowering activity [29].

In Unani system of medicine, it is considered aperient, anti-inflammatory, emollient, astringent, diuretic, emmenagogue, gastric and liver tonic, carminative, anthelmintic, and antipyretic. Swertiachirata has been also reported as having antibacterial, antifungal, antiviral, hypoglycemic, hypo-cholesterol emic, and adaptogenic effects [30] Recently reported anticancer effect of S. chirata has amplified its importance in the scientific community [31].

6.2. Neem (*Azadirachta indica* A. Juss) Family: Meliaceae

Mijāz (Temperament): Hār 2º Yābis 2º *(*Hot2° andDry2°)

Neem is one of the most important detoxificant in Unani system of medicine and is used widely for its antiseptic properties. *Azadirachta indica* shows therapeutic role due to the rich source of antioxidant due to Azadirachtin, nimbolide and other valuable active compounds such as azadirachtin, nimbolinin, nimbin, nimbidin, nimbidol, salannin, and quercetin. *Azadirachta indica* has been revalidated for a pronounced anti-microbial action against a wide range of Gram +ve and Gram –ve bacteria. *Azadirachta indica* significantly attenuates the stress-induced suppression of humoral immune response. *Azadirachta indica* enhances the humoral antibody response to the antigen and hence boosts the immune system [32] .*Azadirachta indica* suppresses inflammatory mediators in acne pathogenesis [33] and detoxification of blood [34].

6.3. Zard-chubah (*Curcuma longa*)

Family: Zingiberaceae

Mizāj(Temperament): Hār 2º Yābis 2º*(*Hot2° andDry2°)

Commonly called turmeric**,** *Curcumin* or *diferuloylmethane* and other *curcuminoids* constitutethe main phytochemicals of *Curcuma longa*, being responsible for its biological actions [35]. The ethanolic extract of *Curcuma longa* rhizomes showed a significant hepatoprotective effect when orally administrated in doses of 250 mg/kg and 500 mg/kg, and the protective effect was dose-dependent. It invigorates and vitalizes the blood, improving its circulation; nourishes and promotes the generation of blood; scrapes the blood of excess fats, cholesterol and sugar; stimulates and procures the menstrual flow in women; benefits the skin and complexion. The chief active constituent in *Curcuma longa* has been claimed to represent a potential antioxidant and anti-inflammatory agent with phytonutrient and bio-protective properties. The main constituents of Curcuma longa rhizome

ethanolic extract are the flavonoid curcumin and various volatile oils, including turmerone, atlantone, and zingiberene [36]. Curcumin the main active constituent of turmeric (*Curcuma longa*) is a natural yellow-orange dye and a good inhibitor of lipid oxidation. Studies demonstrates that *Curcuma longa* pretreatment has a conducive effect on the irradiated wound and is a substantial therapeutic strategy in initiating and supporting the cascade of tissue repair processes in irradiated wounds [37]. *Avicenna* calls Turmeric a dissolving drug which, by virtue of its heat, gradually dissolves, evaporates and dislodges tough, thick humours until they are gone [38].

6.4. Mundi (*Sphaeranthus indicus* Linn.)
Family: Asteraceae
Mizāj (Temperament): Hār 2º Ratab 2º *(*Hot2° andDry2°)
Sphaeranthus indicus is a widely used plant in Indian system of medicine. the whole plant or its different anatomical parts viz., leaf, stem, bark, root, flower and seed are recommended for curing many diseases. The plant is bitter, stomachic, restorative, alterative, pectoralgia, demulcent and externally soothing. The drug Mundi consists of a dried inflorescence used as a blood purifier [39]. In Unani system of medicine, Mundi is used in various disorders like epilepsy, mental illness, hepatopathy, leprosy, fever, cardiotonic and many skin diseases as blood purifier [40].

6.5. Kasini (*Cichorium intybus* L.)
Family: Asteraceae
Mizāj (Temperament): Sard 1º Tar1º (Cold 1° andWet 1°)
It is an important medicinal herb has been used Unani, Ayurveda and Siddha system of medicine for diseases of hepatobiliary system, renal system and blood purifier. *C. intybus* has been traditionally used for the treatment of fever, diarrhoea, jaundice and gallstones [41, 42]. The experimental studies on male rats have shown that *C. intybus* possesses antihepatotoxic and antidiabetic activities [43]. It has been also stated that *C. intybus* have antibacterial [44], anti-inflammatory [45] and antiulcerogenic activities [46].

6.6. Dar-e-hald (*Berberis aristata*)
Family: Berberidaceae
Mizāj(Temperament): Hār 2º Yabis 2º(Hot2° andDry2°)
Dar-e-Hald (*Berberis aristata*) is a medicinal plant and extensively used in Unani System of Medicine from times immemorial either as single drug or in compound formulations to treat infectious diseases. Berberis aristata contains mainly yellow-coloured alkaloids Berberine, oxyberberine, berberine, aromoline, a protoberberine alkaloid karachine, palmatine, oxycanthine and taxilamine and tannins, sugar, starch. The plant is an emmenagogue and is useful in the treatment of jaundice, enlargement of spleen, etc. the drug is also regarded as a laxative, diaphoretic, antipyretic and antiseptic [47].
Berberis aristata root bark decoction is externally used as a wash in painful eye affections, ulcers and haemorrhoids. In the Unani system of medicine, it is used for the treatment of leprosy. Decoctions of root of *Berberis aristata* is used for skin troubles and in blood purification [48].Indian barberry and its extract "rasaut" is regarded as alterative and deobstruent and are used in the treatment of skin diseases, menorrhagia, diarrhoea, jaundice and also in various affections of the eyes [49].

6.7. Rehan/Tulsi (*Ocimum sanctum*)
Family: Labiatae
Mizāj(Temperament): Hār 2º Yabis2º(Hot2° andDry2°)
Rehan tastes hot and bitter and is said to penetrate the deep tissues, dry tissue secretions and normalize the humours. Daily consumption of tulsi is said to prevent disease, promote general health, wellbeing and longevity and assist in dealing with the stresses of daily life.
Tulsi extract is used in the management of all skin diseases, antistress/adaptogenic, antioxidant, Immunomodulators [50].The linolenic acid present in tulsi has the capacity to block both the cyclooxygenase and lipoxygenase pathways of arachidonate metabolism which could be responsible for the anti-inflammation activity of the oil and hence helpful to decrease the inflammation with acne[51].

6.8. Gul-e-ghafis (*Gentiana Olivieri* Griseb.)
Family: Gentianaceae
Mizāj(Temperament): Hār 2º Yābis 2 º*(*Hot2° andDry2°)
It is an ethnomedicinal paramount herb in Unani System of Medicine to treat various ailments of the urinary tract, stomach, hepatic, nervous, reproductive system. The whole plant of *Gentiana olivieri* holds a rich source of secondary metabolites including alkaloids, bitter secoiridoid glycosides, triterpenes, fats, flavone-c-glycosides (isoorientin). The alkaloids (gentianine, gentianidine) have been culpable for their manifold pharmacological activities such as antibacterial, antifungal, hypotensive and the flavone-c-glycosides (isoorientin) have been responsible for the anti-inflammatory, anti-nociceptive, gastroprotective, hepatoprotective, antidiabetic effect [52].

6.9. Babchi (*Psoralea corylifolia*)
Family: Leguminosae
Mizāj(Temperament): Hār 2º Yabis2º*(*Hot2° andDry2°)
Babchi is used in treatment of variety on skin problems, such as leukoderma, skin rashes, infections and others. Roots, stems, leaves, seeds and blooms are used for skin problems. Every part of the plant shows different activity [53]. Psoralen and Isopsoralen are considered therapeutically active constituents of these seeds. They are especially recommended in the treatment of leucoderma, leprosy, psoriasis and other inflammatory diseases of the skin [54, 55].

6.10. Shahtra (*Fumaria indica* Pugsley)
Family: Fumariaceae
Mizāj (Temperament): *Hār*2º*Yabis*2º(Hot2° andDry2°)
Fumaria indica is widely used in Unani system of medicine to treat vitiated conditions of anthelmintic, antidyspeptic, cholagogue, diaphoretic, diuretic, laxative, stomachic, tonic properties and claimed to possess various curative properties for ailments of the blood, skin, gastrointestinal systems and central nervous system. The plant is used to purify blood in cutaneous disease and liver obstruction. The plant is reported to be slight diaphoretic, aperient, alterative and anthelmintic [56].

7. Conclusion
Medicinal plants are a fundamental part of the healthcare system since a long time. Based on the above discussion, it can be implicit that concept of the production of morbid blood under certain physiological and pathophysiological conditions, is very wide in the Unani system of medicine.

Taṣfiya al-dam (Blood purifying) drugs did not have only single activity; they might have multiple activities such as alterative, anti-inflammatory, hematopoietic, tonic, and demulcent activities, associated with this bitter taste and hot and dry temperament. Demonstration of various effects such as tonic to stomach and liver, digestive, appetizer, diuretic, antiseptic, antipyretic along with this research reports may give rise to the useful benefits of these Unani blood purifier drugs. Since blood purifying drugs possess a wide range of pharmacological effects, therefore it can be said that they may prove their effectiveness by evolving a holistic approach and involving its numerous actions. So in this review, a discussion made on possible mechanism of action of blood purification and Unani blood purifiers.

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