Hindiba:

A Drug for Cancer Treatment in Muslim Heritage

Author: Prof. Nil Sari
Chief Editor: Prof. Mohamed El-Gomati
Deputy Editor: Prof. Mohammed Abattouy
Associate Editor: Dr. Salim Ayduz
Release Date: April 2007
Publication ID: 707

Copyright: © FSTC Limited, 2007

IMPORTANT NOTICE:

All rights, including copyright, in the content of this document are owned or controlled for these purposes by FSTC Limited. In accessing these web pages, you agree that you may only download the content for your own personal non-commercial use. You are not permitted to copy, broadcast, download, store (in any medium), transmit, show or play in public, adapt or change in any way the content of this document for any other purpose whatsoever without the prior written permission of FSTC Limited.

Material may not be copied, reproduced, republished, downloaded, posted, broadcast or transmitted in any way except for your own personal non-commercial home use. Any other use requires the prior written permission of FSTC Limited. You agree not to adapt, alter or create a derivative work from any of the material contained in this document or use it for any other purpose other than for your personal non-commercial use.

FSTC Limited has taken all reasonable care to ensure that pages published in this document and on the MuslimHeritage.com Web Site were accurate at the time of publication or last modification. Web sites are by nature experimental or constantly changing. Hence information published may be for test purposes only, may be out of date, or may be the personal opinion of the author. Readers should always verify information with the appropriate references before relying on it. The views of the authors of this document do not necessarily reflect the views of FSTC Limited.

FSTC Limited takes no responsibility for the consequences of error or for any loss or damage suffered by readers of any of the information published on any pages in this document, and such information does not form any basis of a contract with readers or users of it.
HINDIBA:
A DRUG FOR CANCER TREATMENT IN MUSLIM HERITAGE

Prof. Nil Sari*

The following text is the theoretical background of the invivo and invitro experimentations with herbal extracts from Turkey. Starting from the philosophy of the Ottoman Turkish medicine, which has its roots in the Islamic medicine, the drugs Cichorium intybus L. and Crocus sativus L. were identified as identical substitute plants for each other in terms of their active components for cancer treatment. Dr. Hanzade Dogan and I planned to search for the compounds in C. intybus L. and saffron from Safranbolu, as it was claimed in old medical texts that there is a compound in saffron, which was said to act as a transporter for the active compounds for cancer treatment in itself and in C. intybus L. to cross the cell membrane. Crude extracts of both were tried in animal experiments in Turkey at DETAM (Center of Experimental Medical Research of Istanbul University) in 1989, ending up with promising and exciting activities. Since C. intybus L. was much cheaper and easily available, we continued our experiments with intybus. From 1990 to 1994, Dr. Dogan was sent by the Istanbul University to Boston University, where she took part in invivo and invitro experiments at the Departments of Immunology and Pathology. It was Professor John F. Snyder of the Department of Chemistry of Boston University, who carried out chemical analysis of the herbal extracts prepared and sent from our Department during the period. The first pure and novel compound isolated by J. Snyder was from C. intybus L. extract. Later, Snyder produced the drug's natural analogues and synthetic derivatives, while Dogan tested their bioactivity, some of which are included in the patent published in 1997.

In accordance with an agreement between Boston and Istanbul Universities in 1992, claims of both parties were put down. These studies were composed and presented as a paper in the 212th American Chemical Society National Meeting in 1996, where the paper was granted the Fellowship Award. Two patents were produced on these subjects, an international one in 1995 and a United States patent in 1997.

The following paper explores the process by which these and similar drugs were used in the past as medicaments for the treatment of cancer as well as several other diseases. I felt the need to raise this discussion because the rediscovery of this drug is a proof to the share of the historical background in the rediscovery of this drug.

The Wisdom of the Past and the Undiscovered Treasure of Nature

Medical literature of the past is a source of information which has the potentiality of suggestions to the contemporary scientist. This is a different approach to medicine in history from regarding it as an alternative to the contemporary medicine. This different view of medicine in the past and its philosophy on a wider perspective will enable us to evaluate old medical literature more objectively and utilize it. Above all, when we study old materia medica, we discover material that can be utilized and be conscious of the bridge between past ages and ours. This study attempts to convert the combination and welding of the past and contemporary medicine into one corporate whole. When we have a closer look at the old texts we see

* Professor, Istanbul University, Cerrahpasha Medical School, Department of Medical Ethics and History of Medicine.
the truth that we know far too little about the herbal remedies of the past. Contrary to our attitude, the physician in history paid the greatest importance to herbal medicine, not only because surgery had not progressed enough, but also because they believed that the secret through which the equilibrium of health was to be sustained and restored lied in herbal medicine. It is not in vain to believe that knowledge of the ancient usages of drugs can lead to the discovery of new drugs. Therefore, it is of great importance to identify the drugs used in history and carry out experiments with them in laboratories.

The Sources of Turkish Medicine

Turkish medicine may be said to have a relation with all great civilizations, for Turks had political and cultural relations for a long time with China, India, Persia and Islamic countries. They were therefore also carriers of especially practical medical knowledge from one civilization to another over a large geographical area. One typical example is the book Tansukname written in Persian on the medicine of the Uighur Turks of Eastern Turkistan, which was related with Chinese medicine. But the greatest problem in studying and evaluating old Turkish medical texts is due to the use of different alphabets in different times. A great many important works of Islamic medicine, especially of the Seljukian period, were written in Arabic and Persian. These languages were accepted as scholarly or literary languages; but, some Seljukian scholars of Anatolia and the Ottoman scholars began to write in Turkish, and therefore, besides works in Arabic and Persian we have considerable Turkish medical literature available, especially in the field of materia medica. Islamic medical literature written in Arabic and Persian have been widely studied both by Muslim and Western researchers and there is ample publication on the subjects. However, the use of the Arabic alphabet for reading and writing until 1928 involves several difficulties for researchers on old Turkish medical literature, which is almost a completely bare field of research. Other handicaps are the linguistic and vocabulary differences and the great difference between contemporary medicine and old medicine. The traditional medicine declined and finally passed away before the steady advance of the contemporary western medicine, the introduction of which into Turkey was accelerated in the 19th century and eventually replaced the traditional medicine almost completely, except in rural districts. However, the basis of traditional Turkish medicine is reserved in medical manuscripts in the Ottoman Turkish.

When we look through the sources of Turkish medicine, in addition to mutual influences with Central Asian and Chinese medicine, we see that it is basically on the same lines as that of Islamic medical tradition which includes practically a great part of the medical knowledge of the civilizations preceding Islam. This is also true of the administration of drugs based on long experience and observation, which extends to the ancient civilizations, especially to the Indian, Greek and Persian sources. The main sources of Islamic medicine were the writings of Hippocrates and Galen, but the most important source which Islamic pharmacology utilized was Dioscorides's *Materia Medica*. Yet, the tradition of writing materia medicas reached its peak in Islamic medicine.

The Seljukian and Ottoman Turkish scholars followed the Islamic tradition. Simple drugs played a great role in Seljukian and Ottoman medicine and therefore the first aim of those interested in the healing art was to learn the medical properties of drugs. There is abundant material on simple and compound drugs in classical Turkish literature.

In view of Turkish simple drugs, we see that the *Canon* of Ibn Sinā served as one of the most important references for the simple drugs in respect of theory, as well as their therapeutic values. The work concerning simple drugs of Ibn Baytār also had a great influence on the works of Ottoman physicians, who
often utilized from the works of the earlier masters. In addition to the fact that Ibn Baytār introduced about three hundred new drugs; his travel to Anatolia is of great importance in respect of Turkey's medicinal plants. Therefore, the translations of Ibn Sinā and Ibn Baytār into Turkish have been a great help in solving questions in relation with simple drugs in this study; for, in composing of the works on simple drugs, analogical reasoning was considered very important. Authors gave credit to their predecessors for the experience they handed down.

**A Short Look at the Design of Books on Simple Drugs**

Simple drugs deal with drugs in their natural and simple state, or pharmacognosy in contemporary terms. Books on materia medica generally include the description, some physical properties of each of the plant's morphological parts, the Galenic nature and grade, botanical properties, therapeutic values of drugs, the preparation of drugs, substitute drugs and the opinions of other writers on remedies. Usually, the texts give synonyms of the drug terminology from other languages, generally Greek, Latin, Syriac, Arabic, Persian, etc., which help greatly in identifying the drugs today.

**The Question of the Theory of the Nature of Drugs**

The theory underlying pharmacology is inseparable from that of medicine. Each drug was believed to possess qualities called *nature* with various degrees of intensity and was prescribed for a particular malady in the light of the type of nature and the degree of intensity of that nature needed to re-establish the equilibrium of the four humors in the body –blood, phlegm, yellow bile and black bile– which meant a healthy state. The use of drugs is, therefore, related to the nature of the drug, as well as the temperament of the patient. This view based on Galenic medical theory continued to be effective for centuries.

Drugs with the heating property make the body hot, because their nature is hot, and drugs with the cooling property make it cold, because their nature is cold. When we speak of the influence of a drug with regard to its nature, such as cold and hot, it does not mean absolutely hot or absolutely cold by itself, but it is compared in relation to the body. For instance, the temperament of lettuce is colder than that of the human body. A substance which is taken into the body is not only hot or cold actually, but it is virtually hotter or colder than the body. So when we say that a drug is potentially hot or cold, we mean its potential benefit to the body.

The action of the nature of a medicament on the body changes from the first to the fourth degree and therefore the effect of the substances taken into the body changes in degrees from unperceivably slight to that of a poison.

The effect of substances is mainly classified as, pure nutriment, medicinal food, pure medicine and poisons. Medicinal food like lettuce which is feebly nutritious and attenuated, produces a change in the body, but the change is turned into the likeness of the body. Anything that is nutritious will eventually change the temperament of the body in a natural manner. It warms the body, because when it turns into blood that it has a natural effect; and the body becomes warmer. For instance, the temperaments of lettuce and gourds are colder than that of the human body, but since they turn into blood and consequently capable of being converted into tissue, they warm the body in this way. Therefore it was believed that, whenever possible, treatment should be made by means of nutritive drugs or medicinal food and when they had to treat with pure drugs, they should be satisfied with simples if they could.
However, the philosophy of medicine and pharmacology reached beyond the rigid application of the humoral therapy, as hot, cold, moist and dry. As we will see in this study, there was a much broader theorization of the basic pragmatic value of drugs.

It was also believed that many illnesses could be cured by nature itself, for there are natural reactions in the body through which the body heals itself. One of the purposes of drugs was then to aid nature to activate this healing reaction. This is why the idea of the inner heat was paid a great importance to, as we will see later. This is an extension of the great concern of Islamic and consequently Turkish medicine with the overall functioning of the body and the interrelation of the organs within the total unity of the body. Therefore, therapy following this concern tended to try to cure the body as a whole, following a systematized medicine of its own.

**The Relation between Theory and Practice**

Without the equipment and methods of today, physicians in the past felt the need to find an explanation for their observations and clinical and practical experiences.

As Levey put it, "although the ancient use of drugs was not based on a scientific system as we know it today it was, nevertheless, founded on empiricism. It was the theoretical which issued from the practical experience, and not vice versa... The humoral theory was used postfactum as a scholastic kind of interpretation." For centuries the humoral theory was used to explain empirical evidence. The writings ultimately rely upon empirical evidence rather than theory in the actual prescribing of drugs to the patients. This is why ancient and traditional medicine can lead us to certain implications and practical solutions.

**Studying Ottoman Medical Literature**

This study deals with Ottoman medical literature in Turkish before the 19th century, when ancient medicine began to be disfavored and western medicine was introduced and modern medicine and pharmacology took the place of the old. Henceforth, it is to be simply mentioned as old literature, which means mainly the Ottoman medicine with frequent references to the Islamic medicine.

There is a confusion of terminology in defining drugs, because in old literature usually one term is used for describing various herbs. Another confusion is due to some of the dictionaries and contemporary books of pharmacology which provide us with the current meanings of the drug terminology traditionally used, which mislead the reader by identifying the old terminology for the herbs with different ones used today. The names of the herbs, like many other terms, have changed in the course of time. It is also very easy to make mistakes in taxonomic studies depending on ancient texts, because the old drug classifications are quite different and insufficient compared with that of today, which is based on the binomial classification founded by Linneus. Therefore, sometimes, even when you feel you are near the truth, you can never be sure of it. The best way of finding out the current synonyms for the terms described in Ottoman medical literature is to study originally compiled Turkish works and translations into Turkish, for they made use of the materia medica of the time themselves and therefore it was necessary they had to use the right terminology. The translations of works written in Arabic and Persian and later from western languages into
Turkish also help us greatly in determining the Turkish terminology defining drugs and to identify the herb; for the Turkish synonyms of Greek, Latin, Arabic and Persian terminology are given in them.

In advance it should be noted that, since the aim of this study is not to compose a classical historical essay to determine who influenced whom, but merely to try to interpret old literature as a means to lead us to make practical use of medical history. It is contended with noting the sources which were helpful in achieving this aim and comparing information found in them so as to solve the problem of identifying the herb and its therapeutic values.

Since herbal therapy was very popular then, many people were used to note the name, the descriptions, properties and therapeutic values of herbs. Here was chosen the most reliable medical manuscripts, according to their contents, authors, linguistic styles and vocabulary. Although more samples of Turkish materia medica literature can be added, the examples given in this text are considered enough to satisfy the theory.

It should also be noted that hindiba, the subject of this study, though dealt in most of the medical manuscripts, does not practically take place in all of the Turkish materia medica works studied. The majority of Turkish materia medica which provided useful material for the identification of the herb is mostly those of the 17th and 18th centuries. The dates or centuries of the compilations and translations of the manuscripts into Turkish used in this study are given in the bibliography.

Another point is that I simply tried to translate the terminology used in the old texts to today’s language. Contemporary scientific terminology has not been used to replace the old concepts and terms in order to avoid confusion and misunderstanding.

The Drug "Hindiba"

The drug hindiba, the subject of the study, is a good example of the difficulty of identifying old drug names. For instance, in the beginning of this project it seemed that hindiba was referred to as only endive or chicory; but the study of the materia medica in Turkish has proved that the Arabian term hindiba and the Persian term kyasni (kasni) which have been so far used in Turkish terminology, besides the two species of Cichorium, C. endivia L. and C. intybus L., refer to other kinds of drugs, as well. Therefore, in this article the term hindiba is going to be used to avoid confusion. Now let’s have a look at the names and the descriptions of the various kinds of hindiba, as noted in Turkish materia medica.

* The spelling of the term hindiba is kept as it is in Turkish. Levey spells it as hundaba and Sigel as hindiba in Arabic and Redhouse scribes it as hindiba in Turkish.
Figure 1: The cultivated and the uncultivated kinds of hindiba are illustrated in a schematic way. (Dioscorides. Materia Medica. Translated by Abdullah el-Huseyn b. Ibrahim el-Natili. Kitabu’l-hasa’is. Topkapi Museum Library. Registered at section Ahmed III., No: 2127).

Many kinds of hindiba which were used as food and medicine are noted in old literature. It is agreed among authors that the herbs referred to as hindiba consist of two groups: one is the cultivated (bostani) and the other uncultivated (berri); and, rarely, a third kind classified as wild (yabani) is noted, which in some texts is identified with the uncultivated. Various drugs are named after both the cultivated and the uncultivated.

The Cultivated Hindiba

The cultivated hindiba or the hindiba grown in the garden drove its name from the fact that they were sown and grown in gardens. Some writers note that agriculturists used to grow different kinds of it57,68.

While the cultivated hindiba is generally known as aci marul, meaning the bitter lettuce, in Ottoman Turkish, it is also known as the cultivated kyasni (kasni-i bostani), the lettuce kyasni or the hindiba of Damascus32,43,55,59,60,74. The cultivated hindiba was described as broad leaved, resembling the lettuce and edible2.

It is usually noted that there are two kinds of the cultivated hindiba, one looks more like lettuce and it is broad leaved, the other is narrow leaved and tastes bitter7,62,68. The two are said to be brought up in gardens. But it is very difficult to identify them by utilizing the descriptions given in Ottoman texts.

From the Ottoman Turkish materia medica we learn that the bitter lettuce is the endive. For instance, Isa Efendi’s materia medica, being one of the comprehensive works on simple drugs, gives detailed information on hindiba and notes that the cultivated hindiba is called bitter lettuce in Turkish64. We also learn from him
that what is meant from the cultivated hindiba called bitter lettuce is endive, for he gives the terms used to mean bitter lettuce in various other languages. When we look through the main materia medica translations, in that of Mehmet Mumin it is noted that the cultivated hindiba are two kinds and the one called the hindiba of Damascus has broad and rough leaves, it is high and inclined to bitterness, and its flower is blue and large60. In the translation of Matthiolli's materia medica by Osman b. Abdurrahman, of the two cultivated kinds, one is said to be bigger, the other smaller68. The big one is said to have quite flat leaves, like those of lettuce, but that they are more curly, thick veined and rough and it is noted that it was called sweet lettuce and that the Europeans called it endive. We have not so far come across the term sweet lettuce used to mean hindiba in other Ottoman literature besides this text, which was translated by an official translator who was not a physician or a herbalist.

Sir James W. Redhouse, who lived in Turkey for many years and studied Turkish language and literature, published his great work the Turkish and English Lexicon in 1890. He notes that the cultivated kyasni, or, in other words, the kyasni of Damascus means garden chicory, the C. endivia L.32. Isa Efendi, Fazlizade and Yirmisekizade also use the same terminology for the cultivated hindiba55,64,74. The cultivated kind of hindiba grown in Damascus was said to be of the next best quality following the one from Balkh55,64. Kyasni, which was used synonymously with hindiba has changed to mean the species and products of Ferula in the course of time.

As we have seen, since one kind of the cultivated hindiba, called aci marul in Turkish, meaning the bitter lettuce, is named the cultivated kyasni, or the hindiba of Damascus and Ottoman literature generally agrees that it means C. endivia L., what may the other kind of the cultivated hindiba be? The texts we have studied do not provide us with sufficient information of it and besides, the information they provide is sometimes contradictory or different.

When we search for the terms describing cultivated hindiba in dictionaries, we find different names in different dictionaries and even in the same dictionary. For instance, in Redhouse's Lexicon, aci marul is quoted as leontodon taraxacum, the dandelion, which is today known as the dark hindiba. On the other hand in the translation by Osman b. Abdurrahman it is claimed that the second kind of the cultivated hindiba, which is the smaller one with narrower and longer leaves, tastes bitter and therefore is called kucuk marul, meaning the small lettuce or the bitter lettuce and that Europeans call it scariot68. Dioscorides quotes it as wild lettuce17. In Darwault’s L’officine we find La scarole given as cultivated chicory12. The Illustrated Polyglottic Dictionary of Plant Names of Bedevian describes Cichorium endive L. as scariola in French and Italian and the Turkish term for it is given as hindiba; and aci marul is given as C. intybus L. which also does not confirm with Ottoman Turkish materia medica7.

On the other hand, some contemporary work note that bitter lettuce in Turkish is L. scariola L., which means that it is not endive6. But since all Ottoman literature referred to, except that of the translation of Osman b. Abdurrahman, use the term bitter lettuce synonymous with endive68, it can be agreed that the bitter lettuce meant endive in classical Turkish materia medica.

The answer to the question of what the second kind of cultivated hindiba may be is even more confusing, because there is another term, the buql hindiba meaning the vegetable hindiba, which was used to describe one kind of the cultivated hindiba. Probably this is the same kind which Ibn Sinâ and all the other authors mentioned below were used to mean when they called hindiba as buql, that is an edible kind of hindiba.
It is really hard to identify the drugs, simply judging from the description of their leaves as narrow and broad. But, the *buql* cannot be *scariola* if we consider Mehmed Mumin\(^70\), who notes that the *buql* has blue flowers. Still the *buql* cannot be taken as *taraxacum*, as further discussions will show that *taraxacum* which grows wild was taken as the uncultivated kind of *hindiba* in Ottoman Turkish materia medica.

Mehmed Mumin\(^70\) stated that the other kind of the cultivated *hindiba* called *buql* had small and narrow leaves, as Ibn Sinā noted, and that its flowers were small azure blue and it was dominantly bitter\(^70\). In the translation of *Canon*, the leaves of the cultivated kind are described as narrow, looking like lettuce, this description seems to contradict that of Dioscorides, who writes that "*one is more like lettuce and broad leaved*"; but Dioscorides also mentioned the narrow leaved kind of the garden chicory\(^17\). Yet, the information found in the *Materia Medica* of Dioscorides does not help much in identifying *hindiba* and its different kinds definitely. Ibn Sinā notes that this kind is edible and it is regarded as *buql* that is vegetable\(^62\). Yirmisekiz\(^24\) notes that the *buql* kind of the cultivated *hindiba* has broad leaves, which contradicts Ibn Sinā. The mention of a kind of *hindiba* as the *buql*\(^23\), that is vegetable *hindiba*, continued to take place in Ottoman literature for many centuries\(^57,74\). It was also known as the *hindiba for salad*, in Turkish. Levey\(^24\) defines *buql* as *C. endivia* L.; but as several authors\(^70,74\) clearly divide cultivated *hindiba* into two kinds, one of Damascus, which is endive and the other, the *buql*, then we can not say for certain that it is *C. endivia* L. As both kinds of them were said to be grown as vegetable, which kind of cultivated *hindiba* is meant to be *buql*? Ahmed Issa’s dictionary leads the discussion to another herb when he defines the cultivated *hindiba* as *tifaf* and *buql*. These two terms lead us to another term that is the *buql yahudiya*. The *buql yahudiya*, meaning the Jewish vegetable, might then be in use because *chicory* is mentioned in the Old Testament\(^19\).

Although the knowledge found in various literature about the *buql yahudiya* is quite confusing, we find its synonym as *tifaf* in Ahmed Issa’s dictionary. *Buql yahudiya* is the sow thistle, that is *Sonchus*. In other words, *Sonchus oleraceus* L. is also called *tifaf* in Arabic. When we refer to Dioscorides, it provides us a historical background to help us explain this assumption, for he notes of *Sonchus*: "...*Some call it Cichorium... and of this there are two kinds, the one is more wild and more prickly, the other more tender and edible*".

Isa Efendi\(^64\) writes that the early shoots of Sonchus, when it was not yet quite bitter, was used to be eaten fresh; and, it was also used in making flaky pastry called *borek*. Its quality and activity was said to be similar to that of the uncultivated *hindiba*. It must also be noted that *Sonchus oleraceus* L. is eaten as salad and vegetable on the Aegian coast\(^6\).

In the translation from Mehmet Mumin, the *buql* is noted to be a different kind introduced from India. According to this text, it resembles to the cultivated *hindiba* and its flowers, root and dish prepared from it taste bitter too; its leaves are hard and smooth and it is called *buql yahudiya*.

When we refer to Siggel’s dictionary we see that *buql yahudiya* means *qirsaha*, which is Eryngium, that is *devedikeni* in Turkish. This does not fit well with the description of Mehmed Mumin and other literature. Yirmisekiz\(^24\) notes that *buql yahudiya* means *gunevik* (C. intybus L.) in Turkish and *tarakhshaq* (Taraxacum) in Arabian. Some of these descriptions do not accord with one another. Moreover, Sonchus is mentioned amongst the uncultivated kind, as well as the substitutes.
In the translation of Osman b. Abdurrahman, it is interpreted as, "some make an error and take buql yahudiya, that is tavsan otu (Panicum colonum) in Turkish for the small lettuce, the aci marul, called scariot". It is further explained that they might somewhat resemble each other, but there is great difference between them in their effect. It is also claimed that if herbalists administer the guneyik otu, that is the C. intybus L., as hindiba, the treatment will fail to be effective, it may even be harmful. When we consider the warning in the translation of Mattioli's materia medica, we can comprehend the confusion about the bitter and sweet lettuce found in the text. The drug terminology in this translation does not fit those of classical Ottoman materia medica.

Today Sonchus is called esek marulu in Turkish, literally meaning the donkey lettuce. The term marul is also traditionally used to define Lactuca scariola L. while the yahudi baklasi (buql yahudiya) is today used for Lupinus albus L.6

We can assume that the endive was the most popular cultivated kind of hindiba in Ottoman materia medica; but, it is really difficult to identify the other kind of the cultivated hindiba mentioned in the texts, sometimes as Lactuca scariola L. and sometimes Sonchus oleraceus L., or less often as another kind.

**The Uncultivated Hindiba**

The terms used to define uncultivated hindiba are hindiba-i berri, sahra hindibasi, kasni-i berri, kasni-i sahravi, yaban kisnisi and telh cekuk. According to Steingass, in Persian the term hindiba and its different spellings, hindab and hindbid, mean endive. The term kyasni, besides meaning endive, also means the sunflower, which is the C. intybus L. But hindiba is said to be generally known as kyasni in Persian.

**Figure 2**: Hindiba as illustrated in Kitab min al tibb fi'l-ahkami'l-kulliyat ve'l-edviyatu'l-mufredat. Suleymaniye Library. Registered at section Ayasofya, No: 3748.
According to Ibn Sinā, the leaves of the uncultivated hindiba are broad and uneven⁶². In the translations of Ibn Baytār’s book on simple drugs into Turkish⁵⁹,⁶⁰, the uncultivated hindiba is called *wild kyasni*; it is noted that it is also called *tarakhshaquq*. Its leaves are described as small and it is noted that it might be as high as two cubits, and that it has tiny blue flowers. Here, although it is called *tarakhshaquq*, its description resembles the *C. intybus* L.
The dictionary of the Ottoman Turkish, *Lehce-i Osman*, describes the uncultivated hindiba, called *guneyik*, as a long leaved herb with sky blue flowers.

In the original Ottoman Turkish materia medica literature we always find the Turkish term *gunegik*, in different spellings such as *guneyik* and *guvenik*, to mean *C. intybus* L. Since the flowers open early in the day and close soon after midday, it is called *gunegik*, which means *that which is bent towards the sun*. The synonyms are *gunese tapici*, *hur-perest*, or *afitab-perest*, all meaning *that which worships the sun*. *C. intybus* L. was called so because it means that its azure colored flower is the flower of the heaven, which always turns and worships the sun. As the flower of wild chicory always turns toward the sun, both in sunny and cloudy weather, and since when the sun sets it closes and opens again at sunrise, it was also called *gunebin* meaning *that which faces the sun*. Even the time of the day was said to be estimated with it; and it was also called *gun cicegi*, meaning the *day flower*.

In Osman b. Abdurrahman’s translation, it is also noted that the wild hindiba grew in the countryside, meadows, fields, road sides and garden sides and was spread out in the world. According to the description in the text, its leaves are dentate, long, narrow, rough and it tastes bitter. Its root is acrid and it has a branched stem with sky blue flowers.

In short, we can certainly say that the most popular kind of wild hindiba was the *C. intybus* L. in Ottoman Turkish materia medica. Various works of the Ottoman medical literature note that when *guneyik* is mentioned the uncultivated hindiba (*hindiba-i berri*) is meant. But the more important point is that it is clearly stated in the reliable works of the Ottoman Turkish materia medica that when referred to hindiba the uncultivated hindiba is meant. It is also cited recurrently that the *real hindiba* is the uncultivated kind. In Turkish it is called *guneyik* and we learn from Isa Efendi that the most popular kind of uncultivated hindiba was the *C. intybus* L. Emir Celebi and Siyahi gives hindiba as *guneyik* in Turkish and in his dictionary, Huseyn Kadri gives it only as *intybus*.

Redhouse states that the term *guneyik* was used to mean *leontodon taraxacum* and even any cichoraceous plant besides *Cichorium intybus* L.; he points out to the usage of both *C. intybus* L. and *Taraxacum* in Turkey as hindiba. This also shows that one term was used to mean various herbs, which leads to more confusion.

Another term used to define a kind of uncultivated hindiba was, therefore, *tarahsagun*, meaning *Taraxacum*. All Ottoman Turkish literature cited in this study note that it is an uncultivated kind of *hindiba*. Isa Efendi and Fazilzade describe it as a kind of the wild hindiba, as a third group, and the only difference they point to was that its root was long. Fazilzade also notes that it was even used with its root. Ahmet Issa and M. Levey also spell this word as *talakshaquq*. Both of them note that it is Cichorium, but Levey also remarks that the *species is not certain*. Yirmisekizzade also notes that the term *tarakhshaquq* is said to mean *guneyik* in Turkish. Yet, Ahmed Issa defines it as Taraxacum officinale, the dandelion and calls it *seris-i berri*, that is uncultivated *hindiba*.

Another kind of uncultivated *hindiba* is also mentioned in Isa Efendi’s text. It is described as very high and its flowers remain always open. It is said to be called *arslan disi* in Turkish, meaning *lion’s teeth*. He also notes that there are also two other kinds of *arslan disi*. Their flowers are said to be round and they remain always open; their bud is tuberculate while their flower resembles a mill. Although Isa Efendi did not describe the colors of these flowers, this recalls us the varieties of *Taraxacum*. Some contemporary
literature shows that arslan disi has hitherto been used for Taraxacum. Today Taraxacum is generally known as the dark hindiba (kara hindiba) in Turkey.

This information supports the idea that Taraxacum was regarded as the other kind of the uncultivated hindiba in the Ottoman literature.

**A Kind of Hindiba Informed as Endemic to Istanbul**

Hekim Isa Efendi writes that there is a kind of hindiba with a high stem and long branches with long petalled flowers on them, which is found only in Istanbul and not anywhere else. Fazlizade also notes that there is a big kind of hindiba endemic to Istanbul, which he calls hindiba-i kebir. He also claims that it is unique and found only in Istanbul and it did not exist anywhere else. He also states that its flowered stems are very high. We do not have detailed description here of this kind of hindiba to help us to identify it.

Figure 4: Hindiba of Europe (hindiba-i efrenc) as illustrated in a manuscript copy of Terceme-i cedide fi'l-havassi'l-mufrede.

We again come across a certain kind of berri that is an uncultivated hindiba called Istanbul hindibasi, or the hindiba of Istanbul or Cichorium Constantinople in Havassi'l mufrede of Mehmed b. Ali and also in a materia medica manuscript of early 18th century. In the manuscript of simples of Mehmed b. Ali, hindiba is quoted as chicory and named as the hindiba of Europe (hindiba-i efrenc) in Arabic and yemlik, that is edible in Turkish. Today yemlik is a common name used for the species of Scorzonera or Tragopogon. But in the printed version of the same materia medica, it is said to be called chicory of Constantinople in French terminology; hindiba in Arabic, and hindiba of Istanbul in Turkish. When we have a look at the drawing illustrating it, we see that it resembles Taraxacum and not Cichorium. When we study the Flora of Turkey by Davis, we again see the C. byzantinum mentioned in 1857, but as C. intybus L.; and, indeed, we know from Davis's Flora of Turkey that there are species of Taraxacum endemic to Turkey. It was reported in 1968 that there were 43 species of Taraxacum found in Turkey, of which 11 were known from Turkey.
Besides, the species *T. aznavourii* is reported as endemic to Istanbul; but we can hardly identify and distinguish the Taraxacum species mentioned in the Ottoman literature.

Besides, the species *T. aznavourii* is reported as endemic to Istanbul; but we can hardly identify and distinguish the Taraxacum species mentioned in the Ottoman literature.

**The Substitutes of Hindiba**

After having introduced the drug, usually the names of a few substitutes for it were given. A substitute is a drug that can be used in place of a certain drug, for having the same nature and therapeutic values. As we will see further in the text, *saffron* (*Crocus sativus* L.) was accepted as an identical substitute for *hindiba* and was noted as a drug from a different family with similar effects as that of *hindiba*.

The Arabian term *hundrili* (spelled in Turkish *handerili*) was given by some writers as a substitute drug for hindiba, while others classified it as an uncultivated hindiba. When it was taken as a substitute, this meant that it could be used instead of hindiba, that is, it had similar merits. Its leaves were said to be like those of the cultivated hindiba, but it was said to be the most bitter of all. Fazlizade, who wrote that *handerili* was a substitute for hindiba, noted it as *yer sakizi*, that is *latex of the ground*. It was probably named so because its latex was derived from its stem, which was cut at the level of the soil to get the latex.

Siggel gives *hundrili* as *Chondrilla* and Redhouse *handerili*, as spelled in Turkish, as *Chondrilla juncea*, which is *Akhindiba* in Turkish, meaning *white hindiba*. Ahmed Issa notes *hunderili* as a kind of uncultivated hindiba.
Chondrilla has been related with *hindiba* since Dioscorides, who states: "Condrilla, which some also call Cichorium or Seris, has leaves and a stalk and flowers like unto Cicorie, where upon some has said that it is a kind of wild Seris", meaning uncultivated hindiba.\(^1\)

Mustafa Ebu'l Feyz\(^5\) recorded that handerili was a kind of uncultivated hindiba. Redhouse gives it as a kind of wild chicory. Yirmisekizzade\(^7\) notes that it is different from *guneyik* (C. intybus L.)

Isa Efendi\(^6\) states that another drug called *kavuk* or *karakavuk* in Turkish, and named *kyasni talkh-gune* in Persian, has the same effects with the uncultivated hindiba. Fazlizade\(^5\) also noted that there was another drug called *dasti talkh hindiba* in Persian. We find the term *dasti* in Siggel's dictionary\(^9\) as Sonchus. The other term *talkh* (telh) describes its bitterness\(^4\); but in general *talkh-shakkuk* means wild succory\(^1\). Contemporary literature defines *karakavuk* as Chondrilla in Turkish\(^6\).

As we have seen above, hindiba, besides referring to the two species of Cichorium, *C. endivia* L. and *C. intybus* L., also refers to Lactuca scariola L., Sonchus oleraceus L., Chondrilla juncea L. and to several species of Taraxacum, in Turkish. Among the cultivated hindiba we always find *C. endivia* L. and frequently *L. scariola* L. and sometimes *S. oleraceus* L; and among the uncultivated hindiba, *C. intybus* L. and several species of Taraxacum and sometimes *S. oleraceus* L. There were also two substitutes of hindiba, the most often mentioned being Chondrilla and the rarely mentioned one Sonchus, which were regarded as kinds of hindiba itself, by some authors\(^*\).

As a conclusion, *C. intybus* L. was chosen for experimentation, because it was identified as the *real hindiba* in Turkish medical manuscripts.

Since *Crocus sativus* L. was given as a substitute drug from another family, we decided to experiment on it too, to see whether there are similar active constituents in it, as assumed in the past.

In addition, experiments with Taraxacum, which has endemic species in Turkey and as the other popular kind of uncultivated hindiba used widely, was decided to be carried on.

**Inhibitors of Side Effects**

In Ottoman literature some writers state one or two substances as inhibitors of side effects of hindiba which in fact was hardly mentioned at all. For instance, according to Fazlizade\(^5\), *honey* does away with adverse effects of hindiba. It is also noted that if celery (*Apium graveolens* L.) is taken with hindiba, it would prevent its side effects.

**The Nature of the Drug**

The theory of the nature of medicines in the Ottoman Turkish medical literature is mainly based on the Islamic medicine. When we deal with Ottoman Turkish medicine, we can not separate it from Islamic medicine, but it must be evaluated as a continuation of it with some new contributions from time to time.

\(^*\) Our studies showed that the species identified as *hindiba* produce compounds bearing the pharmacophore, which confirm that in old medicine the said species were considered to be *hindiba* from the point of view of their therapeutic effects, as well as their botanical properties: N. Sari, H. Dogan, J. K. Snyder, U.S. Patent n° 5663196 Table 1.
In the old medicine, drugs were selected according to their nature that is whether they were hot, cold, moist or dry and to the measure of the degree of hotness, coldness, etc. This property was an important determinant in therapy, as we are going to see in the following pages of this study, concerning the therapeutic values of hindiba.

All ancient literature agrees that hindiba has a cold and moist nature. According to Ibn Sīnā, hindiba is cold and moist in the highest level of the first degree. Although it was claimed that hindiba was cold and moist in the first degree, some warned that hindiba, especially some kinds of it, were inclined to be dry in the second degree and some kinds are said to be inclined to be hot. Ibn Sīnā had explained this as such: "In summer time the bitterness of hindiba is higher and because of this bitterness the nature of it is inclined to be hot to a certain degree".

The differences in the nature of cultivated and uncultivated hindiba, their seeds and roots are generally discussed, which give clues about the effectiveness of the different kinds of it. Usually, the uncultivated kind is noted as having a higher therapeutic effect then the cultivated. Yet, Isa Efendi notes that all the cultivated and uncultivated kinds of hindiba had a similar nature and that they should be mixed and taken together.

**Theoretical Aspects of the Pharmacotherapy of Hindiba**

When we look through the literature and compare the paragraphs dealing with hindiba, we see that Ibn Sīnā is the author who paid the greatest importance and gave the most interesting information about it. He wrote a special treatise on it which has several copies in different libraries. Here we will study and see the importance of this treatise, which deals with the theoretical aspects of the pharmacotherapy of the drug and the rules to be observed while preparing it as a medicament.

Hindiba is regarded as a compound drug because of its compounded attributes. This means that it is a compound in its nature. All composite bodies originate from elements. The substance of hindiba is composed of simple ingredients which have contrary effects to each other. These contrary effects are described as powers. Power means that the drug has potentialities of affecting the body by the therapeutic constituents existing in it, such as the strength of the power of the drug in heating and cooling.

The kind of composition of hindiba is like a mixture. In a mixture, when each of the two contraries acts upon the other, there may be an action and reaction between the two active constituents with contrary effects and as a result, the property of one may overweigh the other. In such herbal drugs, either one of the natural properties will be dominant, or when they act with nearly equal force a neutral matter with a single property intermediate between these two contraries, will ensue. This quality is the nature of the drug.

In some drugs the composition is weakly stable and can be decomposed very easily. The composition of the drug with two active matters with contrary actions is so weak that it can be decomposed in the body. After the decomposition there will come forth constituents with two contrary effects. Hindiba is a drug of this kind. The primary constituents are so weakly composed that they bare nearly the character of a mixture. Therefore, the constituents contained in the drug are ready to be decomposed simply by squeezing or pressing. Washing or boiling such matter will easily decompose the compound.
The Medical Effects of Drugs in Accordance with the Nature of the Constituents

The constituents resulting from decomposition will have effects called *power*. The potential *hot* and *cold* qualities contained in the nature of the drug will come forth as a result of the decomposition in the body.

The active component which is hot in nature will act promptly. It will diffuse through tissues effectively. The hot constituent acts before the cold constituent and clears the barriers in the passages of the body and prepares the way for the passages so that the cold constituent can diffuse. Later, the cold constituent comes in and carries out its function.

The Treatment of Tumors

When a composed drug is administered for treating tumors with cold matter, the active principle which is hot in nature is assumed to open the passages, by resolving the concentrated morbid matter and the other principle, which is cold in nature, is expected to help the innate heat against *foreign heat* and therefore reduce fever.

The hot constituent, which acts as a transporter by its nature, will resolve, destroy and portage the malignant matter which has settled in tissues. The role of the hot constituent suggests the diffusion of the drug into the cells through circulation, which brings into mind whether the hot constituent affects the cell metabolism and contributes to the permeability of the cell. Of course Ibn Sinā and his contemporaries did not know anything of the cell and cell permeability.

The human nature will lead the cold constituent to the passages in order to keep the morbid matter away from them. For instance, when chamomile (varieties of *Matricaria chamomilla*) is used for the treatment of tumors, the human nature leads the cold constituent (the active matter) to the passages in this way. The human nature also directs this therapeutic constituent to the morbid matter which is already produced and which threatens to grow in a tissue. This constituent inhibits the morbid matter, aggregates them, turns them into a still state, inactivates and prevents its spreading. The human nature also directs this therapeutic constituent to the core of the organ. (This calls to mind the smallest part, the cell.) This active constituent strengthens it and reinforces its power of resisting attacks. (This might mean acting upon the metabolism or the immunity of the cell.) Consequently, it will not be harmed by the malignant matter.

Ancient physicians believed that drugs with cooling effects which were prescribed to treat hectic fever (in chronic diseases), could not diffuse into the circulation and penetrate the protective body barriers. Physicians searched for a transporter and clearer of passages called a *leader drug*, which would transport cooling drugs into the blood circulation and heart, which fevers were supposed to originate from. (The heart was assumed to be the center of the breath in relation with the innate heat, with which, as we will see later, the immunization process is meant). They decided to choose a drug from one of the hot drugs group, as a transporter and clearer of blockages. Saffron was found to be the most suitable one. They believed that if the human nature (that is the immunity system) was strong enough, it would let saffron keep its own *strength*, that is activity and while transporting, the drug would be administered as well. Saffron would transport them to the neighborhood of the heart. When they reach there, the human nature separates saffron from those drugs, and they by themselves will find their way into the heart.
Usually, while saffron plays the role of a transporter drug, as clearer of obstructions also proves its other benefits: the unstable constituent of the drug administered together would be decomposed and diffused into different tissues.

**The Principle in Preparing Medicine from a Drug with Two Contrary Constituents (hot and cold)**

The hot constituent is less stable and more easily evaporating and emerging out of the plant tissue of the compound drug and tends to decompose and part from the other constituent which it is originally together. Its nature would be more inclined to taste acrid and bitter. The bitterness and acridness originates from the hot component which is a clearer of obstructions, meaning medicine that removes the blockages and clears the passages.

It was believed that bitterness would imply the property of the resolving action. Bitter and acrid things provide vigorous dispersion of particles. Acridness and astringency would help the transporting property present in the drug\(^\text{16}\).

---

**Figure 5**: A 16\(^{th}\) century chemistry laboratory as illustrated by Prof. Suheyl Unver.
One can judge primarily from the taste of hindiba that it is a compound drug; for different tastes are indicators of different activities. Hindiba is a compound drug, because it is without sweetness and tastes bitter, acrid and slightly astringent. The lack of sweetness is due to the water element. Astringency is due to the earth element. The words water and earth elements here are not intended to mean water and earth as we know. It rather means that hindiba is composed of two substances of which one dominates over the other, so that the said elements will help in producing the essence of hindiba.

The bitterness of hindiba is due to the mixture of the earth element with the constituent which is dominantly hot. The hot component tends to come forth and to spread on the surface of hindiba. Such a thing which is found on the surface is apt to separate from hindiba's other component and join to and mix with the moisture which exists on hindiba. Therefore, when hindiba is washed, the acrid-ness which is the unstable component will lose its effectiveness and the essence of bitterness remains in the dense earth element. So, it should be concluded that the dense element in hindiba tends to taste bitter, is comparatively stable and will not decompose easily. When this substance is subjected to disturbance by heat, it will not diffuse, as it is dense and stable. As to the other active component in hindiba, since it is cool, it is lazier and heavier, that is more stable.47

When hindiba is washed, the excellent quality that provides permeation and transportation through the passages will be destroyed. The superiority of hindiba to all other green herbs, or to most of them, is that there is an active matter in it which functions as a transporter and clearer of obstructions. This active constituent quickly flows and diffuses in the organs and clears the way, drives away the related humors,
both hot and cold; and the cooling constituent existing in it is activated. It fills up the gaps and passages thoroughly. It even penetrates up to the end of the fibers of the vessels (that is up to the cell, as we know today).

Being unstable, the hot constituent, rapidly decomposes and is destroyed and its activity disappears. The cold constituent is stable. It will not leave the place where it is, it won't move away and it is heavy. In a short time it changes the nature of the organ into enduring coolness.

If it were not for the hot constituent, the passages would not have been cleared and the hot, flaming humors would not have been driven away. If the cooling component could not find a transporter, it would not have gone through to the terminal points of the organs, to the liver and to the heart. It would probably not leave the vicinity of the stomach and the mesentery, but act vainly on them, excessively, completely, continuously, but ineffectively, since it could not diffuse. Above all, it would never reach the heart, the main organ.

Consequently those who wash hindiba will loose its valuable effect. The one who cooks hindiba commits a worse mistake, for boiling would destroy the effective quality, that is the active constituent of the substance of hindiba, by decomposing and evaporating it; but, when they asked Ibn Sinā the reason why and requested him to write an essay on it, he wrote his famous dissertation on hindiba which was inspired by the following hadith: "Eat hindiba without washing it, for there are drops of dews of paradise on it".

The Prophet Mohammed advising it, certainly physicians followed his advice strictly in extracting the juice of hindiba without washing it and using the juice without boiling it. Yet, they suggested letting the juice to settle down and clear, and then filter it carefully. Common physicians who pay too much importance to cleanliness, notes Ibn Sinā, do usually boil the hindiba juice and then filter it.

Thus, concludes Ibn Sinā "most of the words of the good physicians prove the truth of the words of the Prophet, which consist of symbols telling the truth".

And thereafter through centuries many writers referred to the same hadith and gave the same advices in preparing medicine from hindiba, reminding the theory on what occurs in the mixing and solution process and to the fact that the application of heat to the substance which is being treated increases the solvent power of the menstruum.

We come across similar views in Mehmed Mumin's text: "Hindiba has an unstable hot element that perishes when washed. And because of its highly unstable nature, its taste, color and nature change according to the heat, time, season, district and its different kinds".

The said hadith is found in Osman Hayri's Kenzu's-Sihhat: "Eat hindiba, but don't wipe off its dust. For there is not any day when drops of paradise will not drop on it, that is it always drops".

We find the same importance paid to the above mentioned warning in the dictionary of Firuzabadi of the 19th century:

"The cooking of hindiba is a greater mistake than washing it. Those who can not understand the importance of quality, quantity and the rules of preparing it as a whole will give harm rather than doing well. Referring to the hadith given above, it is noted that, when hindiba is washed and shaken, the property
contained in it will perish. If it is cooked even no trace of it will endure; and even Ibn Sinā said that if hindiba was washed or shaken all or most of the useful potential activity will be washed away\textsuperscript{14}. This is probably why hindiba was called the sacred vegetable\textsuperscript{2}; and that it was said to be favored with the secret of all the healing properties of bitterness\textsuperscript{58}.

A Look at the Wide Usage of Hindiba in the Ottoman Period

Hindiba is included among potent drugs in prescriptions found in reliable medical texts and in those prescribed for the palace dignitary\textsuperscript{3,4}. In the Topkapi Palace, drugs were prepared in a special kitchen called Helvahane\textsuperscript{44} and hindiba syrup too was prepared as a medicament here. We find the prescription of it in the 17\textsuperscript{th} century helvahane inventory as:

"65 dirhams of scraped hindiba root, 130 dirhams of hindiba seed, 130 dirhams of hindiba juice is mixed with 130 dirhams of borage and 300 dirhams of sugar".

Hindiba juice was also widely consumed amongst common people in Istanbul; for, in his book of travels Evliya Celebi, the famous Turkish traveler of the 17\textsuperscript{th} century, notes that there were juice producers from medical herbs called esnaf-i mesrubat-i deva, who were tradesmen dealing with the therapeutic drinks. They prepared and sold the juice of hindiba, as well as some other herbs\textsuperscript{13}.

Still, sometimes in some of the bazaars of Istanbul, especially women from villages in the neighborhood sell C. intibus L. and species of Taraxacum as green vegetable for salad and call both of them hindiba. As noted before, the uncultivated kind of hindiba was regarded as the real hindiba in classical Turkish materia medica, too. Hindiba sold in bazaars are usually collected from the fields and hills of Beykoz and Sultanqiftligi regions of Istanbul and from towns and villages not far from the city on both sides of the Bosphorus. T. aznavouru was also found in the same area as a species of Taraxacum endemic to Istanbul\textsuperscript{10}.

Today, as in the past, herbalists called attar sell hindiba roots as a drug for the treatment of liver diseases\textsuperscript{11}. Researches on folkloric medicine in Anatolia today show the usage of hindiba against similar illnesses as those in the past\textsuperscript{11}.

Methods Used in the Past in extracting Hindiba Juice for Preparing Medicaments

Hindiba was used as a medicine in several ways, from merely eating\textsuperscript{59,60} to preparing inspissated plant juice, distillation, decoction and syrup, coating, cataplasm, dressing and poultice. Each part of the various kinds of hindiba, the leaves, flowers, root, seeds and latex, were used in preparing medicaments.

The method of extracting hindiba juice was primarily advised as pounding its fresh leaves and then pressing or squeezing and filtering it. The maceration process was also favored. The syrup and the collected distillate of hindiba was used widely, too\textsuperscript{63}. The least recommended was decoction, also for fear of putrefaction, though we sometimes find it advised in medical texts\textsuperscript{70}.

Juices to be preserved were usually extracted from fresh leaves and flowers collected in spring. The most favored method of extraction was that the plant was pounded in a mortar and pressed with a press and the extraction was preserved in this way, as pure juice. If putrefaction was feared, then the juice was heated or
exposed to the sun until inspissated\textsuperscript{61}. Sometimes, after heating, its foam was taken and filtered\textsuperscript{59,60}. It was also possible to preserve expressed juice like fruit syrups, keeping it in sugar. Another method was putting the expressed juice in a big bottle with a narrow mouth, adding some olive oil on it, as was practiced for preserving rose water. The activity of those in liquid form was believed to endure one year while those inspissated were expected to last longer than a year\textsuperscript{61}.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure7.png}
\caption{An 18\textsuperscript{th} century chemistry laboratory as illustrated by Prof. Suheyl Unver.}
\end{figure}

Maceration was said to be less injures for the plant tissue than decoction. For, as the plant was not heated, the active principles in the drug would not be decomposed and the unstable constituents would not be destroyed. Maceration was used for extracting the unstable constituents in drugs. Those drugs which could not endure heating were soaked in water or in another menstruum. After having been steeped and after the active matter extracted, it was kept as it was for 12 to 24 hours in winter and 6 to 12 hours in summer in hot ash. Macerated drugs were also preserved as syrups\textsuperscript{61}.

The distillate of \textit{hindiba} was also used, as the hot constituent in it was said to evaporate when heated, and it was collected as a distillate containing the active matter. The leaves, root, seeds or flowers were extracted in glass or earthenware balloon and stilled\textsuperscript{3}. Usually the distillation was carried out in a water bath, for plants were believed not to be capable of enduring high heat as it would dissolve and even loose their strengths. Gentle heating was always advised. The distillate was kept in glassware whilst exposing them to the sun, with the bottle open, wrapped with a filter paper. It was said to maintain its strength for one year\textsuperscript{61}.  

In decoctions, drugs were advised to be heated in a pot container. Decoctions were also preserved as syrup. When one third of it evaporated, some sugar or honey was added, its foam was taken and then filtered. The container with the decoction in it is advised to be kept at a cold place, in cold water or in snow, so that it would not decompose or contaminate quickly

When mixtures were going to be prepared, the herb to be added was soaked in the juice of hindiba and exposed to the sun in a bottle. For instance, the scrapings of Cassia fistula L. were soaked in the juice of squeezed hindiba to treat the ailment of the liver or for eruptions in hot humors

Sometimes the distillate or juice of the cultivated and the uncultivated kinds of hindiba were advised to be mixed and administered together

The dose of the medicine prepared from hindiba would (assuming the same amount of herb is extracted) change according to the method of extraction used in preparing it. For instance, the dose of decoctions advised in prescriptions is more than its syrup. Mehmed Mumin claims that its distillate is the weakest compared to its inspissated juice, maceration and decoction

**Discussions of Directions and Methods in Preparing Hindiba Extracts Described in Manuscripts**

The information given above directs us to the following arguments. When preparing hindiba as medicine, its fresh leaves must be used. If washing is needed, care must be taken not to squeeze the leaves during the process and must be taken out of the water promptly.

In studying old literature on the preparation of hindiba extract, some of the texts lead one to the idea that water quickly decomposes an active constituent in it. When we recall that among the methods of extracting there are maceration, decoction, and distillation prepared using water, besides the juice produced from squeezed leaves, it leads us to the conclusion that water was used as a solvent of the constituents in hindiba.

There is no knowledge in the texts studied, except one in that of Mattioli, of maceration of hindiba in wine, which was used as extraction menstruum in the place of alcohol in the past, though there are some examples of maceration of other herbs with wine; but this does not mean that hindiba maceration should not be tried in alcohol to see how the active constituents will be affected by this process, on the contrary this process should also be tried.

We must also keep in mind that the hindiba leaves or juice was sometimes mixed with vinegar, which was added to the preparation for its therapeutic value in old medicine, but in fact it was a menstruum as well. Also honey was added to hindiba, for its therapeutic value and for preserving the preparation

Since there was no idea of what kind of active matter were going to be obtained, and as being eager to follow similar processes to those found in manuscripts, it seemed safer to make use of both the water bath distillation and a modified way of maceration process so that the finished preparation would properly represent the drug used in the past.
We can assume that application of gentle heating in a water bath would be much safer than boiling or cooking; but, as noted in old literature, besides the *cold* constituent, that is the water-soluble and heat stable constituent contained in the vegetable drug *hindiba*, as mentioned above, there was supposed to be a weakly stable *hot* constituent which was said to be decomposed when heated and that it even evaporates quickly. Following the example of the distillation of *hindiba* noted in manuscripts and the idea of Ibn Sinā stating that the weakly stable therapeutic constituent which is *hot* in quality evaporates quickly, using a water bath to collect the volatiles seemed to be a convenient method. Therefore, while assuming to apply gentle heat in a water bath would be much safer than boiling, a fluid extract could be obtained soaking the drug in water and heating it gently and the volatiles could also be obtained at the same time through a distillation process, as it was assumed that besides maceration, gentle heating in a water bath might also serve to the purpose. So, steeping and applying gentle heating in a water bath distillation and then pressing the residue are methods to be used in extracting hindiba, as inspired from the practices in the past.

**Preparing Juice and Distillate of *C. Intybus* L. for Experimentation Invitro and Invivo**

The two different extractions from the leaves of hindiba were prepared in the following way:

Inspired from the old Turkish texts which pointed out to the fact that the real hindiba were the uncultivated kinds, and that it was specifically the *C. intybus* L., it was collected from the fields in the vicinity of Istanbul, especially on the banks of the hills around Beykoz and Sultangiftligi. They were picked in spring before they flowered and in late autumn following rainfalls when they freshly shot and their leaves were tender.

The leaves of *C. intybus* L. used were fresh, were never let to dry and used without harsh washing. Having cut them into small pieces, they were homogenized by pounding them in a ceramic mortar.

200 gr. of pounded *C. intybus* L. leaves all together were put into a balloon with a capacity of 1000 ml. and 400 ml. of distilled cold water was added to it.

The apparatus used for the extraction process is a rotary evaporator. The balloon was placed slantly in water, half of it being in water and the neck was attached to a rotator, which rotated the balloon 30 times in one minute. The rota-evaporator is connected to a vacuum pump, Busch Baureihe R5 Plus. The power of the motor was 10, which is the weakest among Busch vacuum pumps. It drops the air pressure in the evaporator -which is a closed system- from 760 Torr to 10-25 Torr in 20 seconds. Under this low pressure the water in the water bath was heated to 40-50°C at most, to collect the volatiles from the plant homogenate by the help of the cooler in the system, into the other balloon container attached to the cooler. If the pump is not available, the rota-evaporator can be simply connected to a tap vacuum. To reproduce the distillation, the water in the water bath should be heated up to 100°C to be able to get the volatiles, which is a less convenient method. The whole process lasts 12 hours.

The pounded homogenate of the plant in distilled water in the balloon container (the residue) was kept for three days in the refrigerator (+4°C).
Having collected the distillate and stored it in a sterile bottle, the remainder in the balloon containing the heated leaves and the remaining fluid (the residue) was squeezed to avoid loss, and then it was filtered first through a sterile gauze, then through a 0.45 µm millipore filter paper into a sterile bottle, to prevent contamination during the storage.

The fluid extracts were preserved in tight, light-resistant containers and stored in a deep freeze refrigerator. They were not kept longer than six months before using in experimentation.

**Therapeutic Values of Hindiba**

Before studying the therapeutic values of hindiba in detail, it would be proper to point out to the fact that either because of the lack of modern scientific approach, or the interrelatedness of medicine with philosophy, or because of the tendency to keep professional information as a secret, the following information is to be found in different works, usually not systematically organized enough to enable one to comprehend the relations between theory, diseases and therapy easily. Therefore, the following information presented here is a result of patient work to put the scattered pieces of information together and organize them as a systematic whole.

The powerful therapeutic property of hindiba in the treatment of the diseases stated below was insistently emphasized. Its therapeutic value was considered as a specific characteristic of its substance.

**Hindiba Clears Away Obstructions**

The main effect of hindiba is that it clears the obstructions of the passages in the body, specially the digestive system. This is quoted as the basic and most important therapeutic effect of hindiba and it is emphasized recurrently in every text 28,54,55,63,64,65,68,70.

**The Theory of the Conception of the Pathology of Obstructions of the Canalicular System**

As the therapeutic value of hindiba as a medicament for curing the obstructions of the canalicular system is paid great importance, we must have a short look at the theory of the conception of its pathology in order to understand its importance more clearly.

The body can be imagined as a complex of actual, as well as potential, tubes which vary in size. This is supposed to be a continuous system which includes the alimentary-canal, air passages, blood vessels, the cavernous tissues, the serous cavities and the intracellular channels. The metabolic, secretory and excretory products of ingested food materials may be traced through this system. So long as these channels are unobstructed throughout, and these various substances can flow freely through them, the body is in a state of health 16. Therefore, the basic cause of disease is the obstruction of the canalicular system. This is the reason why Ibn Sinā claims that hindiba is the king of herbal remedies, because it is believed to be the most effective obstruction clearer 47. Hindiba continued to be listed in medical works as a *mufettih*, that is an obstruction clearer until the beginning of the 19th century 73.

All the other diseases which are said to be cured by hindiba are various manifestations of the blockages in the body. Although sometimes diseases are named according to the member affected, as arthritis and
ophthalmia; and sometimes according to a symptom, as palpitation and nausea; and sometimes from the point of view of the illness as originating from the humors, such as bile or blood, diseases presumed to be healed by hindiba, to be discussed henceforth, are due to the obstruction of some of the channels somewhere in the body\textsuperscript{16,51,52,54,56,63,71}.

When we have a look at the causes of obstruction, we see that the most important one is the \textit{humoral diseases}, that is those in which \textit{matter} (blood, phlegm, yellow bile, black bile) are concerned.

According to the humoral pathology, the nature of food determines the kind of chyme, and that the kind of chyme determines the nature and amount of the four humors. Consequently, the nature and amount of humors determine the quality and quantity of the waste effete products, that is the superfluities. The presence of superfluities was considered as the most important cause of obstructions. Superfluities determine the amount of disease-substance, or in other words, the accumulation of morbid matter associated with obstruction. Superfluities affect the freedom of flow through the diffused canalicular system of the body\textsuperscript{16,51,52,54,56,63,71}. Gruner\textsuperscript{16} explains the result of superfluities blocking the system in the scope of contemporary medicine:

"As they accumulate in the stagnating tissue-juices they come to exercise a noxious action; they come to be beyond the capacity of tissue-digestion and with their stagnation the ever-circulating bacteria (taken up with the food) also settle and multiply and wandering cell infiltrations gather together. The beginnings of disease are laid down.

"There are the changes in the fluids of the body produced by bacterial or putrefactive breakdown, whether this begins in intestinal stasis, or arises in the course of specific bacterial infections. There are then obstructions not only in the old sense, but in the form of the successive histological lesions consequent-vascular, nutritional, and inflammatory. Materials are deposited more or less permanently (irreversible reactions), as e.g. solid oedema, collagenous tissue, scar formation, fibrosis and hyalo-fibrosis, adipose tissue, hyper plastic formations".

**Theoretical Aspects of the Treatment of Obstructions**

The obstruction in a tissue prevents the flow of tissue fluids and is the forerunner of a disease. When an obstruction is due to the humors being simply over-abundant, their injurious effect can be removed by evacuating them by purgation; but thick or coarse humor requires attenuation by a resolvent. A resolvent is an agent which dissolves the accumulated matter which is the cause of obstruction. For instance an inflammatory mass can be dissolved in this way\textsuperscript{16}.

**The Role of the Hot Constituent of Hindiba**

In the action of resolution hot medicaments are to be used to dissolve tumors. Then comes up the question of whether there is a therapeutic constituent in hindiba which acts as an agent that promotes resolution of tumors. The hot constituent of hindiba has such an effect. It mildly disperses the humors by attenuating the dense particles of the matter, causing them to flow and be removed. This is a description of the lysis process.
As saffron is said to have such a hot constituent which has the property of infusing into the smallest part of the tissue, resolving pathologic matter and clearing obstructions, does this imply that saffron has a cytotoxic effect on tumor cells? And the question whether saffron changes the metabolism of the cell and that it is affective because of its capacity to diffuse into the smallest part of the tissues (that is the cell?), as stated in medical manuscripts, occurs; for saffron is called a transporter drug and prescribed in many compound drugs\textsuperscript{16,24,47}. It is claimed that there is an active principle in saffron which acts as a transporter for the active compounds for cancer treatment in itself and in C. intybus L., to cross the cell membrane.

### The Role of the Cold Constituent of Hindiba

While hindiba is prescribed for various diseases, as other drugs used in old medicine, we can approach to the systematic unity of the given therapeutic values of hindiba from another point of view, too.

Here it should be noted further that hindiba is given as a drug against illnesses of the liver, the spleen\textsuperscript{55,69}, inflammatory swellings, as well as tumors. This, as we will see later, is reminiscent of the relation between the therapeutic values of hindiba and the function of the bodily defense mechanism that is the reticuloendothelial system, as we call it today.

If we recall the two constituents of hindiba, the one of the cold nature was assumed to act as an immunostimulator*. If we have a closer look at the conception of the pathology developed by Ibn Sinā, which was followed by Turkish physicians along with some discussions and small differences, we can see that the concept of the inner heat is very important in fighting against diseases. According to the basic philosophy of Ibn Sinā, that which protects the natural humors from being overruled by foreign heat, which refers to pathogenic agents, is called the innate heat. If the innate heat is feeble, the natural faculties will be unable to regulate the humors; the process of digestion will be spoiled; the humors will not move in accordance with their function; foreign heat will interfere with their activity and humors will be enfeebled; stagnation will occur and the channels will be obstructed; foreign heat will overcome them (humors) and will utilize them in its own way, will impart a different activity to them and they will undergo putrefactive decomposition. And the process which ends up with such a putrefaction is also a cause of cancer, as well as inflammations and swellings in general\textsuperscript{16,37,38,47}.

Gruner\textsuperscript{16} explains the role of the innate heat as stated in Ibn Sinā’s Canon in terms of contemporary medicine, as:

"Normally, the innate heat is the agent which separates normal effete matters from healthy humors. But in disease injurious effete matter (acrid, corrosive etc.) appear as by-products of the abnormal humoral state; the latter being the result either of a change in the innate heat or of a conflict between this and foreign heat (bacterial products)...

The material substance which is stated by Avicenna to be oxidized by innate heat is the bacterial substance, which, as we know, undergoes lysis in the course of the immunizing processes of the body. This is evidently an attempt to explain the nature of bacterial action and infection without the knowledge of the actual bacteria themselves".

---

* The results of invivo experiments showed that the active agent of the extract obtained from the leaves of C. intybus L., directly increased white blood cell counts, see: U.S. Patent n° 5663196 Table 13.
The concept of dispersing the foreign heat in old medicine means the destruction of the pathogenic agents (such as microorganisms) and of their products, as we understand today. According to the medical philosophy of Ibn Sinā, recovery from the attack of foreign heat depends on the innate heat, that is a series of processes of immunization, as we infer.

As saffron was the most famous drug added to compounds to help them reach the heart, the center of the inner heat, quickly, besides being a resolvent, it meant that saffron also opened the way for the innate heat, that is the immunity system to operate and so the other drugs can function better. The experimental results will prove whether the claims in the medical manuscripts are valid or not.

**Hindiba Heals Tumors**

All kinds of swellings, new-growths, lumps and nodosities etc. are classified under the general term waram (verem). Whether an inflammatory swelling or a mass is meant can only be comprehended in the context. Formation of new tissue and inflammatory swellings are agents causing obstruction of the channels.

Cancer is described as a hard mass and is called seretan, because it was likened to a crab. Identified as a hard swelling, cancer was said to be as small as a chickpea at the beginning, then it grew larger, along with increasing pain and the degree of pain increased with the amount of bile mixed. It is described as a fatal illness. Ibn Sinā notes that a cancerous tumor progressively increases in size, is destructive and spreads roots which insinuate themselves amongst the tissue elements. We find similar descriptions of it in Ottoman medical manuscripts, such as the kinds of tumors called cancer are those which spread all through the body, that is metastasizes, grows roots like trees and stick to the organs.

Tumors are mainly classified in two ways:

According to the different kinds of matter of which they are made, for instance, as to the humors concerned.

2-Tumors are also classified as hot and cold inflammatory tumors. Tumors which are coloured and feel warm when touched are usually called hot tumors, while a colourless tumor which does not feel warm is called a cold tumor.

Although it was discussed in old medicine whether cancer was a hot or cold tumor, Ibn Sina notes cancer among the cold tumors.

When viewed from the humors point of view, cancer is classified as an atrabilious tumor. Cancer appears in the Canon as a disease associated with change in the atrabilious humor (the black bile). Cold and dry in nature, the atrabilious humor, is normally formed as the sediment of good blood. After having arisen in the liver, one portion of it goes to the spleen and clears the body of the effete matter. The abnormal atrabilious humor is formed from an oxidation of the bilious humor mixed with putrefied blood. The natural yellow bile (bilious humor) is the foam of the blood, which is formed in the liver. But, cancer formation is admitted to be a result of blood mixing with bile and oxidation which causes it to turn into atrabilious humor. The factor underlying this is an excess of blood which can not flow and will collect and will be kept unused and putrefied. This corruption and putrefaction causes the formation of leafy matter with an acidic character.
which leads to obstruction in the channels. Obstruction prevents the flow of tissue fluids and is the forerunner of disease\textsuperscript{51,54,63,66,73}.

If a swelling is an atrabilious mass, hard to the touch, then, a hot drug which resolves and disperses matter and which opens blockages is advised\textsuperscript{51}. When a physician of the old medicine comes across such a piece of theoretical information as mentioned above noted in relation with a drug as hindiba, he would assume that it is a drug advised for the treatment of cancer.

Therefore, the main factor in the formation of cancer is the merging humors into the metabolic cycle in a pathological manner. When we look through this process and the relation of the yellow bile with the liver, black bile with the spleen and the pathologic changes in the humors and the obstruction of channels as a result of putrefaction and the relation of this process with the digestive system, we can see the therapeutic values of hindiba in the treatment of cancer from the perspective of the practitioners of the old medicine.

The above said comment on the etiology of cancer according to the humoral pathology; and the assumed relation with the digestive system interestingly resembles the recent hypothesis developed that, "dietary fat increases the excretion of bile acids, which can be converted to carcinogens or promoters."\textsuperscript{*} Still more interesting is the results of our laboratory researches which show that extracts of C. intybus L. were found to be most active on colon cancer.\textsuperscript{**}

When we study the therapeutic values of hindiba in materia medicas, we see that it is rarely mentioned clearly as a drug for the treatment of cancer\textsuperscript{51,70}; but hindiba is sometimes directly advised as a drug for the treatment of tumors. For example in the translation of Ibn Baytar\textsuperscript{59,60} it is noted that if the juice of squeezed hindiba leaves are heated, its foam taken and filtered and the juice drunk it would be beneficial in treating tumors. Mehmed Mumin\textsuperscript{70} notes that hindiba removes tumors in the internal organs. Yet, it is often advised for the treatment of the tumor of the throat. Several authors note that if cassia is macerated in hindiba juice (specially the cultivated kind) used as a gargle would be beneficial for the treatment of the tumor, pain and inflammation of the throat\textsuperscript{17,54,55,59,62,64,70} Cassia fistula L. was used for its power of maturating and dispersing inflammations in the internal organs\textsuperscript{16}.

There are few exceptions in the medical manuscripts on general medicine where hindiba is specifically advised as a drug for cancer\textsuperscript{54,70}. A remarkable example is Salih b. Nasrullah\textsuperscript{61}, who defines cancer as a terrible illness which is caused by matter born from burned blood and bile. Advising both operation and medical treatment, he warns that its nature is difficult. As it is surrounded by many vessels, it is called seretan, meaning the crab. In its early phase it is a small tumor as a nut and even smaller. It becomes manifest with pain. The pain increases along with its growth and its colour tends to be dark. When incised, a disgusting smell spreads. The diagnosis of cancer is difficult. At the beginning of the treatment, the body must be purgated from the hot humors. Here we see that pills prepared from Fumaria officinalis L. is used for purgating corrupt humors and its syrup is used to bring the temperament to equilibrium. Following this, the application of tender hindiba leaves on the tumor is advised.

Usually a drug can be evaluated as a remedy for cancer if you know the theory of the process of the formation of cancer. Therefore, when one comes across such a phrase as, "hindiba calms the heat of blood

\begin{itemize}
\item U.S. Patent, No:5,663,196; table no. 4, 10, 14-16.
\end{itemize}
and bile\textsuperscript{55,59,60,64,70}, this means that hindiba was considered to be a drug against cancer, according to the theory of humors. For instance, Isa Efendi\textsuperscript{64} puts forth the fact that hindiba, together with common fumitory cures cancer, establishing a relation between the disease with its cause, without mentioning the disease:

"If black bile is mixed and dark in colour, drink hindiba juice. If it is said to be very bitter, add sugar. It will also be beneficial to the spleen, removing the heat of blood and bile."\textsuperscript{55} (The role of the spleen in the immunological process can be noticed here).

If the black bile was caused by burning of the bile, that is when there was a sign of atrabilious humor being mixed with putrid blood, this meant that it was cancerous. Then some suggest common fumitory to be added to hindiba juice\textsuperscript{24,55,64}. Here we also find the activity expected of fumitory in the treatment of cancer.

Though generally believed to be a fatal illness, there were several writers of the Ottoman period who believed that it was possible to dissolve the insidious matter and prevent its growth and extirpate the ulcerated cancerous matter, by using therapeutic drugs, that would help in the resolution and evacuation of the abnormal atrabilious humor\textsuperscript{51,54,63,64,66} instead of or besides surgery, and cauterisation which was practiced in treating external tumours easily demonstrated to the sense of sight\textsuperscript{46,51,52,66}.

**A Short Look at the Other Therapeutic Effects of Hindiba on Swellings:**

Besides cancer, some other diseases associated with the change in the atrabilious humor were also advised to be treated with hindiba. The most frequently treated disease among these was scrofula, a strumous swelling. This also shows the effect of hindiba on the immunity system.

Cold swellings composed of watery fluid, such as dropsy and tumefaction resulting from liver disorder were also believed to be cured by hindiba. As hindiba was claimed to remove and clean the putrefactions of moist swellings\textsuperscript{55}, its juice boiled with its roots and drunk with oxymel\textsuperscript{70}, would remove moist putrefaction. For instance, dropsy which was believed to be a result of moist and cold swelling in the liver\textsuperscript{54}, was treated with hindiba juice or syrup\textsuperscript{56,59,60,69,71}. The uncultivated kind of hindiba, specially Taraxacum is said to be beneficial for the treatment of dropsy (ascites). Those with hot livers and patients who are heavy after a drunken sleep were to be given rose jam and hindiba juice\textsuperscript{55,59,60,64}. The fact that it was used in the treatment of cirrhosis is another example of the therapeutic value of hindiba on the liver diseases.

**The Treatment of Hot Inflammatory Swellings**

In inflammatory swellings, humors had to be attenuated and evacuated and channels opened, so that purgation could take place. Therefore, hindiba was used in the treatment of the hot and moist inflammatory swellings, too. Its leaves or its juice mixed with flour and vinegar or merely vinegar was used to be applied on hot inflammatory swellings\textsuperscript{59,60,70}. Hindiba, especially with violet oil, barley flour and vinegar was noted to be a matchless medicine against hot swellings\textsuperscript{70}.

Hindiba was given with other drugs with different effects in treating inflammations. The aim in the treatment of internal inflammatory swellings was to purge morbid matter. In cases in which maturation was taking place attenuating drugs, such as Cassia fistula L., that have the power of resolving inflammations in
the internal organs, was added to the prescription. If the matter causing disease was resolved, and channels opened, honey water was given to lave the alimentary tract. Then desiccants were used.

**Arthritis**

When hindiba's therapeutic effects on inflammatory swellings is studied, it is seen that almost every old text claims that hindiba (usually the cultivated) heals arthritis\(^6\), especially gout\(^7\) arthritis. It was applied as a dressing\(^8\) on the joints either by itself\(^9\), or mixed with flour and applied as a plaster on the gouty joint\(^10\). Some authors advice adding ceruse to flour and hindiba mixture\(^11,12\) as a drug for the treatment of inflamed joints and limps. It is also noted that hindiba should be mixed with violet oil, barley flour and vinegar\(^13\), as an extremely effective prescription for the treatment of the painful joints, inflamed gout and hot inflammatory swellings. Pain is relieved due to dispersing the matter which produces it, that is, the cause is treated. Hindiba syrup and hindiba root were also advised to remove the pains in joints\(^14\).

Here we see again the role of hindiba in resolving and purging the accumulated morbid matter and cleaning obstructions in one hand and on the other hand, its anti-inflammatory role.

**Ophthalmia**

Both kinds of hindiba are always claimed to be beneficial in treating the acute inflammation of the eye\(^15,16,17,18,19,20,21,22,23,24\) and both the juice of its leaves and its latex applied on the eye are assumed to remove the cataract\(^25,26,27,28,29\). Some writers advise the juice of the leaves and others of its flowers to be applied on the painful or the acutely inflamed eye\(^30,31,32\).

**The Urinary Tract**

When we have a short look at the other therapeutic values of hindiba, we see that it is said to be helpful in the maintenance of the function of the kidneys\(^33,34\) and the urinary passage, which is another factor in proving its effect in cleaning obstructions. For, other causes of obstructions are those which are non-material, like cases of gross obstructions such as by obstruction with calculi or those in which there is a functional disorder\(^35\).

In the *Canon* hindiba is found in prescriptions used for the treatment of erosion or ulceration of the urinary bladder and urethra. The urinary bladder was advised to be washed through the urethra with hindiba juice, using a special syringe, called *zerrake*. A suppository prepared from hindiba put into the rectum was also used for the same purpose\(^36\).

Gruner quotes the fluid extracts of Taraxacum as a drug used in the treatment of the cancer of the urinary bladder\(^37\).

Hindiba juice was also used as a medicament for treating inflammatory swellings of the genital organs\(^38,39\).

**Papular Swellings**

Hindiba juice mixed with barley flour was said to be beneficial against carbuncle, erysipelas, and with cerusa and vinegar against burns\(^40,41,42\). The juice or dressing prepared from the leaves of hindiba were
used to be applied on various inflamed boils, wounds and blisters, and this treatment was said to remove the pain and cool down the inflammation as well\textsuperscript{23,56,68,69}.

**Hindiba: The Special Drug of the Liver**

The fact that hindiba was supposed to be the best medicine against liver diseases all through the history of medicine can be explained as within the scope of the humoral theory, for the liver plays an important role in the nutritive cycle. This idea can be comprehended better in the light of the following explanation of Gruner\textsuperscript{16}, who attempts to bring a contemporary medical understanding to it:

"We trace the food-constituents through the columnar cells of the intestinal mucosa, across the areolar tissue into the vascular roots of the portal and lacteal system; then into the liver unit itself (comprising phagocytic secretory cells, fundal cells, cubical excretory cells, and the hepatic arterioles and lymphatic clefts related to the sinusoids). Then into the general bloodstream, and finally out of the body through various organs, including the goblet cells of the intestinal mucosa, the bile-ducts, the pancreas etc. The extra-hepatic portion of the cycle is nearly co-terminus within the rest of the body".

In all medical manuscripts it is noted that hindiba clears out obstructions in the liver. While most of the writers of medical manuscripts do not explain in detail how to administer the drug, supposing that the reader already knows its preparation, usually eating it fresh or drinking the juice of the expressed leaves of it was advised. The methods of extraction are described in detail in this study.

According to Ibn Sinā, whatever the characteristic of the liver might be, whether hot or cold, it is beneficial for all kinds of ailments of the liver as well as clearing the obstructions in the liver; yet it is more beneficial for the liver with hot characteristic. However, it is not harmful on the cold liver as the other green herbals. Ibn Sinā prefers the uncultivated kind of hindiba, and notes that the more bitter and the more acrid it is, the more beneficial it will be on the liver\textsuperscript{62}. The idea that the bitterness in its nature is beneficial for the liver in all respects is also found in the translation of Matthioli\textsuperscript{68}.

Ibn Baytar\textsuperscript{59,60}, contrary to Ibn Sinā, advises the cultivated kind to be eaten, so that it will heal and strengthen the liver and clear the obstructions in it.

The Ottoman materia medicas give similar information. For instance, Sakizli and Fazlizade note that if one coffee cup of the juice of hindiba leaves and root pressed and squeezed after having heated in water is drunk early in the morning, it will strengthen and repair the liver and heal all its illnesses. Sakizli also advises to make a salad of the remaining leaves with oxymel and take it after a meal\textsuperscript{55,64}.

Matthioli\textsuperscript{68}, who studies hindiba's effect on the liver in the category of *internal benefits*, gives it as the mostly favored drug for the treatment of the hot liver. It is preferred in whatever way it is used. For instance, eating its leaves either fresh or cooked, or drinking its pressed juice or collected distillate or its decoction or taking its pounded dried leaves will cool it easily and maintain its natural state and purge and clear the obstructed vessels.

**The Influence of Hindiba on the Secretion of Bile**
Depending on the relation of the liver with bile secretion and the small intestine, both actually and according to the humoral pathology, the therapeutic effect of hindiba on them can be noticed easily.

Hindiba was believed to relieve excessive bilious secretion, by preventing the superfluity of bile. The juice of hindiba was believed to cool down the combustion of bile by easing its activity. It was also assumed to allow the bile to flow.\textsuperscript{24,55,59,60,62,64,65}

The juice of its leaves with the juice of common fennel (Foeniculum vulgare M.) or its syrup prepared from the scrapings of its root was said to be the best medicine for jaundice and obstruction of the flow of bile.\textsuperscript{56,70}

Hindiba is also claimed to cool down the superfluity and heat of blood.\textsuperscript{59,60,64} In short it would keep the humors in good balance and one's self in good health.\textsuperscript{64}

According to the humoral pathology, it is generally believed that the cause of cancer is the black bile, that is the atrabiliar humor, which is due to combustion of yellow bile as a result of its mixing with blood, the cause of which is the superfluity of the blood blocked, accumulated and putrefied. Inferring from the expressions such as "hindiba cools down the combustion of bile and calms down the dominance of blood", it was concluded that hindiba was a drug used in the treatment of cancer.

**Hindiba Strengthens the Stomach and Relieves Nausea**

In accordance with the humoral pathology and the effect of hindiba on bile activity, it is always noted that hindiba calms and relieves nausea and strengthens the stomach.\textsuperscript{17,62,64,65,70}

According to Ibn Sinā\textsuperscript{62}, hindiba strengthens the stomach and it is the best drug for the stomach with hot humor and the uncultivated kind is better then the cultivated for the stomach. Ibn Baytar\textsuperscript{59,60} states that, if the cultivated or the uncultivated kind is eaten, or if its juice, obtained by pounding or by squeezing and then heating and its foam taken and refined is drunk, it would strengthen and heal the stomach and clear the obstructions in it and it would also heal the hot stomach due to a trouble in the liver.

Another method of preparing hindiba for strengthening the stomach advised by Mehmed Mumin is to boil it with its root and then to drink it with oxymel.\textsuperscript{70}

Sakizli\textsuperscript{64} and Fazlizade\textsuperscript{55} note that hindiba strengthens the stomach and calms the hot stomach if one coffee cup of its juice, extracted by pounding and squeezing, is drunk early in the morning. Fazlizade also claims that if it is mixed with ceruse and barley flour, it would strengthen the stomach, and if it is applied externally on the stomach, it would be beneficial, too.

The leaves and seeds of cultivated hindiba were said to have an appetizing effect.\textsuperscript{15,47,70}

**Hindiba is used in the Treatment of Fever**

The basic idea in treating fevers is the opening of blockages which cause the putrefaction of humors. Therefore in fevers, a drug which opens blockages, such as hindiba, especially its root is included in prescriptions along with other drugs which purge the humors.\textsuperscript{24} As the obstruction is the cause, and fever the effect, the former must be treated first. Drugs composed of hot and cold active constituents were
administered for the treatment of fever\textsuperscript{47}. Hindiba was accepted as the best drug with two contrary effects, treating gently, yet sufficiently effective. This means that it is not a toxic drug and does not harm the normal tissue\textsuperscript{16,24,65}.*

Although it is usually simply stated that drinking the juice of both kinds of hindiba or eating its leaves as salad\textsuperscript{69} would treat fever, its distillate, maceration or its decoction and the seed of hindiba and the rind of its root was also used to be given as a drug against acute, continuous and recurrent fevers, dropping them gradually. It was specifically advised as beneficial against tertian and quartan fever of malaria, and was also prescribed for the treatment of chronic malaria\textsuperscript{55,59,60,62,64,70}. Some writers note that the leaves and seeds of hindiba are useful against all kinds of fevers\textsuperscript{55,64}.

According to some writers the best way of preparing a medicine of hindiba against fevers is to heat it in water with its roots and then squeeze it to make a salad of it with oxymel and have it after meals\textsuperscript{55} or drink the juice with oxymel\textsuperscript{70}. Another method is to beat its seeds and take them with oxymel or wine\textsuperscript{68}, which will prevent the attack of fever and will gradually drop it down. If taken with rose jam it was said to be beneficial against the putrefactive processes associated with quartan fever, too\textsuperscript{70}.

In the translation of Matthioli\textsuperscript{68} we find a different method of preparing hindiba as a medicament against fevers:

"I found it effective when prepared in another way. The prescription is this: Take a handful of the herb with its blue flowers, chop it into small bits like tobacco, afterwards wash it in white wine or honey water and add 200 dirhams of honey water twice, and heat it gradually, until 100 dirhams of it is left back; filter it through a cloth. In the morning take one cup of it before breakfast and don’t eat anything for 4-5 hours. Go on taking it during the days following the normalization of the temperature. I have practiced it and found it useful".

\textbf{Hindiba is an Antidote against Venomous Snake Bites, Insect Stings and Poisonous Drinks}

Dressings with preparations from hindiba, specially the uncultivated kind is advised as a specific drug beneficial in treating those stung by scorpion, bee (hornet) or any other poisonous insect or those bitten by a poisonous snake or lizard (Lacerta gecko) and it is even said to be beneficial against all animal bites and insect stings\textsuperscript{17,23,55,59,60,62,64,65,69,70}.

Hindiba is advised to be prepared as a dressing with its leaves or together with its root pounded and applied on the bitten or stung spot\textsuperscript{55,59,60,62,64,70}.

Another way of treatment is to have the affected drink hindiba juice and at the same time mix it with barley flour and apply the mixture on to the affected area\textsuperscript{55}.

Hindiba is also said to be an antidote against all poisonous herbs and toxic drinks if its juice is drunk mixed with olive oil\textsuperscript{55,64,70}.

* The bioassay results illustrated both the selective and the non-cytotoxic nature of the active agent found in C. intybus L. Foremost was the little or no activity against the fibroblast cells (L929), which contrasts dramatically with the activity observed against the cancer cell lines tested. See U.S. Patent n° 5663 96 Table 3, 4, 5a, 5b etc.
White sandalwood (Santalum album L.) and common fennel (Foeniculum vulgare M.) macerated in hindiba juice is also advised as an effective medicament in treating against poisons.

According to the old medical philosophy, in conditions of poisoning and intoxication, the body is also exposed to foreign heat, that is pathogenic agents, and it is the role of the innate heat to neutralize the substances, or toxic products of poisons.

The Effect of Hindiba on the Vegetative System

The breath is a very important concept in relation with health and disease in old medicine. The breath also was assumed to flow through the channels. The obstruction in a tissue by morbid matter prevents the flow of tissue-fluids and it is the forerunner of a disease. But it causes this trouble primarily because "the flow of the breath is obstructed and its rhythm impaired". It is really hard to define this phenomenon which Ibn Sīnā introduces in detail. Gruner describes it as the aura, synonymous with the Ch' energy of the Chinese and the Prana of the Hindu. He also pictures it as complex chemical changes through the tissue spaces and the juice canals. When we have a closer look at the theory, it reminds us of the function of the autonomic, that is the vegetative nervous system, concerned with the regulation of the activity of cardiac muscle, smooth muscles and glands. In the Ottoman medicine, as in the Islamic medicine, the breath was believed to circulate from place to place within the body. The passage of the breath from the liver to the brain and from the heart to tissues shows that the circulation has a relation with the anatomical centres of the body. The heart is the centre of life, the source of innate heat, the seat of the formation and the storehouse of the breath. "Breath is that which binds the vegetative and sensitive life into one connected whole". Disease, disturbing the rhythm of the breath, initiates a loss of immunity to pathogenic agents.

As a clearer of obstructions, hindiba is also expected to open the ways to the flow of the breath, by removing the accumulated morbid matter blocking the canalicular system, in which the cardio-vascular system is included.

Therefore, hindiba was advised for, the treatment of tachycardia and palpitation, specially those due to anxiety. Some writers claimed that hindiba, specially the leaves of the cultivated alone, or its mixture with barley flour applied on the heart would calm the fluttering of the heart, heal anxiety and strengthen the heart. Others, who also note that hindiba is a cardiotonic, give a different prescription, including the mixture of hindiba with ceruse and barley flour to be applied on the heart for the treatment of palpitation, heart aches and anxiety.

Conclusion

Although the theory of medicine and the definitions of illnesses and their therapy in the old medicine are quite different from those of contemporary medicine, a system of its own which works out in itself can be discerned.

As we have seen, the efforts of treatment are directed to the cause of illness, but the idea of the nature of the cause is approached from a philosophical point of view. Therefore, if we can establish a good relation between the philosophy of medicine and practical therapy and if we review the general principles of illness and treatment, we can find useful clues that can be used for research aiming the treatment of some cases
which do not well respond well to today's methods. Experimentation of hindiba and saffron as drugs in the
treatment of cancer and as immunostimulators are examples.

**Bibliography and Footnotes**


Following this study, Baytop published a dictionary of Turkish herb terminology, where we find various local
names for the drugs cited in this work, given below:

**Cichorium:** Hindiba, Hindibag, Hindibahar, Cengel sakizi, Kara hindiba, Acigici, Acigici kulagi, Aci gunek, Acikici, Acikulak, Acimak, Acima, Ak gunek, Ak guneyik, Ak hindiba, Cakcak, Catlangac, Catlankoz, Catlanguc, Citlik, Gugeyik, Gunegik, Gunek, Guneylik, Guneyik, Gunervik, Konik, Radika, Yabani hindiba. Ag ganak, Ak kanak (C. pumilum).

**Taraxacum :** Kara Hindiba, Arslandisi, Gelingobegi, Keklik otu, Radika, Seytanarabasi.

**Crocus sativus L. :** Safran, Aspir, Cehri, Cigdem, Yemen safrani; Safran cicegi, Safran cigdemi.

**Lactuca scariola L. (Lactuca serriola L.).** Marul (Yabani), Acı marulu, Esik marulu, Tahlic.

**Sonchus oleraceus L. :** Esek Marulu, Esik gevregi, Kandrul, Kuzu gevregi, Kuzukurku, Sut otu.

**Chondrilla juncea L. :** Cengel sakizi, Hindiba, Citlik, Copkanak, Ezzezze, Garagavik, Gara gevlik, Gara gavuk, Kara kavak, Karavruk, Kara kavruk, Kara kavut, Kara kavik, Karagoz, Karaca kovuk, Karavlik, Karavvik, Karavru, Sakilizik, Sakiz otu.


---

* Following the printed matter, manuscripts are given serial numbers to avoid confusing in the enumeration in the text. Blanks in the bibliography mean that the writers are unknown.


20. (Hayatizade) Mustafa Feyzi Efendi 1978. *El-risâletu'l-feyziyye fi lugati'l-mufredatu't-tibbiyye*. Translated by Hadiye Tuncer. *Yabani Bitkiler Sozlugu*, 2 vol. Gida Tarim ve Hayvancilik Bakanligi. (See reference number 57 for the true name of the author, since Hayatizade has been found to be misdeciphered.)


**Manuscripts**


57. Mustafa Ebu'l Feyz (Mustafa b. Mehmed b. Ahmed et-Tabib). 18th Century; written after 1723; copy date: 1144/1731. *Risale-i Feyziyye fi lugat'i'l-mufredati't-tibbiyye*. Cerrahpasa Medical School, Medical History Department Library, n° 115/1; 149.


64. Ismail Efendi b. Ali el-Sakizi. 17th Century. *Mufredat-i Isma Efendi fi’t-tibb*. Suleymaniye Library, registered at section Hamidiye, n° 580. s. 87


66. —— 15th Century. *Kitab-i esbab-i alamat Cerrahname*. Suleymaniye Library, registered at section Yazma Bagislar, n° 814/1

67. —— *Kitab min el-tibb fi’il-akhami’l-kulliyat ve’il-edviyatu’l-mufredat*. Suleymaniye Library, registered at section Ayasofya, n° 3748.


The pictures in a manuscript of simples, titled *Nebatat*, probably compiled at the beginning of the 20th century, were copied from Mehmed b. Ali’s work. See: Cerrahpasa Medical School, Medical History Department Library, n° 69.

The pictures in the printed copy of *Terceme-i cedide fi’il-havassu’l-mufrede* and those in the manuscript are same; but the two texts, however, are quite different.


