



## Review Article

### THE VALUABLE CONTRIBUTIONS BY UNANI PHYSICIANS IN QARABADIN (UNANI MATERIA MEDICA)

Mahmooda Begum<sup>1\*</sup>, Ashfaque Ahmad<sup>2</sup>, H.M.A.Rasheed<sup>3</sup>, A.A.Syed<sup>4</sup>

<sup>1</sup>P. G. Scholar, <sup>3</sup>Professor and HOD, <sup>4</sup>Associate Professor, Government Nizamia Tibbi College, Hyderabad,

<sup>2</sup>Research Officer (Unani), National Institute of Indian Medical Heritage, Hyderabad.

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#### ABSTRACT

*Qarabadin* (Unani pharmacopoeias) have a rich armamentarium of natural drugs, consisting of mostly herbs but also materials of animal, mineral and marine origin. There are over 2,000 species of plants in the Unani Materia Medica of which many species of plants occurring in India found a place. In addition to treatises concerned just with medicinal substances, books were also composed listing recipes in which a number of medical substances would be compounded. Such medical formularies (*Qarabadin*) were usually arranged into Chapter concerned with a particular type of remedy, such as laxatives or salves or eye remedies, and some were prepared specifically for use in hospitals. There are many collections of different formularies in *Qarabadin*s have been written by Unani physicians. The first true medical formulary ever created was *al-Aqrabadhin* written in Arabic by *Sabur ibn Sahl* (d. 869). The book included medical recipes stating the methods and techniques of compounding remedies, their pharmacological actions, the dosages, and the means of administration. The formulas are organized by the type of preparation to which they belong - i.e. tablets, powders, ointments, electuaries or syrups. *Sabur's* formulary-type compendium is unique in its organization and purposely written as a guidebook for pharmacists, whether for use in their own private drugstores or in hospital pharmacies. This article describes the contribution of eminent Unani Physicians, scholars, scientists and authors in development of Pharmacy.

#### \*Address for correspondence

**Dr. Mahmooda Begum**

P. G. Scholar,

Government Nizamia Tibbi  
College, Hyderabad.

Email:

[hameeduddinkhaja93@gmail.com](mailto:hameeduddinkhaja93@gmail.com)

Ph: +9198019763477

#### INTRODUCTION

The earliest known compilation of medicinal substances was the Ancient Egyptian pharmacological knowledge which was recorded in various papyri such as the *Ebers Papyrus* of 1550 BC, and the *Edwin Smith Papyrus* of the 16<sup>th</sup> century BC. In Ancient Greece, The Greek physician Dioscorides (40-100 AD) is famous for writing a five volume book in his native Greek in the 1<sup>st</sup> century AD. The Latin translation *De Materia Medica* (Concerning medical substances) was used a basis for many medieval texts. *De Materia Medica* formed the core of the European pharmacopeia through the 19<sup>th</sup> century. It became most popular by its Arabic translation with *Kitab al-Hashaish* during the Islamic Golden Age. Pharmacy has developed into an elaborate profession by many renowned Unani physicians and scientists like *Buqrat*, *Razi* (Rhazes), *Ibn Sina* (Avicenna), *Jalinoos* (Galen), *Jabir Ibn Hayyan* (Geber) and others. Medicinal substances in both Antiquity and the medieval Islamic world included not just plants but also minerals and animal substances.

The Arabic literature on pharmacology, however, quickly took a different form from that

inherited from the Hellenistic world. A class of literature arose that explained unfamiliar foreign terms for drugs and compiled synonym lists giving equivalent terms in different languages. A large proportion of the plants described by Dioscorides and Galen would not have been known in various regions of the Middle East. The differing climatic conditions of the desert, marsh, mountain and coastal communities meant that species of medicinal plants, as well as animal species and mineral resources, varied greatly from one region to another. The broader and different geographic horizons of Islamic writers brought them into contact with new drugs. Traders and travellers played as important a role in the knowledge and development of medicinal substances in the Islamic world as did the treatises of Dioscorides and Galen in their Arabic dress.

#### Pharmacy as a profession

For nearly 500 years, great progress was made by the Greeks in the field of pharmacy from 5-15<sup>th</sup> century whatever progress was made in the field of pharmacy was due to Arab physicians. Studies in the field of pharmacology, pharmacognosy and pharmaceutical

sciences were brought to such a high level by the Arab physicians and scientists from the ninth to the thirteenth centuries that their materia medica and most of the pharmaceutical ideas remained supreme for many centuries. In fact, the Arabic materia medica and pharmaceuticals are still used in the practise of medicine in much of near East, North Africa, India, Pakistan, Bangladesh and other parts of Asia.<sup>2</sup> The development of professional pharmacy, as a separate entity from medicine, started under the Abbasid Caliphate during the Islamic Golden Age. In Baghdad the first pharmacies, or drug stores, were established in 754, by the 9<sup>th</sup> century these pharmacies were state-regulated.

Drug stores established in Baghdad, drugs were prepared and sold. The drug stores were inspected by *Mohtasibs* (inspectors). Market Inspectors were responsible for checking the cleanliness of the containers, preparation of drugs and their dispensing. During the reign of Caliph Mamun al-Rashid (d.833) licensing system was introduced. The druggists and the physicians had to pass an examination in order to obtain a license to practice. Licensed pharmacists were called *Sayadala*. *Sinan ibn Sabit* (d. 943), director of Baghdad hospital, was the first administrator of licensing department and founder of public health system. Muslim pharmacists made scientific investigations of the composition, dosages, uses, and therapeutic effects of drugs.<sup>5</sup>

Qarabadin have been given due attention in Unani Medicine in every period right from Hippocrates to the latest. Since then abundant books were written on this subject in different languages especially Persian. Generally a chapter or a book on Qarabadin is described in every major treasure of Unani Medicine. For example fifth volume of *Al-Qanun* by Avicenna (980-1037 AD) deals with compound drugs, likewise *Firdaus al-Hikmat* part six by *Ali ibn Rabban Tabri* (810-895 AD), *Al-Havi* part 20-23 by *Al-Razi* (Rhazes) 850-925 AD, *Kamil al Sana'h* vol. 2 by *Ali ibn Abbas Majusi* (Haly Abbas) 930-994 AD and *Zakheera Khwarazm Shahi* vol. 10 by Ismail Jurjani. Half portion of the famous book '*al-Tasreef*' authored by *Abul Qasim al-Zahravi* (936-1013 AD) deals with the pharmacy and *Materia Medica*. In addition to these treatises a number of separate and absolute books regarding this subject have been also written time to time in Unani Medicine.

### Contributions of Unani Physicians to Pharmacy

There are various renowned Unani physicians who promoted the practise of Alchemy and pharmacy as a profession and career. A great number of Arabic works in pharmaceutical sciences were rendered into Latin at first and thus enriched the pharmaceutical knowledge of the west during the late middle ages. The names and works of such Unani physicians, scholars and authors as *Masawayh* (d. 857), *Al-Kindi* (d. 873), Galen (131-210 AD), *Jabir Ibn Hayyan* (702-765 AD), *Razi* (850-925AD), *Ibn Sina* (980-1037 AD), became widely known and circulated.

### 1. Buqrat (Hippocrates) (460-377 BC)

*Buqrat* or Hippocrates used to prepare his own medicines and from whose period the history of medicine and pharmacy may be said to begin. Hippocrates knew about the effects of several drugs that are still used by modern doctors. He used opium from poppies as a pain killer. Morphine, which is an extract of opium, still use to relieve pain. Hippocrates also knew the drug belladonna, this is extracted from deadly night shade plant. In large doses belladonna can be deadly poison but small doses of the drug can be very effective in relieving stomach upsets. In the writings of Hippocrates nearly 400 simples are named as medicinal substances. He made and used fomentations, poultices, gargles, suppositories, pills, lozenges, ointments, collyria and inhalations.<sup>2</sup>

### 2. Dioscorides (1<sup>st</sup> century AD)

He was an early Unani physician of Rome, he had an authority on materia medica and pharmacy for many centuries. Dioscorides work "De Materia Medica" remained the basis of all books on material medica until 17<sup>th</sup> century in Europe.<sup>2</sup>

### 3. Jalinoos or Galen (131-210 AD)

Till the time of Dioscorides, pharmacy was mixed with medicine and there was no separate identity of this art. It was Galen, a Greek (Unani) physician of Roman period, who gave a distinct identity to the art of pharmacy. An elaborate system of polypharmacy was introduced by Galen. He wrote many books in which he mentioned directions of making hundreds of medicines prepared from plants. In modern medicine a drug which is extracted from a plant is still called a "Galenical". Galen was the originator of the formula for cold cream. He always stressed the importance of pure drugs and their careful handling. Galen's "De Compositione medicamentorum" is the first organised medical formulary in the history of pharmacy.<sup>2</sup>

### 4. Sabur bin Sahl (d. 869)

The first medical formulary to be written in Arabic was prepared by *al-Aqrabadhin Sabur bin Sahl*. The book included medical recipes stating the methods and techniques of compounding remedies, their pharmacological actions, the dosages given of each, and the means of administration. The formulas are organized by the type of preparation to which they belong - i.e. tablets, powders, ointments, electuaries or syrups. *Sabur's* formulary-type compendium is unique in its organization and purposely written as a guidebook for pharmacists, whether for use in their own private drugstores or in hospital pharmacies. As such it is the first true medical formulary ever created.<sup>4</sup>

### 5. Yaqub Ibn Ishaq al-Kindi (800-873 AD)

*Al-Kindi* is credited with 36 works on technology and chemistry. One of these, which has been published was on the extraction of perfumes, indicates that the fantastic distillation apparatus of Maria had by the time of al-Kindi taken a more modern and utilitarian form. Distillation equipment used by al-Kindi is very well described in his book "*Kitab Kimya al-itr wa al-tas'idat*"

(Book of perfume, chemistry and Distillation)". After describing the apparatus (glass retort) used for distillation he says in the same way we can distill wine using a water bath, and it comes out in the same colour as rose water.<sup>5</sup>

There is evidence which indicates that Arab physicians were the discoverer of alcohol and probably of ether radical. It is well documented that alcohol was distilled by *Al Kindi*. The name is pure Arabic, coming from "*Al-Goul*" the word used by the Arab to describe the damaging portion of wine and it is mentioned in the Holy Quran, describing the wine served in paradise as (*Al-Ghoul* free and does not cause hangover).<sup>6</sup>

### 6. *Jabir Ibn Hayyan (Geber) (702-765 AD)*

*Jabir* is known to have promoted the practise of alchemy as a profession and a career. That's why he is considered father of chemistry. He was a great alchemist and is believed to have discovered the process of distillation and sublimation. The credit for the discovery of spirit of wines, mercuric chloride and mineral acids also goes to him. The proof of the fact that substances on burning gain in weight also attributed to him. It is narrated that *Jabir* saved the life of a slave girl of *Yahya bin Khalid Barmaki* by means of an elixir. He is the reputed discoverer of "oil of vitriol (sulphuric acid)" nitric acid, "aqua fortis" and of "aqua regia" (nitrohydrochloric acid) as well corrosive sublimes and lunar caustic.

He wrote many books on pharmacy and chemistry and some of his famous treatise are as follows:

- Book of Royalty (*Kitab al-Mulk*)
- Small Book of Balances (*Kitab al-Mawazin*)
- Book of Mercy (*Kitab al-Rehmat*)
- *Kitab al-Riyadhat*
- *Kitab al-zibaq al-Sherqi* (Book of oriental Mercury)

*Jabir* mentioned that sulphuric acid is obtained by distilling alum. In his work, the name for sulphuric acid is alum, a name which is still used. Specific weight is also referred by him as a characteristic criterion for metals. *Jabir* gave a clear description of noble metals by cupellation and noted that only Gold and silver are resistant to this test. He very well mentioned methods for refinement of metals, preparation of steel, dyeing of clothes and leather, preparation of varnishes to water proof the cloth and protect iron, use of manganese dioxide in glass making, use of iron pyrites for writing in gold and distillation of vinegar to concentrate acetic acid etc. The *Asafia* library of Hyderabad has about 50 manuscripts of *Jabir's* work. Philosophically or rather practically, in both the ways, he was the pioneer of modern chemistry, a fact that cannot be denied at any time or at any standard.<sup>5</sup>

### 7. *Mohammad Ibn Zakariya al-Razi (Rhazes) (864-930 AD)*

*Al Razi* was a Hakim, an alchemist and a philosopher. In medicine, his contribution was so significant that it can only be compared to that of *Ibn Sina*. *Al-Razi* was born at Ray, Iran. He was one of the few

pharmacists who added very valuable contribution to medicine and pharmacy while most of Europe was still living in the dark ages. Some of his works in medicine e.g. *Kitab al-Mansoori*, *Al-Hawi*, *Kitab al-Mulooki and Kitab al-Judari wal Hasabah* earned everlasting fame. His book *Kitab al-Judari wal Hasabah* was the first treatise on smallpox and chicken pox. His book *Al-Hawi* was the largest medical Encyclopaedia composed by then. He was also an expert surgeon and was the first to use opium for anaesthesia.<sup>3</sup> He presented his book *Al-Mansuri* and the *kitab ithbat al-kimiya* (The establishment of Alchemy) to the Samanid prince, *Abu Salih Mansur*. In his book *Kitab al-Asrar* (Books of secrets) he gave full account of Alchemical equipment. His systemic approach, as depicted in *Liber secretorum*, towards experiments for the first time led to a clear classification of chemical compounds into inorganic (mineral derivatives) and organic (animal and vegetable) groups. He described differences between calcium and potassium carbonates, the process for the preparation of white arsenous oxide, silica compounds from bamboo, the treatment of sulphur, arsenic and organic compounds. The use of heated gypsum mixed with egg white as plaster for broken bones was also described by him.

*Razi* gave a full description of Alchemical equipments in his *Kitab al-Asrar* (The Book of secrets) dividing it into two broad categories:

- a) Those used for smelting and other heating processes.
- b) Those used for processing chemical substances (*tadbir*)<sup>5</sup>

He introduced mercury ointment. He is credited with having written nearly 250 works, some of which exclusively upon pharmaceutical subjects.<sup>2</sup>

In his famous book, *al-Mansuri*, however *Al-Razi* devoted four out of the book's total of ten treatises to diets and drugs, medicated cosmetics, toxicology, antidotes, amelioration of laxatives, and compounded remedies, all of which are of pharmaceutical interest. *Al-Razi's* last and largest medical encyclopaedia is his "*Al-Hawi fit-tibb*" which embraces all areas of medical knowledge of the time. It included sections related to 'pharmacy in the healing art, materials arranged in alphabetical order, compounded drugs, pharmaceutical dosage forms and toxicology.<sup>3</sup>

### 8. *Ibn Sina (Avicenna) (980-1038 AD)*

*Ibn sina* was one of the few physicians who added very valuable contribution to medicine and pharmacy. Among the brilliant contributors to the science of pharmacy and medicine during the Arabian era was one genius who seems to stand for his time - the Persian, *Ibn Sina* (about 980-1037 A.D.), called Avicenna by the Western world. Avicenna was an intellectual giant. He was such a universal genius, transcending all restrictions of race and creed and breaking down all geographical frontiers, belongs to the whole of humanity. His book *Al- Qanun fit Tibb* (The Canon of Medicine) was the principal guide for medical science in the West from the twelfth to the seventeenth century. His pharmaceutical teachings were accepted as authority in

the West until the 17<sup>th</sup> century; and still are dominant influences in the Orient. Avicenna was the first in the history of pharmacy who introduced sugar, silver and gold coatings of the pills.<sup>2</sup> In the area of pharmacy he made many contributions including describing 760 drugs, he described the characteristics and action of acids, sulphur and alcohol and described the benefits of alcohol for cleansing of wounds. Perhaps his most lasting in the field of pharmacy was his work in laying down the following rules for testing the effectiveness of a new drug or medication. These principles still form the basis of modern clinical drug trials. These are as follows:

1. The drug must be free from any extraneous accidental quality.
2. It must be used on a simple, not a composite, disease.
3. The drug must be tested with two contrary types of diseases, because sometimes a drug cures one disease by its essential qualities and another by its accidental ones.
4. The quality of the drug must correspond to the strength of the disease. For example, there are some drugs whose heat is less than the coldness of certain diseases, so that they would have no effect on them.
5. The time of action must be observed, so that essence and action are not confused.
6. The effect of the drug must be seen to occur constantly or in many cases, if this did not happen, it was an accidental effect.
7. The experimentation must be done with the human body, for testing a drug on a lion or a horse might not prove anything about its effect on man.<sup>4</sup>

Different works by *Ibn Sina* like the encyclopaedic *Al-Qanun* is a comprehensive treatises on cardiac drugs, code of recipes and other works contain valuable knowledge on problems of general and systemic pharmacology, pharmacognosy and also of the methods of preparation of more than 2000 simple and complex drugs. He developed general principles for the treatment of patients and described them in the first book *Al-Qanun* under the heading, "On General Means of Treatment" According to him, treatments are done in three ways: "one of them is regimen and nutrition; the second, application of drugs and the third, manual treatment, i.e., surgery". Treatment with drugs must take into account by following rules: choice of drugs by their quality, selection of drugs by their quantity and this rule includes change in weight, potency and properties; and the time of administration of drugs.<sup>7</sup>

The second book of *Al-Qanun* gives rather detailed pharmacological characteristic of 811 drugs, among which those of vegetable kingdom constitute 594 (73.7%), of animal kingdom 118 (14.5%) and of mineral origin 99 (12.2%). To avoid repetition of general properties the second character of action, *Ibn Sina* at the beginning of the above-mentioned second book deals in detail with questions of general pharmacology, describes more than 60 kinds of pharmacological effects of simple

drugs, and combined action of different preparations. He describes local, general, direct, specific, indirect, counter attracting, synergistic, potentiating, cumulative, side-effects and some other kinds of drug action in other ways more than those adopted in modern pharmacology. However, his detailed description made quite clear the effect of the drug.<sup>8</sup>

### 9. *Abu Rayhan al-Biruni (973-1048 AD)*

He is one of the few physicians who gave one of the finest definitions of the pharmacist, his role and his profession. In his work *al-Saydnah fit-Tibb*, al-Biruni defined the Pharmacist (*al-Saydanani*) as the professional who is specialized in the collection of all drugs, choosing the very best of each simple or compound, and in the preparation of good remedies from them following the most accurate methods and techniques as recommended by experts in the healing arts. *Al-Biruni* promoted the idea of academic training of pharmacy students coupled with day-to-day practical experiences with drugs. As a result, he said these trainees would become more and more familiar with the shapes, physical properties, and kinds of drugs. They would then be able to differentiate one from the other and would possess the know-how, a knowledge that could not be taken away from them. He also argued that a pharmacist should also be able to substitute or to discard one drug for another. The knowledge of how drugs work on the body (pharmacology), however, is more important than the mere skill of preparing them. In substituting one drug for another the various actions of each should be considered and accounted for. Cure can be sought through a draft, ointment, anointing oils or by fumigation. Thus, in seeking a substitute, all these and other applications should be considered. Without this knowledge one falls short of professional goals.<sup>4</sup>

### 10. *Abu Mansur Al-Muwaffaq al-Harawi (fl. 976 AD),*

He was a Persian physician and pharmacologist; his contributions in the field are also pioneering. He wrote *Kitab al-Abnyia un Haqa'iq al-Advia* (The foundations of the true properties of Remedies):

It was written between 968 and 977 AD, which is the oldest prose work in modern Persian. It deals with 585 remedies (of which 466 are derived from plants, 75 from minerals, 44 from animals), classified into four groups according to their action. The drugs with synonym in Persian, Syrian, Sanskrit and Greek are also mentioned along with their characteristics, Mizaj and degrees. Outline of a general pharmacological theory, Abu Mansur distinguished between sodium carbonate (natrun) and potassium carbonate (qali); he had some knowledge about arsenious oxide, cupric oxide, silicic acid, antimony; he knew the toxicological effects of copper and lead compounds, the depilatory virtue of quicklime, the composition of plaster of Paris and its surgical use. He also describes the distillation of sea-water for drinking.<sup>16, 23, 24</sup>

### 11. *Ibn Al-Wafid (997-1074 AD), Latin: Abenguefit*

He is an important Spanish pharmacologist who wrote two books *Kitāb al-Rashad fī al-Tibb* and

*Mudjarabāt fī al-Tibb*, both of which were printed in Latin more than fifty times.

### 12. *Ibn Baytar* (d. 1248)

He composed a most comprehensive book "*Kitab al-Jamey le Mufradat al-Adwiya wa al-Aghzia*" of all the Arabic treatises on *Materia Medica*. It is an alphabetical guide to over 1,400 medicaments in 2,324 separate entries, taken from his own observations as well as over 260 written sources which he quoted. It was based on 300 actual plants discovered by him along the length of Mediterranean coast between Syria and Spain. This was one of the greatest botanical compilations dealing with medicinal plants in Arabic. The book refers to works of some 150 previous Arabic authors, and also quotes 20 Greek scientists. According to Max Meyerhof, "it is a work of extraordinary erudition and observation". All the drugs were listed in alphabetical order. The book surpassed that of Dioscorides and remained in use until the 19th century. His second book on the subject *Kitab al-Mughni fil Adwiya al-Mufrada* was published around 1260AD where drugs were listed therapeutically. It consists of 20 chapters, dealing with ailments of the head, eye, ear, and general antidotes. Ibn al-Baytar discovered the earliest known herbal treatment for cancer: *Hindiba*, a herbal drug which he identified as having anticancer properties and which could also treat other tumours and neo-plastic disorders. After recognizing its usefulness in treating neo-plastic disorders, *Hindiba* was patented in 1997 by Nil Sari, Hanzade Dogan, and John K. Snyder.<sup>9</sup>

**Other books were written in later periods are numerous:**

*Qarabadin Qadiri* by Akbar Arzani, *Qarabadin Zakai* by Zakaullah Khan, *Qarabadin Azam* by Azam Khan, *Qarabadin Ehsani* by Ehsan Ali, *Makhzan al-Murakkabat* by Hakim Ghulam Jeelani Khan, *Bayaz Kabeer* by Hakim Kabeeruddin Qarabadin Sarkari by Government of Andhra Pradesh, *National Formulary of Unani Medicine* by Government of India, *Kitab al-Murakkabat* by Hakim Syed Zillur Rahman

### CONCLUSION

The present overview has demonstrated the crucial role played by various Unani scholars, physicians, scientists and authors in the development of pharmacy as a separate profession. *Buqrat* (Hippocrates), Dioscorides, *Jalinoo* (Galen), *Razi* (Rhazes), *Jabir Ibn Hayyan* (Geber), *Ibn Sina* (Avicenna), *Al-Kindi*, *Al-Beruni*, and *ibn Baytar* has done eminent work in development of pharmacy which laid down the base for modern pharmacy. Various pharmaceutical preparations and equipments discovered and developed by Unani experts are still use in pharmaceutical field. This article is an attempt to acknowledge the contribution of Unani physicians in development of pharmacy.

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