Review Article

History of *Ilmul Saidala* (Unani Pharmacy) Through Ages: A Critical Appraisal and Current Scenario

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Abstract

Ilmul Saidala (Unani pharmacy) is an important pharmaceutical branch of Unani System of Medicine, also known as Greco-Arabic medicine. Its historical evolution is intricately related with that of human's disease and sufferings. The earlier records about the *Ilmul Saidala* reveal that the Greco-Roman civilization is credited with its origin and development. Then, the Arabs preserved their medical legacy, and enriched it with their pharmaceutical experiments, innovations, and newer formulations. Most of the physicians rendered voluminous compendium known as "*Al-Qarābādhīn*" (pharmacopoeia) on the pharmacy including pharmaceutical as well as cosmeceutical preparations. After the fifth century, the development in Unani Pharmacy has been greatly contributed by Arab physicians and the world acclaimed piece of knowledge from this period is Avicenna's 'Canon of Medicine'. The medical influences of the Arabs helped in further development, regulation, and advancement of pharmaceutical sciences in the European soil and evolved it as a distinctive institution of respect and public welfare. The vastness of knowledge of Greco-Arabic period can be judged from the fact that the contemporary innovations and developments in the pharmaceutical industry is primarily owed to the original contributions of Greek, Egyptian, and Arab philosophers and physicians, such as Hippocrates, Pedanios Dioscorides, Galen of Pergamon, Avicenna, Rhazes, Geber etc. In India, Mughals, especially emperor Akbar was very instrumental in the propagation of Unani medicine and had appointed Unani physicians in different cities of his territory. Later on, *Khandan Shareefi* (Shareefi family) and *Khandan Azizi* (Azizi family) played important roles in the promotion of Unani Pharmacy. In post-independence India , *Ḥakīm 'Abd al-Ḥameed* established Unani pharmacies on the lines of the modern pharmaceutical industry for the mass production of Unani formulations in compliance with *Good Manufacturing Practice* (GMP) guidelines. At present, Unani System of Medicine and its pharmacies enjoys the patronage of Government in India and other South-East Asian countries, such as Pakistan and Bangladesh along with post graduate education in Unani pharmacy. The present work is a sincere attempt of authors to critically appraise the Unani Pharmaceutical potentials from the past, the current waves of developments and issues, and their possible ways forward.

Keywords: Saidla; Qarābādhīn; Unani medicine; Pharmacy; Avicenna, Hamdard.

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Introduction

Ilmul Saidala (Unani Pharmacy) is an art or science that deals with preparation and distribution of drugs used for the prevention and treatment of various diseases in Unani medicine. In other words, it is a branch of Ilmul Advia (Unani Pharmacology) where in various single drugs or drugs' substances are rendered into a suitable dosage form by composition / mixing and analysis for therapeutic indications. Since ancient times, *Ilmul Saidala* has been an integral

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part of medicine, and by the beginning of the eighth century, it had become a separate branch of medical knowledge. It was largely enriched by the learned pharmacists from Arab, Syria, Persia, India and the far East laying the base for future innovations.[1] The history of pharmacy as an independent science is quite old.[2] Greeks used the word "Pharmaki" for the drugs or poisons, and thus, the word "pharmacy" has been very popular in the English language.[3]

Before the dawn of history: Since the beginning, the proud profession of pharmacy came in existence as a remote and simple art; and because of that, its development is quite parallel with that of man. Ancient man learned from instinct and observation of birds and beasts. Cold water, a leaf, dirt, or mud was his first soothing application. The roots of modern innovations and development in the field of Tibb (medicine) and Saidala (pharmacy) are seemingly owed to the earliest contributions of Greek, Egyptian and Arab philosophers and physicians, like Hippocrates (born on the island of Cos in 460 BC), Pedanios Dioscorides (first century AD), Galen (130-200 AD), *Ibn Sina* (Avicenna 980-1037 AD), *Zakarīya Rāzi* (Rhazes 865-915 AD), and *Jabīr bin Hayyān* (Geber 721-815 AD).[4,5]

Before 500 BC, Egyptian Saidalani (apothecarists or pharmacists) used instruments made up of wood, stones, glasses for preparing the medicines. They had the knowledge of processing the decoction, extraction, mixtures, Laūq (linctus), ointments, and pills. Egyptian methods of processing and formulation of the drugs were similar to those popular in other contemporary civilizations of that era. Firstly, they prepared Laūq made up of lead oxide; sedative enema from the bark of opium (*Papaver somniferous* L.), and vaginal douche from plant decoction. They were aware about the use of Laūq and gargles in the diseases of ear and throat. They were the earliest to use the aromatic and fragrant ointments in the skin diseases.[3]

Ancient Greek philosophers and physicians had their own pharmacy e.g. Hippocrates used to prepare drugs and it is said that initiation of pharmacy began in the Hippocratic era. Hippocrates used opium extracts as an analgesic; he also had knowledge about *Baladur* (*Semecarpus anacardium* L.) that Belladonna extracted from the same may be fatal in high doses and is therapeutically useful in *Sū' Mizāj-i-Mi'da* (gastric dyscrasia) in low doses.[3] He was the inventor of Takmeed (fomentation), poltis, Shiyafat (suppository), Fatila (bougie), Hubūb (pills), Lozaat (formulations prepared from almond), Marham (ointment), Nashūq (a liquid preparation or powder used for insufflations), Qutūr (eye drop), which are the dosage forms meant for treating the diseases.[3] Personalized medicine is a novel term for a medical model in which all diagnostic, therapeutic and prognostic aspects of a disease are individualized for a patient using specific molecular testing, although a history of such holistic attitude toward medicine has been also attributed to Hippocrates, about 2400 years ago.[6]

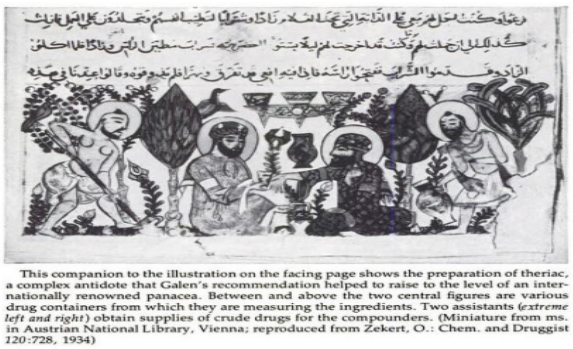
In the first century AD, Corneliuscelsus prepared a paste named "Sory" for prevention of occurrence of mould in teeth with ingredients of *Tukhme Khashkhash* (opium seeds, *Papaver somniferum* L.), *Habbul Qilqil* (*Cardiospermum halicacabum* L.), copper sulphate and *Ushuq* (*Dorema ammoniacum* D. Don.). In between 600-1000 BC, Roman and Iskandri (Alexandrian) physicians used the dosage forms including infusion, decoction, paste, ointment, Farzaja (tampons), Safoof (powder) and Niswar (nasal insufflations) that are still in use. Most of the physicians wrote compendium on medicinal chemistry and pharmacy known as "*Al- Qarābādhīn*" (pharmacopoeia). Compound formulations are mentioned in these books divided into different assortments and categories. The numbers of these books are far above the ground.[3]

The earliest *Qarābādhīn* (pharmacopoeia) is traced back to Sumerian history (2004 BC); Egyptian manuscript Ebers Papyrus (1550 BC) that deals with herbal medicine, contains 876 prescriptions made up of more than 500 different substances and herbs.[7] Hippocrates made important contributions in the fields of medicine and pharmacy with description of about 400 pharmacopoeial formulations in his books.[2]

Pedanius Dioscorides (40-90 AD) was the biggest pharmacopeian of his time; he contributed hugely in transition of pharmacy practices. The Latin translation (De Materia Medica -written between 50-70 AD) was later on translated in Arabic language too, named *Kitab al-Hashaish*, and served the foundation for much of the future development and advances made by Arab physicians in pharmacology and pharmacy.[7]

Galen (129-200/ 216 AD) practiced and taught both medicine and pharmacy in Rome; his principles of preparing and compounding formulations ruled in the

western world for 1500 years, [Figure 1] and his name is still associated with the class of pharmaceuticals compounded and prepared by the mechanical means as Galenicals. He was the originator of the formula for a cold cream quite similar to the presently known today. Many procedures crafted by Galen have their counterparts in today's modern compounding laboratories. He always stressed on the importance of pure drugs and its careful handling. He authored about 129 books, including exclusive pharmacopoeia named "*De Simplicium Medicamentum*" or "*Kitāb Al-Adviā Al-Mufrādā*". He is also known as inventor of *Qarābādhīn.* Some Unani compounds are also named after him, such as *Jawarish Jalinus, Majun Jalinus, Habbe Jalinus*, and *Namak e Jalinus*.[7] "*Decomposition Medicamentorum*" is the first systemic *Qarābādhīn* rendered by *Galen* in the history of *Ilmul Saidala* (Unani Pharmacy). Till fifth century, progress and innovation in the field of *Saidala* was anchored by the Greek physicians.



This companion to the illustration on the facing page shows the preparation of theriac, a complex antidote that Galen's recommendation helped to raise to the level of an internationally renowned panacea. Between and above the two central figures are various drug containers from which they are measuring the ingredients. Two assistants (*extreme left and right*) obtain supplies of crude drugs for the compounders. (Miniature from ms. in Austrian National Library, Vienna; reproduced from Zekert, O.: Chem. and Druggist 120:728, 1934)

Figure 1: Preparation of Theriac

Source: Image from *Kremers and Urdang's History of Pharmacy* courtesy of the American Institute of the History of Pharmacy; 1986:25.

After fifth century, the innovation, development and scientific existence of pharmacy (*Saidala*) were done by great Arab physicians because of their exceptional inclination towards chemical studies.[3] Arabic pharmacy as a profession having separate entity from medicine was recognised in the ninth century under the *Abbasid Caliphate*, and later on, it became an independent, well defined and organised profession. This century saw the founding and its vicinity as well as in other cities.[8] Several public pharmacy shops, besides those connected with hospitals sprang up in the central and commercial cities of Iraq, Egypt and Syria.[9] Many of the pharmacists, who managed these shops, were skilled in the apothecary's art and quite knowledgeable in the compounding, storing, and preserving the drugs. Government sponsored hospitals in this era had their own dispensaries which were attached to manufacturing laboratories where syrups, electuaries, ointment and other pharmaceutical products were prepared on a large scale. The pharmacists and their shops were inspected periodically by a government-appointed official (*al-Muhtasib*) and his aides.[10] These officers were assigned to check the accuracy of the weights and measures as well as the purity of the drugs used, intended to avoid the use of deteriorating compounded drugs and syrups as well as safeguard the public health.[11]

These early ascend and development of professional pharmacy in Arab led to the three major developments: (1) Rapid increase in the demand of drugs and their availability in the markets; (2) Professional maturity and (3) The outgrowth of intellectual responsibility by qualified pharmacists.[12]

After a comprehensive literature survey of Arabic and Persian texts on this subject, it is quite clear that the pharmacy in Arabic period was very advanced and highly developed. First drug store was established in Baghdad in 754 AD [Figure 2], where drugs were procured, organized, prepared and sold.[13]

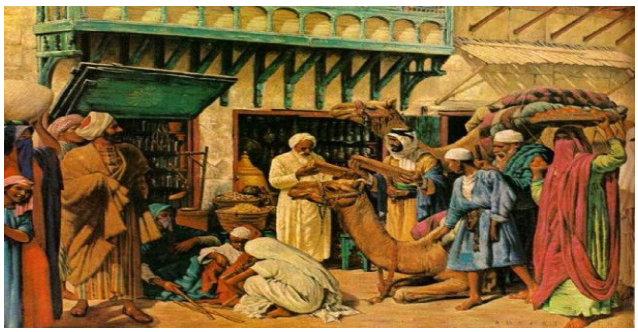


Figure 2: The First Apothecary Shops in Baghdad

(Source: A History of Pharmacy in Pictures Washington State University, College of Pharmacy)

According to the Cyril Algood (1893-1970 AD), the art of *Saidala* (pharmacy) in its developed and innovative form was only found in cities of the Caliph.[3] Grandson of Caliph *Hadhrat Muʿāwiyah Ibn ʾAbī Ṣufyān* (Reign. 661-680 AD), and Prince *Khalid bin Yazid* (Calid, Kalid, or King Calid d.704 AD)[14] was the first king associated with the development of *Saidala*, and for the first time translations of Greek texts were rendered into Arabic under his supervision.[15]

According to Sami Khalaf Hamarneh (b. 1925 AD),

the pharmacists working in their field before the first half of the 9th century had no academic training and guidance. The accentuated pharmaceutical education and training was started in first half of the 9th century under the Eastern Caliphate in Iraq. During the reign of *Al-Mu'tasim* (833-845 AD), the learned and morally responsible pharmacists were granted licences to operate their own drug store near army camps, while uneducated and uncultured drug sellers and quacks were stripped of such privileges. The physicians had owned and operated pharmacy shops from Hippocratic ara; in the first half of the twelfth century, the concept of hospital pharmacy named *'Khizanat al-Advia'* (drugs store in hospital) was practically esteblished in an-Nuri hospital at Damascus,. A special characteristic of this hopital was *'juzwi dawasazi'* (extempor pharmacy); the prescriptions were dispensed by pharmacists as directed by physician according to need, instead of already compounding. Another hospital pharmacy section for *'Kulli dawasazi'* (pharmacopoeal pharmacy) manufacturing, compounding and storing of drugs was also instituted in the great *al-Mansuri* hospital of Cairo. So the apothecary's art became recognized in Egypt and the pharmaceutical literature reached a high standard. In 9th century, the lay physicians established hospitals and pharmacy shops that also served as important centres for pharmaceutical and medical education.[9]

Department of pharmacy played a commendable role in developing numerous newer formulations in medieval Arabic era; during this period authentic and referential *Qarābādhīn* with systemic and scientific approaches was written. The caliphate of Arab paid special attention towards the development of medicine acquired from Greek and thus become popular as a "*Greco-Arab Medicine*".[16]

Ibn an-Nadim mentions *Riwaq* as-saidanani (the pharmacist) who wrote one of the earliest Arabic work on pharmacy *'Kitab as-Saidanah'* (Book of the apothecary Art), which is lost. *Ibn 'Abd Rabbih* (860-940 AD) wrote *'ad-Dukkan'* being the first text on practice of pharmacy in Spain.[9]

A book named "*Qarābādhīn Kabeer* or *Aqrābāzeen* (The big formulary)" was written by *Sābūr ibn Sahl* (d.869 AD), the author of the first known Arabic Formulary for pharmacist (*Sayadilah*) in hospitals and retail drug store.[9] It was used in hospitals as a manual in that period.[17] *Mesu Khurd* (Mesue the Elder eighth century) wrote a *Qarābādhīn* which was translated into Latin and accepted as a seal and credentialed till four centuries and after that it become a base for European pharmacopoeia.[3] The period from third to ninth century in Arab lands is considered as richest period concerning pharmacy and the healing arts. One of the contributors was *Yuhānnā ibn Masāwaih* (Mesue in Latin), his *Qarābādhīn* named "*Qarābādhīn*-e-*Yuhānnā ibn Masāwaih* (Formulary of *Yuhānna ibn Masāwaih*) in Arabic language got translated into Latin and became a pedestal and foundation for the London Pharmacopoeia.[18]

He observed that Indian sandalwood utilized in the manufacturing of perfumes was introduced in pharmaceutical preparations as early as the eighth century by the Arabs.[19]

Ibn Masāwaih's book "*al-Mushajjar al-Kabir*" is a medical encyclopaedia in tabulated form on diseases and their treatment based on diets and drugs such as barley water, its preparation and therapeutic uses, and amelioration of purgative drugs.[19]

Before drug standardisation, the use of illicit and putrid drugs was common by Attar and pharmacist. This lacuna was removed by *Qarābādhīn Kabeer* (The big formulary) by *Sābūr ibn Sahl* (d. 869 AD) at government level; but adulteration was eliminated with the help of *Minhāj al-Bayān* (The Course of Explanation) by *Abū 'Alī Yaḥyá ibn 'Īsá Ibn Jazlah al-Baghdadi* (Latinised as Buhahylyha Bingezla d. 1100 AD)[20] and al-*Aqrābādhīn al-Kabir Le ibn Tilmīdh* (Formulary of *Ibn al-Tilmīdh*) by *Ibn al-Tilmīdh* (1073–1165 AD). In the Arabian era, some important and useful apparatuses were invented.[3]

Saidla during Arabic period may be divided into 3 categories:

(1) *Al-Saidalani*:- the most professional and educated pharmacists (began in ninth century)

(2) *Al-Attaareen*: - the merchants of drugs since Arabic periods till now.

(3) *Al-Jawwaleen*: - they used to procure medicines and sell as wanderer.

According to Sami Khalaf Hamarneh (Born. 1925 AD) Arabs preserved their methods related to drugs / pharmacy, and are a branch of drug study, such as to differentiate between pure / unadulterated and impure / adulterated drugs by means of impact and application of fire. These procedures were adopted

to prevent cheating and fraud related to drugs.[3] A renowned pharmacopoeia is *Minhāj al-Bayān fi ma Yastamiluhul Insān"* by *Ibn Jazlah* (d. 1100 AD); it was translated in English entitled "Hospital Procedure with Compound Drugs". This Arabic handbook of pharmaceutics covers not only simple medicines (materia medica) but also compound formulations in chapter wise pattern such as a chapter on *Murakkabat* (compound formulations), *Ma'jeen* (a semisolid dosage form), *Huboob* (Pills), *Safoof* (powder), *Sharbat* (syrup), *Mazmaza* (gargle), *Joshanda* (decoction), etc. The introduction is related to compound remedies followed by simple drugs in alphabetical order[20] and dosage forms like *Safoof* (powder), *Zamadat* (paste), *Huqna* (enema), *Shiyaf* (suppository), *Farzajah* (tampons), *Sunoon* (tooth powder), and *Advia* (medicine) for sinus and abscess are also mentioned with especial description of drug actions, such as *Mudirr-i-Bawl* (diuretic), *Mudirr-i-Hayd* (emmenagogue), *Nafe' Aqr* (anti-sterility), *Muqawwi-i-Bah* (aphrodisiac), *Muarriq* (perspirant) and *Muqawwi-i-Sha'r* (hair strengthener).[3]

Abu Hasan 'Ali bin Sahl Rabban at-Tabari (838–870 AD), wrote several medical books; the most famous is *Firdous al-Hikmāh* (Paradise of Wisdom) written in Arabic as original text, also called *al-Kūnnāsh*.[21,22] For storage, he recommended vessels made up of glass or ceramic for liquid (wet) drugs; lead containers for fatty substances; especial small jars for eye liquid and salves. He prescribed an ointment made of juniper-gum, fat, butter, and pitch for the treatment of ulcerated wounds.[19]

Hunain Ibn Ishāq (Latinised as Iohannitius 809-873 AD) was the first who propagated the preparation of *Surma* (eye powders),[17] and wrote many famous books on this topic. His famous treatise "*Kitab al-Ashr Maqalaat fi al-Ain*" (Book of the Ten Treatises on the Eye) was completed in 860 AD, and the tenth treatise is devoted to compounded drugs for eye medications divided into four types: (1) Cory eye powders (*Kuhls*) (2) Kneaded soft mass (mess) (3) Wet (liquid) eye salves or collyria, and (4) Eye compresses or poultices (plaster). *Hunain Ibn Ishāq* gave a universal antidote against poisoning to the world, also called as *Tiryaq* in Arabic, hence the Latin "theriaca".[19]

Jābir ibn Hayyān (721-815 AD Latinised by Geber)[23] - the founder of modern pharmacy. He is credited with the invention of over 22 basic laboratory equipment such as *Qar' Anbeeq* (Alembic and retort). He also invented various chemical substances such as hydrochloric, nitric, citric, acetic and tartaric acids, silver nitrate and ammonium chloride [24] as well as various chemical processes such as distillation, evaporation, sublimation, pulverization, washing, straining, cooking, calcinations, and condensation, crystallization and dissolution which are mentioned in his book "*Sunduq al-Hikmah*". He is also credited with invention of Aqua Regia for melting the gold. His book "*Nataej al-Takmeel*" was translated into French language in 1672 AD that served an extensive aid in development of European pharmacy.[25]

Several essential mineral and chemical substances were utilized in amalgamations and elixir such as ammoniac, vitriol, common salt, sulphur, quicklime, arsenic, tutty (impure zinc oxide), malachite, manganese, marcasite, natron, impure sodium borate and vinegar. The equipment used were pots, pans, retorts, tuber, crucibles, alembics, and various distilling apparatus, covering platters, tumblers, ceramic jars, mortars and pestles (often made of glass or metals), and tripods, scales, and medicinal bottles.[19]

Ahmad bin al-Jazzar al-Qayrawani (895-979 AD) appointed an assistant to prepare medicines for his patients, under his supervision due to the fear that the prescription would not fall into the hands of unqualified pharmacist, for this ground, many physicians owned pharmacies or had special sections at their 'clinics' for this purpose.[9]

The first definite partition of two field's pharmacy and medicine and the recognition of the autonomous and academically oriented status of pharmacy established only in *Abbasiyyah* (Abbasid) capital Baghdad, and *al-Razi* was one of the few pharmacists who contributed very precious contributions to pharmacy and medicine while most of Europe was still reeling under the dark ages.[26]

Abu Bakr Mohammed al-Razi (865-925 AD) contributed to the early practice of pharmacy in many ways by compiling texts, in which he introduced the use of 'mercurial ointments' and development of apparatuses, such as mortars, flasks, spatulas, and phials, which remained in use of pharmacies till the early twentieth century.[27] In his book *Sirr al-Asrar*, *al-Razi* has discussed alchemical procedures and techniques, such as sublimation and precipitation of sulphur and arsenic, condensation of mercury, calcination of minerals (gold, silver, copper, lead, and iron), glass, salts, shells, talc, and waxing. He

also elaborated methods and procedures of colouring (gold leafing) the silver object to imitate gold as well as the reverse technique for removing the colour and returning it to silver.

Concerning the tools and equipment of the alchemist, *al-Razi* classifies them into two kinds:

1. Utensils to be used for the dissolving and melting of bodies such as the furnace, crucible, bellows, holder (tongue or ladle), macerator, pot, stirring rod, cutter, and grinder.

2. Utensils use to carry out the operation of transmutation, such as the retort, alembic, receiver and other parts of the distilling apparatus, oven (stove), cups, bottles, jars, pans, and blowers.[3]

He was the first who introduced *Marham Simāb*. He wrote about 250 books; some of which are related to pharmacy. He also had a personal laboratory. According to Eric John Holmyard (1891–1959 AD) has mentioned in his book "*Al-Kimi*" (Alchemy) that a list of instruments were available in *Razi's* laboratory, e.g. beakers, flask, phials, basins, glass crystallising dishes, jugs, casseroles, candle lamps, braziers, furnaces, files, spatulas, pestle and mortar, ladles hammers, shears, sand bath, water bath, aludles alembic, funnels, and cucurluts. *Al-Razi* famous book "*Kūnnāsh al-Mansuri*", *al-Razi* devoted four out of ten chapters of the book on diets and drugs, cosmetics, toxicology and antidotes, amelioration of laxatives, and compounded remedies; the book was translated many times into the Latin between 1480 to 1489 AD, and its Urdu translation was published by CCRUM in 1991.[28]

Al-Razi's last and largest medical encyclopaedia *Kitāb al-Hawī al-Kabeer* (Continens Liber or The Large Comprehensive) was covering all areas of medical knowledge of the time; the 19th, 20th, 21st, 22nd, and 23rd volumes deal with pharmacy, Materia Medica arranged in alphabetical order, and toxicology.[29]

'Ali ibn al-'Abbas al-Majusi (d. 994 AD), Latinized as *Haly Abbas* described compound drugs in the various pharmaceutical dosage forms such as *Laūq* (linctus), decoctions, powders, and dentifrices.[30]

Abū al-Qāsim Khalaf ibn al-'Abbās al-Zahrāwī (Latinised as Abulcasis 936-1013 AD) father of pharmacists and chemists of Andalusia, composed *Kitab al-Tasrif* in 30 volumes, most of the volumes from 3rd to 29th are related to pharmacology and pharmaceutics. He also discussed pharmaceutical equipments in this text, three drawings are displayed in the 28th treatise (*Liber Servitoris*) which are strictly related to pharmacy, the first two drawing are of moulds-made up of ebony or other kinds of wood to make the tablets of an exact weight[31] [Figure 3]; and the third pharmaceutical drawing is of Strainers *'al-Marawiq'* which includes three strainers, of smallest, larger and largest size, made of porous, less porous and thick and cohesive cloth consequently.[9]

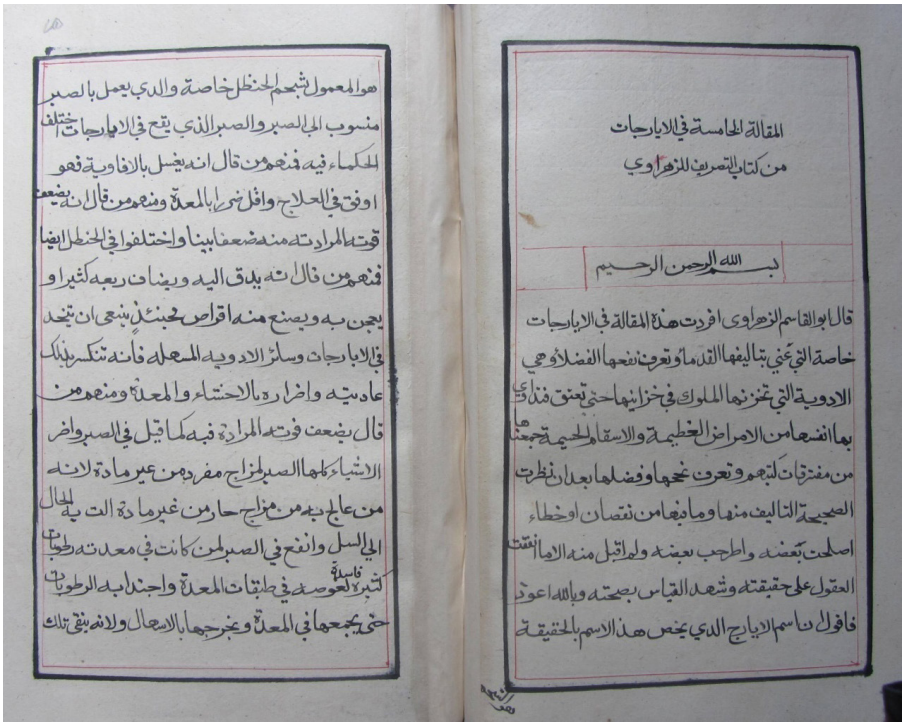


Figure 3: Manuscript of *Kitab al-Tasrif*
Source: *Khuda Bakhsh Oriental Library Patna*

Ibn Sina (980-1037 A.D.), (also called as Avicenna) pharmaceutical writings was accepted as an authority in the West until the seventeenth century, and still exert dominant influences in the Orient. He was the first person in the history of pharmacy who introduced coating procedure on pills and

tablets with sugar, silver and gold foils. He dedicated a specific and meticulous chapter on compound drugs in the book "*Al-Qanoon fit Tib*" (The Canon of Medicine) with their manufacturing procedures[32,33] This famous text dominated medical schools of Asia and Europe for near about five centuries,[34] like physician *Al-Zahrawi* and *Al-Majusi*, *Ibn Sina* also prepared the necessary medications for their patients.[33]

Abu ar-Rayhan al-Biruni (973-1048 AD) was very instrumental in educating the pharmacists. One of the scholarly definitions of the pharmacist, there role and profession was given by the illustrious scholar in his book on pharmacy "*Kitab al-Saydanah fit-Tibb*" (Materia Medica, or Pharmacology); he defined "Pharmacist (*as-Saydanani*) as a the proficient who is specialised in the assortment of all drugs, choosing the very best of each single or compound, and in the preparation of good remedies for them following the most accurate methods and techniques as recommended by experts in the healing arts." He elaborated that pharmacist should be able to substitute or discard one drug for another.[35]

In the twelfth century, *Ibn al-Tilmīdh* (1073-1165 AD) of Baghdad wrote an antidotarium *al-Aqrābādhīn al-Kabir* consisting of 20 chapters, e.g. chapter for *Aqras* (tablets), chapter for *Hubub* (pills), chapter for *Ayārījāt* (a semi-solid dosage form) and chapter for *Safufat* (powders) etc. It is organised on the basis of dosage forms with description of preparation of formulations like *Nabidh* (fermented un-distillate material) and *Handiqun* (a dosage form prepared with honey). *Ibn at-Tilmidh* arguably exhibited his expertise and competence on pharmaceutical dosage forms, methods of the preparation and collection, identification and preservation of drugs in his book's discussions. He also urged on weighing exact doses of drugs in prescriptions and outlined ways of administering them in each case.[30,36]

Apart from pharmaceutical preparations in 'Pharmacopeia of Ibn at-Tilmidh' he also mentioned cosmaceutical preparations as in twentieth chapter he also wrote about odor removers and anti-perspirant as an independent chapter.[37]

Based on historical record, 'The Marrakech Hospital' was a great hospital with a well maintained pharmacy shop built about 1190 AD by Al-Mansur (1184-1199AD). At its time, the hospital had no equal in the world. Trained pharmacists (Sayadilah) were employed to prepare food and drink and the required medicaments and dispensing of drugs. Herbs, flowers and fruit trees were cultivated in the hospital's garden for medical consumption.[9,38]

One century later, *Minhāj al-Dukkān* or *Mīnhāj al-Dukkān wa Dustūr al-A'Yān fi A'Māl wa Tarākib al-Adviā al-Nafi'a li-al-Insan'*, a manual on practical pharmacy was written by *al-'Attār al-Israilī al-Harūnī* of Cairo and it was completed in 1260 AD. Its use was widespread among pharmacists from 13th century up to the modern time. [9] The book is divided into 25 *Abwāb* (chapters) consisting of preface, instruction for practitioners of pharmaceutics, preparation of syrup along with methods of correction if any. It was composed as pharmaceutical piece of work in the *Mamlūk* period of Cairo. *Ibn al-'Attar*, was a skilled pharmacist, who devoted the instruction booklet to his descendant who was also in same profession to take charge of the business in place of his aged father. He gave attention to the important, practical aspects of pharmacy, the maintenance of the drug store, and its proper management, he also emphasised that one should be mastered in the methods of compound formulation and supply of pharmaceutical preparations and knowledge of the materia medica. This same text was digitally published by the Ghaemiyeh Computer Research Institute of Isfahan in 1996.[39]

In early 13th century *Dawud bin Abi al-Bayan*`composed his *ad-Dustur al-Bimaristani* (a hospital formulary) mainly related compounded drugs, and as a guide to physicians and pharmacists of an-Nuri hospital of Cario.[9]

Attar (apothecarist) has to work under the vigilance of the *Muhtasib* (drug inspector) assigned with inspection of processing and manufacturing of compound formulations; it should be carried out only by those persons who had complete and accurate knowledge in the concerned field. These officials were appointed to ensure the accuracy of weights and measures as well as the purity without adulteration of the drugs. The administration was assigned to prevent the use of deteriorating compound medicines and syrups, and to safeguard the public health.[19] In particular, they observed pots and vessels in which *Mau-sh-Shaeer* (barley water) and *Arq-e-Gulab* (distilled rose water) were prepared and preserved which should be clean and enamelled; old and putrescent pots and vessels were disposed off by the order of the *Muhtasib*.[30]

Akbar (1542-1605 AD) appointed a group of Unani

physicians in different cities of his territory and paid special attention to the development of pharmacy.[3] *Ali Gilani* (d. 1609 AD) designed a formula of *Deodar* Oil used for treatment in both Unani as well as conventional medicine. In the *Mughal* period, the Dukes due to their daintiness and delicacy could not tolerate bitter and dreadful taste drugs, so physicians developed a delicious and fragrant dosage form known as "*Khamira*" (Fermented confection). In the same period, calcination was propagated on large scale prepared from different metals and animal origin drugs dispensed in the form of tablets. In British government, the reputed family of physician "*Khandan Shareefi*" (*Shareefi* family) and "*Khandan Azizi*" (*Azizi* family) rendered memorable contribution in the field of pharmacy for the betterment and development of Unani Medicine. In the latter years, *Ajmal Khan* (1868-1927 AD) of the *Shareefi* family established a pharmacy where research was carried out on single drugs in *Ayurvedic* and *Tibb*i College Delhi. Professor Dr. Salimuzzaman Siddiqui (1897-1994 AD), motivated by *Ajmal Khan* separated the active constituents, e.g. Ajmaline from Asrol (*Rauvolfia serpentina* Benth.).[40]

Ḥąkīm 'Abd al-Ḥąmīd (1908-1999 AD) was an extraordinary figure of Unani medicine who initiated modernised mass production of Unani drugs. He set up Hamdard Dawakhana for quality production of Unani drugs for domestic and global market.[41]

Table 1: Summary of development in Unani Pharmacy

S. No	Personalities	Contributions in Pharmacy
1.	Hippocrates (460-370 BC)	He had own pharmacy, used extracts and inventor of some dosage forms.[2]
2.	Pedanius Dioscorides (40-90 AD)	A biggest pharmacopoian and hugely contributed in transition of pharmacy practices.[7]
3.	Galen (129-200/216 AD)	Gave principles of preparing and compounding, originator of cold cream and Galenicals, inventor of *Qarābādhīn* (pharmacopoeia)[3,7]
4.	*Sābūr ibn Sahl* (d.869 AD)	Author of first known Arabic Formulary at government level for the use of pharmacist (Sayadilah) in hospitals and retail drug store.[9]
5.	*Mesu Khurd* (Mesue the Elder 8th century AD)	His *Qarābādhīn* was base for European pharmacopoeia.[3]
6.	*Ibn Masāwaih* (Mesue in Latin 777-857 AD)	His formulary was pedestal and foundation for the London Pharmacopoeia.[18]
7.	*Hunain Ibn Ishāq* (Latinised as Iohannitius 809-873 AD)	Propagated the preparation of *Surma* (eye powders) in "Book of the Ten Treatises on the Eye".[17]
8.	*Jābir ibn Hayyān* (721-815 AD Latinised by Geber)	Categorized poisons by their kinds and natural origins. Inventor of *Qar' Anbeeq* (Alembic and retort), chemical processes such as distillation, evaporation, sublimation, pulverization, washing, straining, cooking, calcinations, and condensation, crystallization and dissolution.[23,35]
9.	*Razi* (865-925 AD)	Introduced the use of 'mercurial ointments' and development of apparatus such as mortars, flasks, spatulas and phials, mineral classification was categorized. Promoted the medical uses of chemical compounds.[3,29]
10.	*Al-Majusi* (d. 994 AD) Latinized as *Haly Abbas*	Divided drugs according to their pharmacological action.[30]
11.	*Abū al-Qāsim al-Zahrāwī* (Latinised as Abulcasis 936-1013 AD)	Father of pharmacists and chemists of Andalusia, composed *Kitab al-Tasrif* in 30 volumes, most of the volumes (3rd to 29th volume) is related to pharmacology and pharmaceutics.[9]
12.	*Ibn Sina* (Avicenna 980-1037 A.D.)	Experimentation & quantification, clinical pharmacology, efficacy test of drugs. He introduced coating procedure on pills and tablets with sugar, silver and gold foils.[32,33]
13.	*Al-Biruni* (973-1048)	He was very instrumental in educating the pharmacists.[35]
14.	*Ibn Jazlah al-Baghdadi* (Latinised as Buhahylyha Bingezla d. 1100 AD)	*Minhāj al-Bayān* (The Course of Explanation) adulteration was eliminated by this book.[20]
15.	*Ibn al-Tilmīdh* (1073-1165 AD)	An antidotarium on applied pharmacy used in the '*Adudi* hospital in Baghdad, and model pharmacological work in the hospitals of the Arab civilization.[30,42]
16.	*Al-'Attār al-Israilī al-Harūnī* (fl.1260)	*Minhāj al-Dukkān* a manual on practical pharmacy in tabulation.[33]
17.	*Ali Gilani* (d. 1609AD)	He designed a formula of *Deodar* Oil.[40]
18.	*Ajmal Khan* (1868-1927 AD)	He established a pharmacy and research was carried out on single drugs.[40]
19	*Ḥąkīm 'Abd al-Ḥąmīd* (1908-1999 AD)	Initiated modernised mass production of Unani drugs for domestic and global market.[41]

Current Scenario in India

India is the adobe of traditional medicine maximally utilizing the natural or herbal products for the beneficence of ailing masses. Lack of proper cure for chronic diseases accompanied with untoward effects of conventional medicines has compelled the developed countries to head towards "Alternative Medicine" such as Unani, Ayurveda, and Siddha etc. A number of World Health Assembly resolutions have been convened aimed at scientific development of traditional medicine and medicinal plants for the maximum utilization in the health promotion of common masses. These developments have equally shaped the global scenario of Unani Medicine.[43] At present, Unani System of Medicine and its pharmacies enjoys the patronage of Indian Government under the Ministry of AYUSH, and has been an essential part of the National Health Plan. India is leading in research, development, and education of Unani System of Medicine globally.

Central Council for Research in Unani Medicine (CCRUM), New Delhi: Keeping the pace with pharmaceutical research, Central Council for Research in Unani Medicine (CCRUM)- an authoritative institute in Unani medical research under the Ministry of AYUSH, Govt. of India has come up with the establishment of Drug Standardization Research Institute (DSRI), at Ghaziabad; Central Research Institute of Unani Medicine (CRIUM), at Hyderabad; Regional Research Institute of Unani Medicine (RRIUM), at Chennai; Drug Standardization Research Unit (DSRU), at New Delhi; Regional Research Institute of Unani Medicine (RRIUM), at Srinagar; Regional Research Institute of Unani Medicine (RRIUM), at Aligarh; Chemical Research Unit (Grant-in-Aid), AMU, Aligarh for drug standardization & patenting of drugs at national level.[44] So far, standardization of 298 single drugs and 100 compound drugs under the technical guidance of Unani Pharmacopeia Committee has been developed by it. Standardization of 277 single drugs in five volumes and 385 compound drugs; physicochemical standards of 350 compound drugs, and National Formulary of Unani Medicine in five parts containing standards of 1228 formulations has been published. There are more than 485 licensed Pharmacies manufacturing Unani drugs in different parts of the country and 88 pharmacies have Good Manufacturing Practice (GMP) certification. [44] Moreover, Govt. of India has established an enterprise «Indian Medicine Pharmaceutical Corporation Limited» for manufacturing the herbal medicine including Unani formulations which is one of the major manufactures of Unani drugs catering to the needs of the Central Government dispensaries. Unani pharmacies run by the State Governments are also functioning in various states such as Uttar Pradesh, Madhya Pradesh, Andhra Pradesh, Karnataka and Tamil Nadu. Manufacturing and sale of Unani Drugs are regulated under Drug & Cosmetic Act 1940 with mandatory compliance with GMP. Drug Standardization is undertaken by competent institutions of central government e.g. Pharmacopeial Laboratory for Indian Medicine (PLIM), Pharmacopeia Commission of Indian Medicine (PCIM), Unani Pharmacopeia Committee (UPC) and CCRUM.[45]

The primary institute of research in Unani medicine in India CCRUM (Central council of Research in Unani Medicine) also manufacture Unani medicines at Central Research Institute of Unani Medicine; Hyderabad CCRUM is mainly concerned in pre-clinical and clinical research. There is also a need of scientific innovation, research and development in the field of Unani pharmacy at this premier research institute. Tremendous achievement of CCRUM in the field of Unani Pharmacy as if till now is translation, publications and reprint of various Unani text related to Unani pharmacy.[46]

Besides these government manufacturing units, the most leading company equipped with latest pharmaceutical technology and dedicated R & D in Unani pharmacy in private sector is Hamdard Laboratories (India) followed by Dawakhana Tibbiya College Aligarh, Dehlvi Remedies, New Shama Laboratories (P) Ltd, Rex (U&A) Remedies Pvt. Ltd, which have carved out a significant capital market share for last few years in India and abroad too.

Numerous committees appointed by the Government of India to weigh up and appraise the status and practice of Unani Medicine have stressed the importance of preparing an official Unani Pharmacopoeia. Having regard to all these deliberations, the Unani Advisory Committee suggested the constitution of Unani Pharmacopoeia Committee (UPC) consisting of experts of Unani System of Medicine and other sciences. The Unani Pharmacopoeia Committee (UPC) is constituted under the Chairmanship of eminent person from the field, one member-secretary from Ministry of AYUSH and sixteen members expert in Unani medicine and other disciplines .[47]

National Institute of Unani Medicine (NIUM), Bengaluru India: It is the only institute that has been very instrumental and quite proactive in embarking on advanced academic research with innovative and novel ideas in the field of Unani Pharmacy. It runs a three-year post graduate degree program with a separate department of pharmacy named as Department of *Ilmul Saidala*. The researchers at NIUM have actively used contemporary and recent high-end technologies in the field of pharmaceutical research. Many modern dosage forms from Unani drugs have been studied and scientifically evaluated such as cream, medicated oil, effervescent granules, medicated sachet, foaming tooth paste, sugar-free syrup, effervescent tablet, extract tablets, emulgel, hair dye, shampoo etc., as these forms are not mentioned in Unani classical pharmacy. In contrary to this, most of the other academic institutes of Unani medicine have only focused their research on classical and traditional dosage forms.

It will be injustice to not acknowledge the contributions made by Department of Ilmul Advia of Aligarh Muslim University which has played a pivotal role in shaping and nurturing a future generation of scholars and researchers in the field of Unani pharmacology since its establishment in 1972. From this sound foundation, department of Ilmul Saidala was established in various academic institutions. The Department of Ilmul Saidla, Aligarh Muslim University, Aligarh runs a two years post graduate diploma program in Ilmul Saidla, but from last year it has started a three-year post graduate degree program 'Mahire Tib -Ilmul Saidla (M.D. Unani Pharmacy). In some ways, Ilmul Advia had not necessitated running PG courses in AMU, but institution of such a magnificent cadre and history must have taken the lead in starting PG course in their campus. Another 'MD Ilmul Saidla' in Ayurvedic and Unani Tibbia College, Karolbagh, New Delhi also started from 2010 and continued till now.

Rest of the World: Unani system is popular in different parts of the world with different names as Unani Medicine or Unani *Tibb* in India, Bangladesh, Sri Lanka & South Africa; *Tibb-e-Sunnati* (Traditional Medicine) in Iran; Eastern Medicine in Pakistan; Uyghur Medicine in China; Traditional Complementary and Alternative Medicine (TCAM) in United Arab Emirates (UAE); and Islamic Medicine in Kuwait.[45] Different pharmacopoeia committees in the South Asian region were advised to expedite preparation of standards for Unani drugs. Pakistan Tibbi Pharmacopeia approved by the Board of Unani and Ayurvedic System of Medicine, Pakistan under the Act II/1965 was published in 1970.[48]

Unani medicine has an institutional and Pharmaceutical framework in some of the Asian and African countries like Pakistan, Bangladesh, Sri Lanka, South Africa, Iran, Kuwait, and United Arab Emirates (UAE). In Pakistan, there are about 500 dispensaries in private and government sectors with 100 Unani drug manufacturing units.[39] Hamdard Dawakhana (Pakistan) is the leading manufacturer of Unani medicine in Pakistan. Moreover, Unani medicine has also made significant progressive strides in Bangladesh and the leading example in the field of Unani pharmacy is Hamdard Dawakhana.

Unani manufacturers have also started investment in research and development with new and innovative technology for the higher effectiveness of Unani drugs and cosmetics. [41]

In South-East Asian countries, such as Pakistan and Bangladesh, the patronage and laws governing the Unani pharmacy have also been quite appreciable.

Incentives to drug manufacturers, entrepreneurs, and institutions for international propagation of AYUSH and registration of products; exports and support for international market development and promotional activities and so many initiatives have been taken by Indian Government in Globalising Unani System of medicine.

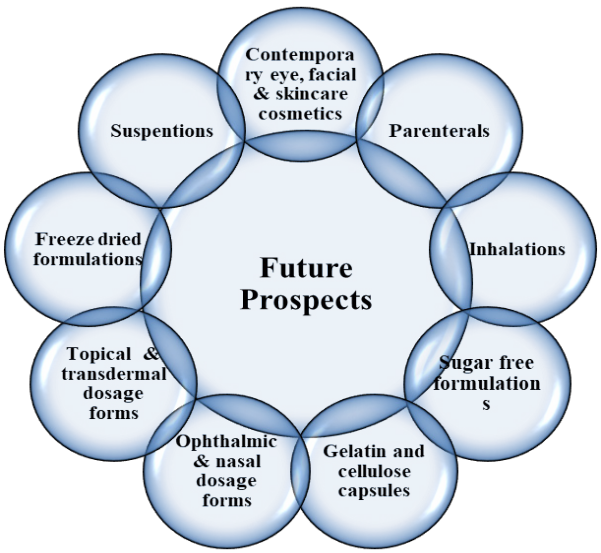


Figure 4: Future Prospects in Unani Pharmacy

The development of Unani Pharmacy in the present scientific era has been very considerable

and appreciable. Most pharmaceutical companies have adopted modern techniques and contemporary pharmaceutical equipment for manufacturing their products. The modern palatable dosage forms are also in practice like capsules, tablets, granules, syrup, sugar-free syrup, cream, lotion, ointment, toothpaste and cosmetic products. Some dosage forms used in eye cosmetics should be adopted such as eyeliners, eye shadows, false eyelashes, mascara, concealers, primers, eyebrow enhancers, and eye brushes, eye palettes; facial cosmetics such as foundation, primer, highlighter & shimmer, talcum, concealers & correctors, blush, bronzer, setting spray & powder, primer finder, foundation finder; cosmetics used in skincare such as moisturizer, cleanser, face mask; in lip care e.g. lip gloss, lipstick, lip liner etc. In medicine, there should be the inclusion of modern dosage forms e.g. Parenteral, Inhalation, Oral Solid (Hard Gelatin Capsules, Soft Gelatin and cellulose Capsules), Ophthalmic, Aqueous Nasal Dosage Forms, Topical and Trans-dermal Delivery system, Solution Formulations, Freeze-Dried Formulations, Suspensions etc. [48] [Figure 4]. Topical Novel Drug Delivery System such as Hydrogel and Novel Drug Dosage Form for Oral / Parenteral use such as Nanogel, Liposomes etc. based dosage form for Unani formulations can also be considered in recent scenario [49]

Packaging and distribution of Unani medicines needs modification and improvement, and it should be rationalized and updated with a prime focus on promotion, administrative support, research and development. Modernization of techniques is very important for delivering effective Unani healthcare products; the regulatory authorities should provide guidelines and methodologies for research and evaluation from time to time to ensure the quality, safety, efficacy, cost-effectiveness, utilization, and best practices.[48] The thrust areas of research in Unani Pharmacy are a modification of different dosage forms; standardization of single drugs, and compound formulations; scientific validation of every procedure mentioned in Unani classical text e.g. *Tadbeer -e -Advia* (detoxification of drug), development of Standard operating procedure for a formulation of compound medicine etc.

Discussion and Conclusion

Unani medicine is an integral part of national health programme of the Indian government. It is also promoted by Indian Subcontinent Countries like Bangladesh and Pakistan. The initiatives taken by the government for the promotion of Unani medicine are highly appreciable. There has been an amalgam of contribution from Greek, Roman, Arab, and Indian subcontinent physicians in its development, and have played an important role in propagation of Unani system of medicine, and many physician / authors contributed in the form of books / publication in the field of pharmacy such as *Yuhānnā Bin Māswaih, Sābūr ibn Sahl, Yaqoob Kīndī, al-Zahrawi, al-Mājūsī, Rāzi, Hunain Bin Ishāq, Ibn Sīnā, Ibn al-Jāzzār, al-Biruni, al-Zahrawi, Ibn al-Tilmīdh, 'Attār al-Israilī* etc. In India, the *Mughal* period has been a golden period for the popularity of this healing system. In recent years, *Hakim Ajmal Khan* and *Ḥakīm 'Abd al-Ḥameed* initiated modernized mass production of Unani drugs and established pharmacies for the same. Presently, the efforts must be ushered in developing palatable dosage forms suitable to the needs and changing lifestyles of the population at large.

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References

1. Hamdard pharmacopoeia of eastern medicine. Reprint second Edition ed. Satguru; 1997.
2. Remington JP. Remington: the science and practice of pharmacy. Lippincott Williams & Wilkins; 2006. ISBN 0-7817-4673-6.
3. Akbarabadi MM. Fehrist Qarābādhīn Ma'dane Tajurbat. 1st ed. Patna: Khuda Baksh Oriental Library; 1998:2.
4. Bender GA, Thom PB. A history of pharmacy in pictures. Parke, Davis & Company; 1952:2.
5. Ahmad W, Zulkifle Hamiduddin, M, Afreen S, Rahman O. Explanation and elucidation of cancer in reference to Greco-Arabic literature. *Bangladesh Journal of Medical Science.* 2019 Mar 25;**18**(2):184-9. https://doi.org/10.3329/bjms.v18i2.40683
6. Shahrajabian MH, Sun W, Cheng Q. The influence of traditional Iranian and Chinese medicine on western and Islamic countries. *Asian Journal of Medical and Biological Research*. 2019 Aug 4;**5**(2):94-9. https://doi.org/10.3329/ajmbr.v5i2.42490
7. Shahabuddin; Usman Ghani; Abdul Hannan. Unani Medicine: Comparative Study of Unani Qarābādhīn (Pharmacopoia) and clinical evaluation of some herbal medicine for Amoebiasis. 1st ed. VDM Verlag Dr.Muller, 2011.
8. Ghazal. SK. The Valuable Contributions of al-Rāzī (Rhazes) in the History of Pharmacy. Foundation for Science Technology and Civilisation, 2007:2.
9. Hamarneh SK. Health Sciences in Early Islam. Volume II. collected paper. Anees MA, editor. Texas, USA: Nooe Health Foundation and Zahra Publications; 1984:44.
10. Ubani LU. Preventive Therapy in Complimentary Medicine. Xlibris Corporation; 2011:432.
11. Wikipedians, B. Medicine. Pedia Press. 2011:127-128. books?id=Xj786a0P6scC}
12. Ghazal SK. The valuable contributions of Al-Razi (Rhazes) in the history of pharmacy during the Middle Ages. *Journal of the International Society for the History of Islamic Medicine (JISHIM).* 2003;**2**(9):11.
13. Boslaugh SE, editor. The SAGE Encyclopedia of Pharmacology and Society. SAGE Publications; 2015:740-42. https://doi.org/10.4135/9781483349985
14. Glick TF, Livesey S, Wallis F, editors. Medieval science, technology, and medicine: an encyclopedia. Routledge; 2014:20. https://doi.org/10.4324/9780203957868
15. Cotnoir B. Alchemy. Weiser Books; 2006:16.
16. Samarqandī MBA. Qarābādhīn Marīstānī.(Urdu translation by Abdul Bari) 1st ed. New Delhi: Dept. of AYUSH Gov. of India, 2006:11.
17. Qutfi J. Tarikh Al-Hukama. (Urdu translation) 1st ed. New Delhi: CCRUM; 2012.
18. Beeston AF, editor. Arabic literature to the end of the Umayyad period. Cambridge University Press; 1983:501. https://doi.org/10.1017/CHOL9780521240154
19. Zakārīā Virk. Muslim Contribution to Pharmacy. https:// karachi. academia. edu/ ZakārīāVirk. Accessed on 16.09.2019.
20. Rodini M. Medical Care in Islamic Tradition During the Middle Ages. WebmedCentral: International Journal of Medicine and Molecular Medicine 2012;**3**(7): WMC003549.
21. Prioreschi P. A History of Medicine. *Byzantine and Islamic Medicine*. Vol. **IV.** Horatius Press Omaha.2001:222-23.
22. Usiba' IA. Uyun Al-Anba Fi Tabaqat Al-ATībba. Vol. I. Urdu translation. 1st ed. New Delhi: Central Council for Research in Unani Medicine (CCRUM), 1990:193-506.
23. Abu Musa Jabir ibn Hayyan. Encyclopædia Britannica Online. Retrieved 11 February 2008. Accessed on 11th May 2020.
24. Tschanz DW. A short history of Islamic pharmacy. *International Society for the History of Islamic Medicine (JISHIM)*. 2003**;4**(2):11-17.
25. Zakariya M Virk. Musalmanon Ke Sciencei Karname. Aligarh: Markaz Farogh science Aligarh Muslim University; March, 2005:127.
26. Zebroski B. A Brief History of Pharmacy: Humanity's Search for Wellness. Routledge; 2015:76-87. https://doi.org/10.4324/9781315685830
27. Amr SS, Tbakhi MA. Abu Bakr Muhammad Ibn Zakariya Al Razi (Rhazes): Philosopher, Physician and Alchemist. *Annals of Saudi medicine*. 2007 Jul 1;**27**(4):305. https://doi.org/10.4103/0256-4947.51482
28. Juljul I. Tabaqat Al-ATībba Wa Al-Hukama (Urdu translation by Hakim Abdul Bari Falahi). 1st ed. Delhi: Bharat Offset, 2012:165-218.
29. Qadeer A. Tībbi Sahaef. 1st ed. New Delhi: Education Publishing House, Delhi, 2004:49-50.
30. Hamarneh S. Ecology and Therapeutics in Medieval Arabic Medicine. Sudhoffs Archiv. 1974:165-85.
31. Hamarneh SK, Sonnedecker GA. A Pharmaceutical View of Abulcasis Al-Zahrāwī in Moorish Spain: With Special Reference to the" Adhān,". Brill Archive; 1963:72.
32. Sina I. Al-Qanun Fil-Tib. 1st ed. New Delhi: Jamia Hamdard, 1998.
33. Saad B, Said O. Greco-Arab and Islamic herbal medicine: traditional system, ethics, safety, efficacy, and regulatory issues. John Wiley & Sons; 2011:**7**,27,91. https://doi.org/10.1002/9780470944363
34. Beg H. surgical principles of Ibn Sina (Avicenna). *Bangladesh Journal of Medical Science.* 2015 Jun 20;**14**(3):217-20. DOI: https://doi.org/10.3329/*bjms*.v**14**(3).22776 https://doi.org/10.3329/bjms.v14i3.22776

35. Al-Bairuni AR. Al-Saidana Fi Al-Tib. I ed. Tehran: Farhangistan Zaban wa Adab Farsi; 1383.

36. Gazi Jahangeer Rather, Hamiduddin, Mohd Ikram, Mohd Naquibuddin, Akhtar Ali. Historical Significance of Qurs and Habb dosage form in Unani Medicine with special emphasis on Qurs (Tablet). *Journal of Research in Unani Medicine* 2018:**5** (1):59-69.

37. Hamiduddin, Akhtar Ali, Wasim Ahmad. Evolution of Cosmetics and Cosmeceuticals in Unani Medicine: A historical perspective. *Journal of Research in Unani Medicine*, 2016;**5** (2):72-83.

38. The Marrakech Hospital. https://muslimheritage.com/marrakech-hospital. Published on: 20th December 2002. Accesed on 13th March 2020.

39. Israilī. Minhāj al-Dukkān. Isfahan: Ghaemiyeh Computer Research Institute of Isfahan, 1996. http://www.ghaemiyeh.com.

40. Rahman SZ. Aainae Tareekhe Tibb. 1st ed. Aligarh: Publication Division Aligarh Muslim University (AMU) Aligarh, 2001:392-93.

41. Anonymous. Unani System of medicine the Science of Health and Healing. New Delhi Department of AYUSH ministry of Health & Family Welfare, Government of India, 2013:8.

42. Aqrābādhīn. https://www.nlm.nih.gov/hmd/arabic/welcome.html. Last reviewed: 31 December 2014. Accessed on 13.10.2019.

43. Deshpande SM. Study of Current Market Scenario & Marketing Prospects against Changing Attitude of Consumers towards Buying of Ayurvedic Medicines in India. *International Journal of Business and Management Invention.* 2015;**4**(6):48-54.

44. Drug Standardization Research Programme. http://ccrum.res.in / ViewData Multiple ? mid =1546. Last Update on Thursday, June 8, 2017. Accessed on 14.06.2019.

45. Rahman R. UNANI Medicine: The Art of Health and Healing. YOJANA, 2015:43-47.

46. Objective of the Council. https://ccrum.res.in/UserView/index?mid=1422. Accessed on 10.05.2020.

47. Unani Pharmacopoeia Committee. http://www.ccrum.net / research / upc /. Accessed on 04.07.2019.

48. Usmanghani K. Unani medicine: Implications and applications. 2011. https:// pdfs.semanticscholar.org/d942/120ee950a8211b31a7ecc14062deb5c9cad1.pdf, Accessed on 28/08/2019.

49. Zaigham, Hamiduddin, Tauheed A and Ali A: Recent trend in traditional medicine dosage form and present status of Unani and Ayurvedic medicine. *Int J Pharm Sci & Res* 2019; **10**(4): 1640-49.