

A Study on the Pharmacognosy Materials of Ancient Traditional Medicine Prescriptions Used to Treat Bubonic Plague

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ABSTRACT

Background: Ancient Mongolian doctors and scholar-monks identified diseases that were prevalent among Mongolians but were not described in Indian Ayurveda or Tibetan medicine. Based on the theory of wind, bile, and phlegm, they revised the classification of diseases to incorporate these conditions. A notable example is the entirely new systematization of the classification, nomenclature, diagnosis, and treatment of infectious diseases. Consequently, attention must be directed to the works of Mongolian physicians and scholar-monks whose contributions were instrumental in advancing and sustaining this area of knowledge. **Objectives:** The research objective is to identify medicinal raw materials used in prescriptions for the bubonic plague that occurred in Mongolia, which were not included in the classification of infectious diseases in the "Ashtanga hridaya samhita," one of the three major Ayurvedic works, and the "Four Medical Tantras," the principal text for training Tibetan and Mongolian doctors. **Materials and Methods:** This study utilized source analysis of ancient texts and the checklist method as research methods. **Results:** The study yielded the following findings. First, the earliest recorded descriptions of bubonic plague, which was prevalent in Mongolia during that period, were presented in the works of the scholar-monk Lama Ishbaljir, who integrated both theoretical and practical approaches. Subsequently, scholar-monks such as Luvsanchoinpil and Choijamts described methods for the treatment and prevention of individuals affected by the bubonic plague in their respective texts. In particular, Ishbaljir emphasized that the composition of the Nine Blacks ingredients could be used not only for preventing this disease but also for the prevention of infectious diseases more broadly. **Conclusion:** The renowned Mongolian medical scholar Ishbaljir authored his book "Bdud rtsi zil dkar" in 1753, in which he claimed to be the first Mongolian physician to write about marmot poisoning or bubonic plague. Historically, Mongolian ancestors and nomadic communities have long employed various methods to prevent and treat infectious diseases. Over time, these practices were adapted and enriched to suit regional characteristics, extreme climates, unique living conditions, and the physiological traits of the population. Some approaches were newly discovered, while others evolved through generations of experience. Through this process, these methods contributed to the development of a unique and comprehensive body of medical knowledge, shaped by the cognitive and scientific advancements of ancient doctors and maarambas.

Keywords: Ancient Doctors, Bubonic Plague, Infectious Disease, Mongolian Doctors, Tibetan Medicine.

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INTRODUCTION

During the late Buddhist period, from the late 16th century, ancient medical texts derived from ancient Indian Ayurvedic medicine began to be translated into Mongolian. Among these scriptures, the most widely circulated in Mongolia was the "Ashtanga hridaya samhita" written by sage Vagbhata in the 7th-8th Centuries CE. At the same time, "The Four Medical Tantras," the principal text for training Tibetan medical practitioners, enjoyed widespread use in Mongolia. Following the establishment of the first medical



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school based on this text in Inner Mongolia in 1681, Mongolian doctors and scholar-monks played a crucial role in translating, annotating, and updating portions of its contents. In particular, considerable attention was devoted to the preparation of animal, plant, and mineral raw materials used in prescriptions drawing on medicinal substances from Mongolia.

Furthermore, the recognition of diseases common among Mongolians but absent from Indian and Tibetan medical traditions prompted a revision of disease classifications within the framework of the wind, bile, and phlegm theory. A notable example of this process is the entirely new systematization of the classification, nomenclature, diagnosis, and treatment of infectious diseases. Therefore, it is important to study the works of Mongolian doctors and scholar-monks who have made significant contributions in this field and have worked to refresh knowledge in this area (Sharav, 2006; Sharav, 2014). By reviewing our traditions, examining the extensive body of knowledge preserved by our ancestors, and clarifying its values, we can strengthen the foundation for the accurate and rational development of traditional medicine in the future, while promoting its coordinated development alongside modern medicine (Dagvadorj, 2026).

Accordingly, we have chosen this topic as a case study in this field, examining selected sources, historical records, and medical texts related to the history of infectious diseases, and making them available for research, educational purposes, and public access.

Research objectives

The objective of this study is to identify the medicinal raw materials used in prescriptions for the bubonic plague that occurs in Mongolia, which were not included in the classification of infectious diseases in the “*Ashtanga hridaya samhita*,” one of the three major Ayurvedic texts, and the “*The Four Medical Tantras*,” the principal text for training Tibetan medical doctors.

MATERIALS AND METHODS

One. The following ancient medical texts were used as the primary research materials:

1. Sumbe Khamba Ishbaljir “*Bdud rtsi zil dkar*.” An ancient Mongolian manuscript medical book (1753). It is preserved in the personal library of Academician Bold Sharav.
2. Toin Luvsanchompil “*Gces bsdus snying nor*.” An ancient medical manuscript translated into Mongolian (1845). It is preserved in the personal library of Academician Bold Sharav.
3. Gelon Chojamts, *Ngo mtshar dga’ ston gter mdzod* (Vol. 51, 1922). Translated from Tibetan and annotated by Demchigmaa O. and Bold Sh., and reviewed and edited by Choimaa Sh. Ulaanbaatar, 2026, 276 pages.

Two. Research methods

This study employs a qualitative textual analysis approach; therefore, formal statistical analysis is not applicable. The data consist of source texts that are systematically examined and interpreted rather than quantified, and no statistical procedures were performed during the analysis. The following methods were used:

Source text research method

The materials used in this study were selected in accordance with the research objectives. The authors’ works were organized chronologically, starting from the earliest periods of their birth and lifetime. For each source text, a detailed analysis was conducted, examining the text itself, its title, author, place of origin, characteristics, content, interpretation, and translation. Subsequently, the main content and innovative ideas of each work were compared and analyzed in relation to other original texts.

The checklist method

The checklist method was used to classify information related to infectious diseases in traditional medicine and to identify the components that define them. This method allows for systematic categorization of information, facilitates data collection, and enables easy integration into an electronic database. As a result, it has become the foundation for developing a comprehensive database on infectious diseases.

RESULTS

One of the three major texts of Indian Ayurvedic medicine, the “*Ashtanga hridaya samhita*” comprises 120 chapters and 7120 verses (Vagbhata, 1994). The principal text used for training by Tibetan medical practitioners, “*The Four Medical Tantras*,” contains 156 chapters and 5900 verses (*The Four Medical Tantras*, 1727). In his commentary “*Man ngag lhan thabs*” on the Commentary on the Instructional Tantra of the “*The Four Medical Tantras*,” a prominent scholar of Tibetan medicine in the 17th century, Desrid Sanjaajamts (1653-1705) introduced the concept of bacteria to elucidate the stages of various serious diseases and the causative agents of infectious diseases (Tidwell & Gyamtso, 2021).

In the “*Instructional Tantra*” of “*The Four Medical Tantras*,” the group of infectious diseases is divided into 4 categories based on causes, conditions, routes of entry, and both general and specific symptoms. In “*Man ngag lhan thabs*” by Desrid Sanjaajamts, these are further systematized into 18 categories, describing a total of 22 infectious diseases (Gyamtso, 2016).

According to this classification, the theoretical and methodological foundation of the book “*The Four Medical Tantras*” derives from the classical triad of ancient Indian Ayurvedic medical texts, particularly the “*Ashtanga hridaya samhita*,” and therefore its

classification of infectious diseases is similar. Consequently, these works do not contain a classification of bubonic plague. For this reason, Mongolian scholar-monks later incorporated the bubonic plague into their medical writings. This is because marmots live in Mongolia and have long been widely used as a food source. At the same time, it was established that marmots can transmit bacterial infectious diseases to humans, which led to the development of a new classification of marmot-related infectious disease (bubonic plague).

The findings indicate that the Mongolian scholar Lama Sumbe Khamba Ishbaljir (1704-1788) was the first to describe bubonic plague and its treatment in his writings formally. In addition, Luvsanchoinpil Toin (19th century) and Gelon Chojiamts (late 19th century-early 20th century) addressed the treatment and prevention of bubonic plague in their own medical texts (Tserendorj, 2026).

Sumbe Khamba Ishbaljir (1704-1788)

Ishbaljir was born in Upper Mongolia in 1704. From a young age, he traveled both within his homeland and to other regions to study and master medicine alongside Buddhist knowledge. In particular, he became well acquainted with the classical medical texts of India and Tibet, and through his medical practice, accumulated extensive experience in treating diseases common in Mongolia. The seven major and minor medical works he authored made a significant contribution to the development of traditional Mongolian medicine. These works examine the theories and practices of Indian and Tibetan medicine in relation to local conditions, including climate, natural resources, living environments, agricultural practices, and the diseases prevalent among the Mongolian people. As a result, his works were able to take root in the Mongolian context and are significant for presenting entirely new theoretical concepts and treatment methods (Sharav & Bold, 2016).

Sumbe Khamba Ishbaljir wrote his book “*Bdud rtsi zil dkar*” in 1753 at the age of 49. To our knowledge, no earlier written work describing bubonic plague has been identified. Therefore, Sumbe Khamba Ishbaljir can be regarded as the first scholar to record this disease of the marmot. Evidence supporting this conclusion is found in the following passage from his book “*Bdud rtsi zil dkar*”:

“If one eats the meat of a diseased marmot taken from its burrow, one will contract marmot typhus. The method of treatment is to press the chest against the snow; the poison will be drawn out, and the snow will turn yellow. The patient should drink melted snow water at dawn, or repeatedly bathe in lake water at dawn, until the foul odor disappears and recovery begins. During treatment of the marmot’s poison that has developed, the prepared Precious black ingredients’ pill (Nine black ingredients’ pill) should be administered, and the blood of black frogs and black mice should be given to drink. Medicines used for neutralizing poison, such as detox cleanses and

similar remedies, are also helpful. Alternatively, if the Precious black ingredients’ pill is prepared and administered, it can suppress the poison and prevent marmot poisoning” (Ishbaljir, 1753). In this book, Sumbe Khamba Ishbaljir refers to the marmot plague as marmot poison or *khijig* (infection). The medicinal formula for the *Precious black ingredients’ pill* consists of about 77 ingredients or raw materials. Its preparation is highly complex, and some of the medicinal raw materials used in the formula can no longer be clearly identified or obtained today.

However, in another work titled “*Bdud rtsi thig pa*,” Sumbe Khamba Ishbaljir writes: “*The disease known as marmot poison can be prevented by taking or applying the preparation called the Composition of Nine Blacks. Every morning, it should be administered on an empty stomach, mixed with garlic and alcohol. In the morning, the patient should drink alcohol and then immerse themselves in the cold water of a lake or river, remaining there until they begin to shiver. Afterward, the Composition of Nine Blacks should be taken several times to induce sweating. When sweating occurs, if the poison is severe, a foul odor resembling rotten meat will be produced. After this, the chest and short ribs should again be pressed against snow or ice; if the snow or ice turns yellow, it is a sign that the treatment is effective.*” (Ishbaljir, 18th century).

The *Composition of Nine Blacks* consists of the following ingredients: Mongolian, English, and Latin names of Nine Blacks (Table 1).

1. *Terminalia chebula*.
2. *Aconitum kusnezoffii*.
3. Ox gall stone.
4. *Commiphora wightii*.
5. Deer's musk.
6. *Acorus calamus*.
7. *Ferula asafoetida*.
8. Sulfur.
9. Chinese black ink.

The *Nine Blacks* preparation is considered important not only for preventing plague but also for the prevention and treatment of other infectious diseases, whether worn as an amulet or taken orally (Jambalchoijidanzerenlei, 1829).

Toin Luvsanchoinpil

Luvsanchoinpil was a prominent representative of Mongolian religious knowledge and scholarship who lived in the 19th century. His major work on medicine is “*Gces btus snying nor*”, a 234-page book written in 1845 (Sharav & Bold, 2016). In this work, Marmot disease is described as an infectious condition that manifests with symptoms such as pain in the short ribs

following the consumption of meat from an infected marmot. In his work, he outlines methods for preventing marmot disease: “If one drinks alcohol mixed with garlic every morning on an empty stomach, infection can be prevented. If one consumes a dose of dried blood from a bull deer or a large yak, and applies garlic boiled in oil to the mouth and nose in the morning, one will not be affected by marmot poison.” In addition to herbal remedies such as garlic, the text recommends the use of animal-derived medicinal materials, including the blood of healthy yaks. It also notes that inhaling the aroma of barley flour roasted with oil and cow dung smoke, as well as drinking boiled dried carrots and beets, may be beneficial (Luvsanchoinpil, 1845).

Gelen Choijamts (late 19th century - early 20th century)

Gelen Choijamts lived in the late 19th and early 20th centuries. His profession was making Buddhist images, but he was also an expert in herbal medicine. Although he was a Mongolian monk, he authored a 206-page manuscript measuring 11x26 cm in Tibetan between 1921 and the late autumn of 1922, entitled “*Ngo mtshar dga' ston gter mdzod*” (Sharav & Bold, 2016). On page 86, he specifically mentions the infectious disease of marmots (Choijamts, 1922) (Figure 1).

Rtsibs thung lha mo, in Mongolian “*Goddess' short rib*,” is a highly contagious disease. It is transmitted through the consumption of the marmot meat or upon hearing its sound. Symptoms include: Headache, shortness of breath, intense heat beneath the ribs, vomiting of brownish material, weakness and fatigue, and palpitations in the lungs and heart. Intense heat rises over the ribs, accompanied by swelling or inflammation from violent heat. *Co'u sha u bo wan* is administered to treat marmot plague. The ingredients are:

1. Cinnabar 010.
2. Ox gall stone (*Bos taurus domesticus* Cmelin) 100.
3. *Arctium lappa* 050.
4. Realgar 020.

5. *Paeonia anomala*. L 050.

These ingredients are ground into a fine powder, roughly the size of a bean or button, kneaded with a stick, and steeped in distilled water to prepare a decoction (Choijamts, 1922). The preparation is said to be highly beneficial for jaundice, cough, shortness of breath, delirium tremens, marmot poison, dog poison, vomiting, scarlet fever, smallpox, intestinal worms, and warm diseases of vital and hollow organs.

The uses of each of the five ingredients in the *Co'u sha u bo wan* recipe are explained as follows from Jambaldorj's “*Ngo mtshar dga' ston gter mdzod*,” the main book on traditional medicinal raw materials, and the Encyclopedia of Mongolian Studies.

Cinnabar

It is a sweet, cooling, and toxic mineral, produced artificially (Jambaldorj, 1817-1823). The main components are 86.2% mercury and 13.8% sulfur (Encyclopedia of Mongolian Studies, 2002). It is used to treat paralysis, childhood plague, cancer, detoxification, nerve damage, and scabies.

Ox gall stone

Ox gallstone has a bitter taste and a cool, heavy quality. In Mongolia, cow gallstones and artificial gallstones are mainly used in medicine. It is used to relieve infection, poison, liver disease, and stomach heat (Jambaldorj, 1817-1823).

Arctium lappa

Arctium lappa has a bitter taste and a cold quality. It has the effect of stone diseases, promoting urination, and correcting vascular diseases (Encyclopedia of Mongolian Studies, 2002).

Realgar

Realgar is a toxic mineral with a bitter flavor, warm properties, and a heavy nature. It stops inflammation and decay and is especially effective against evil spirits, bad energy, diseases, and infection. It is regarded as an excellent medicine for treating diphtheria (Jambaldorj, 1817-1823). In general, realgar is considered highly

Table 1: Mongolian, English, and Latin names of Nine Blacks.

Sl. No.	Mongolian names in Latin transcription	English names	Latin names
1.	Altan üngüt arür	Black Myrobalan	Terminalia chebula
2.	Khun khors	Kusnezoff's monkshood	Aconitum kusnezoffii
3.	Ükhriin tsüsni chuluu	Ox gallstone	Calculus bovis
4.	Gügel	Indian bdellium tree	Commiphora wightii
5.	Khüdrin zaar	Deer's musk	Moschus
6.	Shudag	Sweet flag	Acorus calamus
7.	Ömkhii Davirkhai	Asafoetida	Ferula asafoetida
8.	Khükher	Sulfur	Sulphurium
9.	Khyatad khar bekh	Chinese black ink	Atramentum

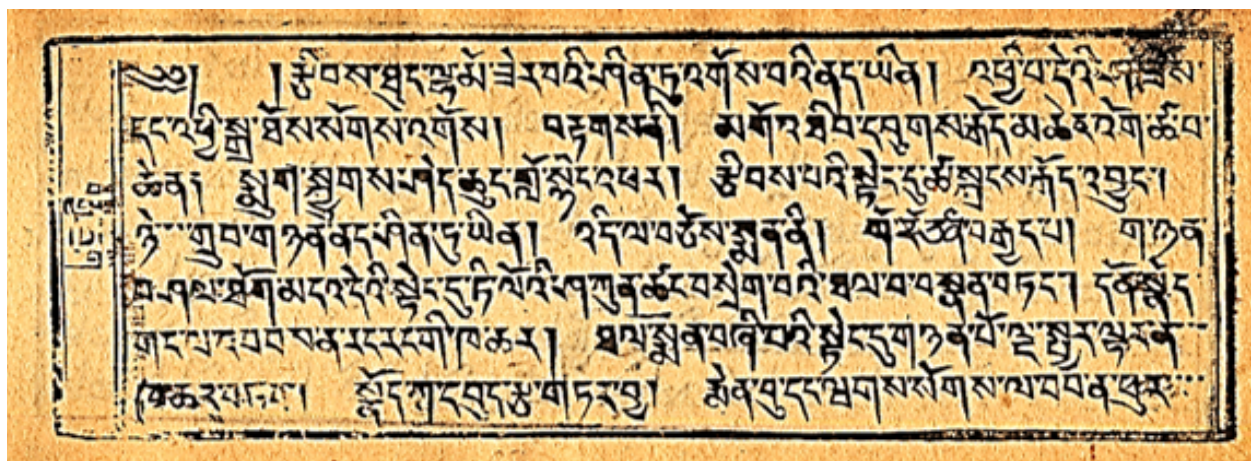


Figure 1: The page of the scripture “*Ngo mtshar dga' ston gter mdzod*” by Chojiamts in 1922, about treating marmot plague.

effective for the treatment of bacterial infections, phlegm, various tumors, and throat swelling.

***Paeonia anomala* L.**

The root of the *Paeonia anomala* L. is sweet and bitter in taste, warm in nature, and light in potency. It relieves urination, digestion, bleeding, headache, and improves digestive function (Sharav, 2014).

The recipe for *Co'u sha u bo wan* (*Zhou shau bo wan*) mentioned by Gelen Chojiamts in his text “*Ngo mtshar dga' ston gter mdzod*” is not recorded in the existing medical and herbal medicine scriptures to the best of our knowledge. Therefore, it is hypothesized that this recipe may represent a novel formulation by Chojiamts. This medicinal recipe needs to be studied in detail in the future.

DISCUSSION

In “*The Four Medical Tantras*”, it is stated that “Bacterial disease is caused by a poisonous worm, as fine and invisible as copper in the blood.” The accumulation of wind, bile, and phlegm occurs because the worm is disturbed by the conditions of location, time, food, and events, which weakens the body and becomes a bacterium” (*The Four Medical Tantras*, 1727). In the commentary on “*The Root Tantra*” in “*The Four Medical Tantras*”, Desrid Sanjaajamts’s “*Manag Lkhantav*” states: “Bacterial disease is believed to be caused by a type of worm with a head resembling a lizard that enters the hair follicles through the mid-shaft of the hair and the nostrils. The small, legless, red worms that inhabit the body are invisible to the naked eye and can move rapidly throughout the body, along with the blood-dwelling worms in the veins, causing all bacterial diseases” (Sanjaajamts, 18th century). To clarify, this means that the worms enter from outside and cause bacterial diseases along with the internal worms that live inside the body. Therefore, it is clear that infection is basically caused by some kind of bacteria. Marmot plague and infection are caused by bacteria from marmots infecting the body, resulting in disruption of the three syndromes.

No previous work on marmot poison or disease has been found since Sumbe Khamba Ishbaljir’s “*Bdud rtsi zil dkar*” written in 1753. In this text, it is said that consuming the meat of a diseased marmot during hibernation causes marmot typhus. The prescribed remedy is to press the chest against snow, whereby the poison is believed to be drawn out, causing the snow to turn yellow. Drinking melted snow water at dawn and repeatedly immersing oneself in lake water at dawn are said to eliminate the foul odor. During treatment of the marmot’s poison that has developed, the prepared *Precious black ingredients’ pill* should be administered, and the blood of black frogs and black mice should be given to drink. Medicines used for neutralizing poison, such as detox cleanses and similar remedies, are also helpful (Ishbaljir, 18th century). Alternatively, if the *Precious black ingredients’ pill* is prepared and administered, it can suppress the poison and prevent marmot poisoning. At present, there is no detailed research on this *pill*.

In his next work, “*Bdud rtsi thig pa*”: “The marmot poison is a disease that is said to be caused by the infectious disease of short ribs called “*The Goddess’ Short Rib*.” It is stated that the disease can be prevented by administering or applying the *Composition of Nine Blacks*. It is further noted that consuming it every morning on an empty stomach, mixed with garlic and alcohol, also serves as a preventive measure.

One important observation from this study is that methods for the prevention and treatment of marmot-related infectious diseases are frequently described in the sources. In addition to Ishbaljir, Toin Luvsanchoinpil also discusses preventive measures in his work: “If one drinks alcohol mixed with garlic every morning on an empty stomach, infection can be prevented. If one consumes a dose of dried blood from a bull deer or a large yak, and applies garlic boiled in oil to the mouth and nose in the morning, one will not be affected by the poison (Luvsanchoinpil, 1845).

In addition to being taken orally, “*The Composition of Nine Blacks*” can also be worn as a preventive measure and is believed to protect against a wide range of infectious diseases. During the

“COVID-19” or “Novel Coronavirus” pandemic, the Mongolian Government recommended “*The Composition of Nine Blacks*” for use in multiple forms, including being worn, used for fumigation, applied externally to the body, and administered orally. This medicine is important for preventing infectious diseases and preventing further complications (Coronavirus, 2020). Furthermore, it highlights the continued relevance of traditional compound formulations in Mongolian and Tibetan medicine. From a pharmacognostic perspective, these materials provide a basis for investigating bioactive constituents and exploring their potential in modern natural-product drug discovery.

CONCLUSION

Ancient medical books written by doctors and scholar-monks Ishbaljir, Luvsanchoinpil, and Choijamts contain valuable information on marmot plague, including its symptoms, nomenclature, treatment approaches, and prevention methods. Among these scholars, the renowned Mongolian Buddhist and medical figure Ishbaljir is believed to have first mentioned marmot poison or marmot infection in his book “*Bdud rtsi zil dkar*” written in 1753. Such medical knowledge was not static but gradually expanded through observation, experience, and transmission across generations. Across different historical periods, nomadic communities and their physicians of Mongolia developed a variety of ways to prevent and treat infectious diseases. These practices were continually adjusted to fit local environments, harsh weather conditions, the unique of nomadic life, and the health characteristics of the population. In this sense, medical understanding developed as part of everyday experience, with each generation building on and refining what had come before. These accumulated practices came together to form a coherent and distinctive body of medical knowledge, shaped by the intellectual traditions and scholarly work of early physicians and scholar-monks.

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ABBREVIATIONS

CE: Common Era; COVID-19: Coronavirus disease 2019.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

SUMMARY

Ancient Mongolian doctors and scholar-monks identified diseases that are not found in Indian Ayurveda or Tibetan medicine but were prevalent among Mongolians, in accordance with the theory of wind, bile, and phlegm, leading to a revision of disease classification. A notable example is the entirely new systematization of the classification, nomenclature, diagnosis, and treatment of infectious diseases. The renowned Mongolian medical scholar Ishbaljir authored his book “*Bdud rtsi zil dkar*” in 1753, in which he claimed to be the first Mongolian physician to write about marmot poisoning or bubonic plague. Historically, Mongolian ancestors and nomadic communities have long employed various methods to prevent and treat infectious diseases. Over time, these practices were adapted and enriched to suit regional characteristics, extreme climates, unique living conditions, and the physiological traits of the population. Some approaches were newly discovered, while others evolved through generations of experience. Through this process, these methods contributed to the development of a unique and comprehensive body of medical knowledge, shaped by the cognitive and scientific advancements of ancient doctors and scholar-monks.

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