

The Balance of Hot and Cold Elements in Traditional Malay Medicine: The Therapeutic Role of Betel Nut (Sirih Pinang) Based on Selected Malay Medical Manuscripts

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DOI: <https://dx.doi.org/10.47772/IJRISS.2025.909000641>

Received: 22 September 2025; Accepted: 27 September 2025; Published: 24 October 2025

ABSTRACT

Betel (*Piper betle* L.) and areca nut (*Areca catechu* L.) function as social and spiritual symbols and are a significant medicinal synergy in traditional Malay medicine. In modern times, society has become increasingly unfamiliar with the authentic practice of menyirih (betel quid chewing) in Malay culture. This study aims to discuss the nature of the disease (hot or cold) in the treatment of betel nut based on selected Malay medical manuscripts. This is a qualitative study employing document analysis by utilising Malay medical manuscripts MSS 2515 and 'Kitab Tibb Muzium Terengganu' which have been transliterated from Jawi to Roman script, as primary sources. Studies show that the synergy of betel nut and areca nut is used for diseases such as seizures, mouth ulcers, vomiting, flatulence, shingles and fever. The research also show that degree of heat or cold of a betel nut synergy was not a priority but the temperament (mizaj) of heat or cold is more important in treating the diseases. On top of that, this study proves that the synergy of betel and areca nut not only functions as a physical treatment ingredient, but also plays an important role in balancing the hot and cold elements in the patient's body according to the Malay medical philosophy. Thus, this finding strengthens the understanding of the uniqueness of traditional Malay medical knowledge and opens the way for further scientific studies on the therapeutic potential of heritage ingredients such as betel and areca nut.

Keywords: betel, areca nut, sirih pinang, traditional Malay medicine, Malay medical manuscript.

INTRODUCTION

The wisdom of the Malay community in the field of medicine demonstrates the high level of knowledge regarding the use of materia medica. This wisdom is certainly not acquired in a short period of time, but is built upon long-term observation and personal experience. From the perspective of betel nut treatment, both of these plant elements are often paired with areca nut in treating illnesses in classical Malay medical manuscripts. In the Suma Oriental, recorded by Tom Pires, it is stated that between 1512 and 1515, the exotic practice observed at that time was the practice of chewing betel nut, which involves eating betel leaves and areca nuts [1]. Additionally, archaeological and linguistic evidence also suggests that betel and areca nuts were native plants in the Malay Archipelago [1]. Besides, [2] stated in 'The Book of Malayan Medicine' that the betel nut medicinal ingredients used in Malay medicine refer to betel quid, which is the material used for chewing betel nut, consisting of the betel plant (*Piper betle*) and the areca nut (*Areca catechu*). In addition, betel (*Piper betle*) and areca nut (*Areca catechu*) plants are among the plants that are easily found in the Malay garden concept or in Malay residential areas [3]. In the context of traditional Malay medicine, betel nut is often used externally by traditional medical practitioners known as Tuk Dukun or Malay medicine practitioners. Liquid from betel nut chewing is associated with spiritual elements. The Malay community believes that liquid from betel nut chewing has an element of heat and strength that can treat diseases caused by the disturbance of spirits [4].

METHODOLOGY

In this study, the content analysis method combines inductive and deductive approaches. The inductive approach involves the process of constructing meaning or searching for patterns based on data that has been collected without relying on pre-determined theories at the beginning of the study. It is more open and flexible, allowing themes or categories to emerge naturally from the analysed data. Meanwhile, the deductive approach begins with a pre-established humoral theory before the study is conducted. Researchers use this theory in the process of analysing data. In this study, document analysis involved the collection, organisation, and analysis of selected Malay medical manuscripts; MSS 2515, and the 'Kitab Tibb Muzium Terengganu'. These Malay medical manuscripts dated to the 18th and 19th centuries were selected based on their varying prescriptions involving betel and areca nut as well as the availability of their texts for study. The details of the pronunciation of betel nut (*sirih pinang*) became the focus of the research of the manuscripts.

Hot and Cold Concept in Traditional Malay Medicine

Malay traditional medicine emphasizes the stability of four main elements in the human body which encompasses water, fire, wind, and earth for the purpose of maintaining existing health. Medicines derived from flora and fauna are given with the intent of restoring bodily balance disrupted by changes in humoral temperament. In Arabic, temperament is known as *mizaj* or *mazaj*, which literally means the state of mind and body. In the Tibb concept, it is used to describe the qualities of the elemental mixture that forms the human body. The temperament referred to here is the pure quality produced by the interaction and reaction of the body's four elements (earth, water, fire, wind) and their respective qualities (hot, cold, moist, dry). Furthermore, temperament can describe the overall body condition, a single organ, the entire metabolic process, or even a person's behavioural and mental profile [5]. In the Galenic medical system adapted by Malay medicine, the etiology or cause of disease stems from a loss of humoral balance within the body. The Malay humoral system holds the belief that a person's health can be restored through the application of heat and cold effects on the body ([6], [7], [8]). As [6] explains:

"The terms 'hot' and 'cold' do not pertain to actual temperature, but refer to a symbolic power contained in most substances. To ensure health, one must maintain the body's internal 'temperature' balance between the opposing powers of hot and cold by attempting to avoid extreme or prolonged exposure to one quality or another. When one is ill, however, the attempt is made to restore health by re-establishing the 'temperature' balance."

Thus, in restoring health, traditional Malay medicine provides remedies that correspond to the nature of the illness, whether it is "cold" or "hot" in nature. For instance, to treat a "cold" illness, a "hot" remedy is given to rebalance the body. This traditional Malay method is considered unfamiliar in Western medicine ([7]; [8]). A clear example is the use of penicillin, a "hot" medicine, which is discouraged for treating "hot" illnesses like measles. Similarly, calamine lotion may prove ineffective for rashes as it can produce adverse bodily reactions [9]. Therefore, medicinal materials based on plants have certain temperature elements that are suitable for certain diseases. This is as outlined by Ibn Sina that aromatic herbal plants are hot-dry, which is related to the treatment of heart and lung problems. Meanwhile, herbs that have a pungent taste are cold-dry and suitable for treating diseases related to blood. Next, inflammatory diseases and those involving kidney problems are cold-wet and are categorized as cold diseases. And finally, herbal plants that have a bitter taste are hot-wet and are used to treat diseases related to the wind element such as the intestines, liver and spleen [10]. The temperature element of plants that is identified based on the properties and substances of this plant is known as the principle of "al-mizaj" and has been accepted in traditional Malay medicine and treatment [10].

In Malay medicine, the humoral theory is influenced by the Greek (Yunani) humoral doctrine and Prophetic medicine (*Tibb al-Nabawi*). This Greek-Arab model was not only adopted into Malay medicine but also applied in understanding diseases and various types of Malay food ([8]; [9]). However, the humoral theory introduced by Hippocrates and Galen was interpreted by the Malays according to their own culture, customs, beliefs, and environment. This doesn't mean that the Malays altered the doctrine of Galenism but rather adapted certain terms into the Malay language. As noted by [11], the Malay humoral system is closely tied to local culture and is manifested in customs, rituals, taboos, and healing practices. It is therefore evident that while the foundations of

humoral theory came from external influences, the Malay humoral system was shaped by an Islamic worldview adapted to the local societal context.

Galenism emphasized the necessity of hot and cold elements in life. For example, heat is needed to digest food, though cold is not always essential. The core of Galenism's health-disease model is based on the four humors and their qualities, known as humoral pathology [12]. In the Malay humoral theory, the aetiology of disease is also based on the Malay physiological understanding that the human body contains four main fluids: blood (*dam*), phlegm (*balgham*), yellow bile (*safrā'*), and black bile (*sawda'*) [13]. Sheikh Nuruddin al-Raniri, a 17th-century scholar, described the properties of the four elements of nature in humans in his book *Bustan al-Salatin*. He noted that the first element, fire (*nar*), is hot and dry; wind (*hawa'*) is hot and moist; water (*ma'*) is cold and moist; and earth (*turab*) is cold and dry. These four elements represent manifestations of nature, not as physical substances, but as symbolic qualities within humans, conveyed through the four humors [14].

In this study, diseases that use betel nut treatment are divided according to the *a capite ad calcem* method, which is the arrangement of diseases starting from the head to the feet. The method of classifying this disease is as recorded in *Bustan al-Salatin*, *Kitab Tibb* and *Kitab Taiyib al-Ihsan* [15]. Diseases that start from the head are diseases related to the head such as headaches and pain in the sensory organs, then descend to the abdomen such as intestinal colic and other diseases that exist in the abdomen. Next, it is followed by the lower part, which is diseases related to the genitals or genitals and also the feet. There are also various types of diseases that are not specific to certain parts of the body such as types of fever and skin diseases. Meanwhile, the second method of classifying diseases is based on the classification of humors. Through the principle of this humoral doctrine, diseases are divided into two types, namely cold diseases and hot diseases. Both types of diseases are based on the nature of the humor involved in triggering the disease, either due to an excess of phlegm humor or blood humor in the human body [15].

RESULTS

Based on the Malay medical manuscripts studied, the list of names of diseases that can be treated with the synergy of betel nut treatment has been rearranged according to the *a capite ad calcem* method, which is the arrangement of diseases starting from head to toe [16] as shown in Table 1 below:

Table 1. List of diseases based on body systems

Organ/System	Disease	Manuscript
Head	Seizure (Sawan senak)	Kitab Tibb Muzium Terengganu
Mouth	Ulcer (Serawan) Ulcer (Serawan)	Kitab Tibb Muzium Terengganu MSS 2515
Chest/respiratory	Phlegm (Balgham) Cough/sigh (Batuk/esak) Cough (Batuk) Sigh/tiredness (Esak/lelah)	MSS 2515 Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu
Stomach-related illness	Vomiting (flatulence) [Muntah (angin)] Want to vomit (Hendak tiada muntah) Sharp stomach pain (Sakit perut tajam) Stomach pain with diarrhea and cramps (Sakit perut cirit dan rengat) Constipation (Sembelit) Intestinal colic (Cika) Cancer in stomach (Sapan) Wind (Angin) Vomiting (flatulence) [Muntah (angin perut)] Sharp stomach pain (Sakit perut tajam)	MSS 2515 MSS 2515 MSS 2515 MSS 2515 MSS 2515 Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu

	Stomach cramp (Sakit perut memulas) Stomach pain with diarrhea and cramps (Sakit perut cirit dan rengat) Stomach pain (Sakit perut)	Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu
Lower abdomen or genital-related illnesses	Gallstones (Karang)	MSS 2515
Bone/muscle/joint	Gout (Pirai) Fracture (Patah/tergeliat)	MSS 2515 Kitab Tibb Muzium Terengganu
Skin	Shingles (Kayap) Fire shingles (Kayap api) Red rashes (Badam) Shingles (Kayap) Fire shingles (Kayap api)	MSS 2515 MSS 2515 Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu
Teeth	Toothache (Sakit gigi) Toothache (Sakit gigi)	MSS 2515 Kitab Tibb Muzium Terengganu
Childhood diseases	Crying (Sawan tangis) Seizure (Sawan) Seizure (Sawan senak) Fever with cough and seizure (Demam batuk sawan)	Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu
Fever	Thypoid fever (Demam kepialu) Fever in childbirth (Demam dalam beranak) Fever (Demam) Wind thypoid (Kepialu angin) Fever in childbirth then crazy (Demam dalam beranak maka gila)	MSS 2515 Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu Kitab Tibb Muzium Terengganu
Nerve	Wind tapping (Weakness, paralysis of limbs) [Angin mengetik (lenguh lumpuh kaki tangan)]	Kitab Tibb Muzium Terengganu

DISCUSSION

The analysis of hot diseases discussed by the researcher in this subtopic is based on the symptoms of the disease. However, if there are diseases whose symptoms are not mentioned in the Malay medical manuscripts, therefore the researcher listed the symptoms of the disease in general based on the basic principles of the element theory in traditional Malay medicine. In addition, the researcher also considered the causes of the disease involving certain organs to determine whether the disease is hot or cold.

Hot Diseases

Seizures

Seizures are a type of disease caused by a brief surge of excessive electrical activity in the brain [17]. This disease comes on suddenly and causes the limbs to become stiff, convulsive and accompanied by foaming at the mouth [18]. However, in Malay medicine, seizures have various names based on the symptoms experienced by the patient [19]. For the problem of fever and cough seizures stated in betel nut treatment, it refers to the symptoms of seizures accompanied by symptoms of fever and cough. No other specific symptoms for seizures mentioned

in selected Malay medical manuscripts are specified. However, basically this type of seizure causes cramps in the limbs and hands and fever (febrile convulsion). It is a symptom of seizures that is commonly experienced by children and is not dangerous [20]. Furthermore, Hippocrates and Galen stated that cold baths and cold water irrigation were used to treat convulsions [21]. Therefore, convulsions that attack children are usually of a febrile nature. The excerpt below shows a prescription for convulsions whose symptoms are not specifically stated in the manuscript that was reviewed:

As another remedy for children with fever, cough and seizures, take the contents of the yam, bamboo starfruit and cumin, then chew it with betel nut and spray it on the child's throat, and he will be fine. (Kitab Tibb Muzium Terengganu: 246)

Serawan

Serawan is a disease that shows symptoms of white spots on the tongue, inside the cheeks and palate [22]. According to the [18], *serawan* means a disease with red spots or rashes. Inflammation or ulcers in the mouth and tongue indicate the hot nature of *serawan* disease and require cold medicine to treat the disease. It is a fungal infection caused by excessive growth of the yeast *Candida albicans*. Due to the fact that the immune system is not yet strong enough, babies are more susceptible to *serawan*. The following is an excerpt from a manuscript regarding the prescription of *serawan* disease:

As another *serawan* medicine, take fennel with pomegranate leaves and eat it with betel nut three times a day, healed. (Kitab Tibb Muzium Terengganu: 108)

Sapan

Sapan refers to diseases related to cancer [23]. Meanwhile, [24] stated that sapan is a type of cancer in the stomach as recorded in the study of the manuscript of Kitab Tibb numbered W. 277. [25] stated that cancer is a hot disease and it is necessary to avoid hot medicines and foods so that the symptoms of cancer do not become worse. Excerpts from the manuscript studied regarding sapan prescriptions are as follows:

As for sapan medicine that is sprayed on items where, take kait-kait leaves and cengal leaves and seripis leaves and cekur bonglai and shallots and black cumin, then all of them are chewed with betel nut, sprayed, healed. (Kitab Tibb Muzium Terengganu: 173)

Karang

Karang (Gallstone disease) or penile stone disease as mentioned in the manuscript studied refers to a disease that affects men. It is stated that if the gallstones are removed from the urinary tract, then the penis becomes strong. According to Syeikh Ahmad Al-Fatani, an imbalance in the bile humor causes gallstones [26]. Therefore, this gallstone disease is hot in nature. The prescription for this disease is as follows:

Take the black birah root, then dry it, then eat it with betel nut, then eat it every day, it is very beneficial, the gallstones will disappear and the penis will also become stronger because of it.

(MSS 2515: 189)

Bone/Muscle/Joint

Pirai

Based on The Medical Book of Malayan Medicine, [27] recorded the disease of pirai which was stated as a disease caused by external elements and accompanied by pain in the joints, veins and bones which was similar to rheumatic or gout pain. For example, a passage in the book states that "On hearing the news of a death, a man gets pain in his bones; should he unexpectedly see the corpse, the pain increase, and affects the whole of the man's body". Rheumatic or gout disease is associated with inflammation which is translated through swelling,

redness and a hot sensation in the affected joints. Therefore, it is categorized as a hot disease. The prescription for pirai disease is as follows:

Take betiram leaves and damang leaves and tiger milk leaves and lime leaves and semedu leaves and cekur and bonglai and jerangau and chili and pepper and shallots and garlic and black cumin then all of them are rubbed with betel nut and sprayed on the sore spot for three days, healed. (MSS 2515: 249)

Fracture

For fracture problems, no specific symptoms are stated, however this problem is categorized as a hot or cold disease depending on the synergy of betel nut and other medicinal ingredients [24]. The prescription for fracture is as follows:

Take the outer skin of the tarjam (martajam) and the roots of the kempukup and suda lalang, and bonglai, cumin, shallots, chewed with betel nut and areca nut, spread on the floor, then open for 3 days and open for 2 days, healed. (Kitab Tibb Muzium Terengganu: 72)

Skin

Shingles (Kayap)

Shingles is a type of skin disease that is watery and itchy and the patient's skin appears red, pus-filled and watery. In addition, the skin also feels hot as if it has been smeared with chili [28]. Therefore, the symptoms of this disease indicate that it is a hot disease. Among the prescriptions for shingles are as follows:

Take hard fruit and lenga oil and gelam skin then chew with betel nut and betel nut, spray on the shingles, healed. (Kitab Tibb Muzium Terengganu: 76)

Red rashes (Badam)

Badam (red rash on the body) or chicken skin is a type of skin disease that starts with round spots, but inside it is grumbling like chicken skin with its feathers pulled out [14]. Reddish skin shows symptoms of inflammation, hence badam disease is hot in nature. Here is a treatment for badam disease:

Take three parts of sembung leaves or take ribu-ribu root and mertapi root and merlada root and tampam root and larak root and rattan bini root and bitter rattan root and kaduk root and limau buffau root and mara-mara root, take equal weights then slice then chew with betel nut then spray on the disease for three days; after that, take the pulp and throw it into the three-branch road. (Kitab Tibb Muzium Terengganu: 63)

Fever

For fever and fever during childbirth, then madness is a disease that is identified as a disease that is hot in nature. Fever generally involves an increase in body temperature due to excess blood humor in the body [29]. Meanwhile, women after childbirth can experience fever due to several factors, including blood loss, bacterial and viral infections, headaches, back pain and unstable body temperature (too cold or too hot). In fact, emotional disorders after childbirth can cause mental health disorders caused by the mother's blood circulation not being smooth and changes in body temperature after the childbirth process. Therefore, this situation causes blood flow to the brain to be disrupted [29]. In the prescription of betel nut which states fever after childbirth followed by madness, then this disease is hot in nature. The following is a prescription for spray treatment for fever in childbirth that causes madness:

And again, if a person has fever in childbirth, then madness, and the spray medicine, then take mikdat root and tampam root and larat root and rembega root, then all of them are chewed with betel nut, then spray it for good health. (Kitab Tibb Muzium Terengganu: 278)

Cold Diseases

In general, in Malay medicine, patients who suffer from cold diseases need to avoid cold elements such as cold foods and cold winds. Understanding the symptoms of this disease is important in determining the treatment method which is also humoral, namely the administration of medicine or food whose properties are opposite to the disease of the person who wants to be treated [15].

Seizure (Sawan senak)

Based on a study of Tibb manuscripts by [35], *sawan senak* shows symptoms of closed eyes and a pale face. For sawan senak, the symptoms are not stated in the manuscript studied. However, Wan Ahmad Ibn Wan Muhammad Zayn Al-Fatani stated in Kitab Tayyib Al-Ihsan fi Tibb Al-Insan that the symptoms of paleness indicate that the cold element dominates a person, so indigestion is categorized as a cold disease [31]. The following is a prescription for *sawan senak*:

As another remedy for indigestion. Take forest pecan and mustard vomiting leaves and princess cemukur leaves, bonglai, shallots, black cumin, then spray with betel nut on the boy's stomach, healed.(Kitab Tibb Muzium Terengganu: 237)

Chest/respiratory

In the betel nut treatment studied, the diseases related to cough are phlegm and sigh or also known as fatigue. Phlegm is one of the the symptoms of cold diseases [24]. The following is a prescription for phlegm and sigh:

As another remedy for cough or hiccups, take turmeric and camphor and eat it with betel nut, healed.(MSS 2515:145)

Stomach-related illness

Based on the prescription of betel nut, two indigestion-related diseases recorded are indigestion/bloating and indigestion with vomiting and diarrhea. Indigestion is defined as feeling indigestion in the stomach [18]. Vomiting is the act of expelling something back from the mouth [18]. Symptoms of vomiting mentioned in betel nut treatment are vomiting with wind in the stomach and vomiting that is not sticking out. Syaikh Ahmad Al-Fatani described the symptoms of indigestion and vomiting as cold diseases caused by disturbances in the balance of spleen fluid [26]. Therefore, indigestion, bloating, vomiting (flatulence), vomiting that is not sticking out are cold diseases that require hot elements to resolve stomach wind [26]. While stomach pain with diarrhea is a condition of diarrhea accompanied by pain in the stomach that is cramping like the condition before and after giving birth to a baby while the mother also has symptoms of diarrhea and vomiting [18]. Hot medicines are needed to treat stomach pain, constipation, indigestion and diarrhea [32]. Hence, the internal stomach problems that are stated are cold diseases. The following are some prescriptions for indigestion problems:

As another remedy for stomach aches that are twisting, take betel leaves that have not yet blossomed, roll them up, and seven betel leaves, then recite the verse of Al-Kursi and eat them with betel leaves, good health.(Kitab Tibb Muzium Terengganu: 217)

Tooth

Based on the study, there are no symptoms of dental disease. Among the prescriptions stated are as follows:

Then take the root of kuruk and a little bit of landak then eat with betel nut, it is healthy.(MSS 2515: 225)

As stated in the book *Taiyib Al-Ihsan Fi Tibb Al-Insan*, toothache is caused by excessive phlegm humor [15]. Therefore, it falls under the category of cold diseases.

Thypoid fever

[27] stated that typhoid fever refers to a continuous fever that lasts for more than three days. In traditional Malay

medicine, there are various classifications of typhoid fever based on the symptoms experienced by the patient such as typhoid fever with fire, heat fever and shivering typhoid fever. Based on the study, the prescription of betel nut that shows symptoms of cold is typhoid fever with cough. The following is an excerpt from the Tibb manuscript that was studied for the treatment of typhoid fever with cough:

Then take gandarusa leaves and kapas lime leaves and amethyst leaves and burn them, take the ashes and sprinkle betel nut on the chest, aflat.(MSS 2515: 143)

Based on the symptoms, this type of typhoid is caused by excessive phlegm and causes the body to become cold. Meanwhile, for typhoid fever, the symptoms of which are stated as wind pain and wind cold typhoid fever throughout the body, these symptoms refer to the symptoms of cold diseases caused by an increase in the cold element which causes disruption in the flow of energy and blood. Typhoid fever caused by wind has symptoms such as heat, pain throughout the body, cold, cold, hot sweating, tiredness and dry mouth [15]. [33] stated that the treatment method of poultice is used to treat wind typhoid fever, thus this shows that it is a cold disease.

Wind tapping (Angin mengetik)

The symptoms of wind tapping resemble the tickling wind disease as stated in the prescription of betel nut, namely, the condition of being tired, paralyzed or dead in the legs or arms, or one side of the body as follows:

Then this is what is sprayed; tired, paralyzed or dead in the legs or arms or one side of the body. Then take chili root and pepper root and betel root and kaduk root, cumin and shallots and ginger and nine grains of pepper and pomegranate leaves and lime leaves and inverted nyarung leaves and kait-kait leaves and cekur and jerangau. All of that is mixed, then spray with betel nut. If it is applied to the arm and covered with a cloth, healed.(Kitab Tibb Muzium Terengganu:147)

The symptoms of tired, paralyzed or dead in the legs or arms are caused by excessive cold elements entering the patient's body ([2]; [24]).

In general, betel is hot based on the spicy taste of its leaves [34]. In the Book of *Bustanus Salatin* by Sheikh Nuruddin ar-Raniri, the 'mizaj' of areca nut is stated as cool and dry at the third degree. This means that betel used in small quantities is able to provide the desired therapeutic effect, and if used in large quantities it will be harmful [13]. Meanwhile, the findings of the specific 'mizaj' degree for betel were not found by the researcher. Meanwhile, for betel leaves, a study by [35] showed that betel is safe to take orally even if it exceeds the dose appropriate for the body weight of rats. However, in terms of determining the degree of betel's *mizaj*, relevant experts are able to determine the appropriate degree of betel's *mizaj* by taking into account qualitative and quantitative factors. The terms "hot" and "cold" used for the illnesses above do not refer to actual temperature but rather to the symbolic forces inherent in the illnesses. Thus, to maintain internal body balance between hot and cold energies, excessive or prolonged exposure to one quality (hot, cold, dry, moist) should be avoided ([6]; [12]).

However, not all humour-based treatments necessarily require medicine with opposing qualities to the illness. For instance, if the humour quality of an illness has a moderate level of heat, then hot-natured medicine can still be given to the patient. The clash of hot humours can stimulate T cells and B cells to move more actively and become more effective in fighting bacteria or viruses in the body ([34]; [25]). This is explained by [34] in the *Kitab Perubatan Jawi*, regarding the first stage of treatment which applies the principle of "similar quality", where a hot illness is treated with hot herbs and a cold illness with cold herbs. Furthermore, if the illness persists for three consecutive days without any response to the first-stage treatment, the second stage is applied, where herbs of opposing qualities to the humour of the illness are used [34]. Observation of the physical properties of betel and areca nut such as the properties of the leaves, roots, smell and colour can provide clues to their properties, whether they are hot or cold. This method is an agreed upon method in traditional medicine ([34]; [36]).

Apart from that, a study by [37] stated that determining the degree of heat or cold of a medicinal substance was not a priority for the local Malay community, but the concept of *mizaj* and the degree of heat and cold was

developed by previous figures without the help of sophisticated tools and technology such as those available today [13]. For example, in the Book of *Bustanus Salatin*, Sheikh Nuruddin ar-Raniri classified the mizaj and the degree of heat and cold for 73 types of foods and medicinal substances. There are errors and differences among classical doctors regarding the determination of whether a substance is hot, cold, dry, wet or ughari (balanced). However, in general, from a qualitative point of view, the mizaj of heat or cold is more important. The cause of the error is due to the condition of the body of an individual who feels the effects of a substance. This is because a healthy body will absorb the quantitative value of the substance accurately. Therefore, a person's mizaj or temperament is different because it is influenced by genetics, environment and lifestyle [38]. Besides, medicinal materials can also be a source of error because the materials planted or grown in different soil, climate, age, harvesting methods and storage methods can change the nature and degree of a medicinal material [13]. Therefore, understanding the patient's body based on symptoms is extremely important, as it involves the method of selecting medicine that is compatible with the patient. For example, in diagnosing a patient, if there is an imbalance in the bodily fluids of phlegm (*balgham*), yellow bile (*saфра*'), and blood, but the diagnosis shows a dominance of phlegm, thus the illness is classified as a cold-natured [26].

CONCLUSION

In conclusion, hot and cold concept in Malay traditional medicine is a manifestation of humoralism according to the mold of Malay society because the qualitative concepts of humoral theory (hot, cold, dry, moist) have been interpreted and simplified in the context of Malay culture into a single concept of "hot" and "cold". The treatment of diseases for betel nut prescription is based on the cause and symptoms of the disease as outlined by Syaikh Ahmad Al-Fatani in *Kitab Tayyib Al-Ihsan Fi Tibb Al-Insan* in the fifth chapter. Diseases that are hot or cold require medicinal ingredients or foods that have opposing properties to produce different humors. These differences in humors are important in restoring balance to the patient's body. Therefore, Galen's approach, which has been adapted according to the Malay medical system, is easier to understand and practice by the general public.

In line with the Sustainable Development Goals 2030 in ensuring healthy living and promote well-being at all ages, this study recommends further research on the practice of betel nut in various Malay communities. Investigation on the knowledge of betel nut can be adapted into modern medical practice. Next, the effectiveness of treatment through the use of optimal betel nut dosage needs to be given attention. This is because any side effects that can interfere with health problems can be avoided. Therefore, this study encourages thorough research by taking into account the absorption rate, metabolism, excretion of phytochemicals and also subsequently determining the pharmacokinetic profile of the phytochemical extract of betel nut. It is hoped that the impact of this study is able to convince the modern generation that betel nut has medicinal value that is simple and inexpensive if used with the appropriate method and dosage according to a person's body.

Conflict of interest

No conflict of interest.

REFERENCES

1. Khir, J. (2013). An Introduction to the Use of Sirih in Malay Culture. Singapore: Passage.
2. Gimlette, J.D. & Burkill, I. H. (1930). The Medical Book of Malayan Medicine, translated by Inche' Ismail, possibly in Penang, circa 1886. Garden Bulletin, 6(11-15), 323-474.
3. Md Azalanshah, M. S., Azizah, H. & Halijah, I. (2019). Taman Melayu: konsep dan pelestariannya dalam dunia moden. Akademika, 89(2), 83-96.
4. Saad, O., Zuraidah, M. Y. & Adenan, J. (2013). Perubatan tradisional Melayu: Konsep dan amalan. In: Nazarudin, Z., Rahimah, A. H. & Mohd Kipli, A. R. (ed.). Kearifan Tempatan Pengalaman Nusantara Jilid 1: Berasal Dari Akar, pp. 155–180. Pulau Pinang: Penerbit University Sains Malaysia.
5. Mones, A., Hakima, A & Marc, S. M. (2013). Avicenna's Medicine: A New Translation of the 11th-Century Canon with Practical Applications for Integrative Health Care. United States: Inner Traditions/Bear.

6. Logan, M. H. (1975). Selected references on the hot-cold theory of disease. *Medical Anthropology Newsletter*, 6(2), 8–14.
7. Manderson, L. (1987). Hot-cold food and medical theories: overview and introduction. *Social Science and Medicine*, 25(4), 329-330.
8. Pisol, M & Mohd Nor, M. (2014). Daripada Falsafah Menjadi Sains: Doktrin Perubatan Melayu dalam Kitab Bustan Al-Salatin. Kuala Lumpur: Perpustakaan Negara Malaysia.
9. Laderman, C. (1984). Food ideology and eating behaviour: contributions from Malay studies. *Social Science and Medicine*, 19(5), 547-559.
10. Samihah, K., Siti Alida, J. A. & Rusniah, A. (2018). Tumbuhan ketum di Malaysia: Cabaran dan prospect. University Utara Malaysia.
11. Endicott, K.M. (1970). *An Analysis of Malay Magic*. Kuala Lumpur: Oxford University Press.
12. Mones, A., Hakima, A & Marc, S. M. (2013). *Avicenna's Medicine: A New Translation of the 11th-Century Canon with Practical Applications for Integrative Health Care*. United States: Inner Traditions/Bear.
13. Naseer, S. (2020). *Bustanus Salatin Bab Ketujuh Pada Menyatakan Ilmu Tashrih dan Ilmu Tibb Kajian & Transliterasi*. Kuala Lumpur: Baytul Hikma.
14. Pisol Maidin. (2013). Ilmu anatomy dan physiology dalam Kitab Bustan al-Salatin. In Rahimah A.H., Mohd Kipli, A. R. & Nazarudin, Z (ed.). *Kearifan Tempatan: Pengalaman Nusantara Meneliti Khazanah Sastera, Bahasa dan Ilmu*, hlm. 180-192. Pulau Pinang: Penerbit University Sains Malaysia.
15. Pisol Maidin. (1995). *Konsep Kesihatan dan Ethnopharmacology: Satu Kajian Falsafah Berdasarkan Beberapa Naskah Manuskrip Perubatan Traditional (Bustan al-Salatin, Kitab Tibb dan Taiyib al-Ihsan)*. Kuala Lumpur: University Malaya.
16. Glick, T., Livesey, S. J. & Wallis, F. (2005). *Medieval Science, Technology, and Medicine*. An Encyclopedia. New York: Routledge.
17. Wienholts, K., Murkens, M., Raftakis, M. & Muhlichen, M. (2025). Convulsions as a cause of infant death: new insights into its meaning based on evidence from four European cities (1800–1955). *Medical History*, 69(2), 234-255. doi:10.1017/mdh.2025.7
18. Kamus Dewan Edisi Keempat. 2017. Dewan Bahasa dan Pustaka: Xentral Methods Sdn Bhd.
19. Harun, M. P. (2017). *Kitab Tib Muzium Terengganu: Edisi dan Huraian Teks*. Kuala Lumpur: FRIM.
20. Kavanagh, F. A., Heaton, P. A., Cannon, A. & Paul, S. P. (2018). Recognition and management of febrile convulsions in children. *British Journal of Nursing*, 27, 20.
21. Rees, A. (1810). *The Cyclopaedia: Or, Universal Dictionary of Arts, Sciences, and Literature*. United Kingdom: S. F. Bradford.
22. Ang, D., Sifrim, D. & Tack, J. (2008). Mechanisms of heartburn. *Nature Reviews Gastroenterology and Hepatology*, 5, 383–392. <https://doi.org/10.1038/ncpgasthep1160>
23. Muhammad Dzulkarnain, M., Mardhiahm M. & Mohd Affendi, M. S. (2020). *Rawatan Kanser Dalam Beberapa Manuskrip Melayu Terpilih*. Kuala Lumpur: Academy Jawi Malaysia.
24. Ellya, R. (2014). Ramuan herbal non instan dalam naskah kitab tib sebagai alternatif pengobatan. *Sosial Budaya*, 11(1), 1-18.
25. Laderman, C. (2023). *Wives and Midwives: Childbirth and Nutrition in Rural Malaysia*. United States: University of California Press.
26. Fairuzah, M. S., Zilal, S., Nur Najwa Hanani, A. R. & Norhissam, M. (2019). Perspektif Syaikh Ahmad Al-Fatani tentang kaedah mengenal pasti penyakit: analisis awal terhadap Kitab Tayyib Al-Ihsan fi Tibb Al-Insan. *International Journal of Islamic and Civilizational Studies*, 6(22), 111-122.
27. Gimlette, J.D. & Burkill, I. H. (1930). *The Medical Book of Malayan Medicine*, translated by Inche' Ismail, possibly in Penang, circa 1886. *Garden Bulletin*, 6(11-15), 323-474.
28. Norhalim, I. (1997). *Perubatan Tradisional*. Malaysia: Fajar Bakti.
29. Wan Faizah, W. Y. 2013. Pengurusan humoral dan hubungkaitnya dengan etiologic sakit demam dalam system perubatan tradisional Melayu di Kelantan, Malaysia. Seminar Serantau Ke - 2 Pengurusan Persekitaran di Alam Melayu. Pekanbaru, Riau, Indonesia, May, 6-7, 2013.
30. Abdul Samad, A. (1988). *Warisan Perubatan Melayu*. Kuala Lumpur: Dewan Bahasa dan Pustaka.
31. Mohd Affendi, M. S. (2018). *Transliterasi Tayyib Al-Ihsan Fi Tibb Al-Insan*. Kuala Lumpur: Khazanah Fathaniyah.

32. Wan Faizah, W. Y. (2017). Nilai dan Simbolisme Sirih dalam Budaya serta Perubatan Tradisional Masyarakat Melayu dan India. Pulau Pinang: University Sains Malaysia.
33. Harun, M. P. (2015). Ilmu perubatan Melayu tradisional dari naskhah-naskhah lama. *Journal Antarabangsa Alam dan Tamadun Melayu*, 3(3), 3-17.
34. Ismail, A. (2018). *Kitab Perubatan Jawi*. Perlis: HPA Industries SDN. BHD.
35. Sengupta, K., Mishra, A. T., Rao, M. K., Sarma, K. V., Krishnaraju, A. V. & Trimurtulu, G. (2012). Efficacy of an herbal formulation li10903 containing dolichos biflorus and piper betle extracts on weight management. *Lipids in Health and Disease*, 11(176). <https://doi.org/10.1186/1476-511X-11-176>
36. Willie, J. (2010). *Farmakologi Herbal Plus Tabel Toksisitas*. Indonesia: Universitas Indonesia Publishing.
37. Hart, D. V. (1969). *Bisayan Filipino and Malayan humoral pathologies: folk medicine and ethnohistory in Southeast Asia Vol. 76*. New York: Cornell University.
38. Yavari, M. (2021). Hot and cold theory: future perspectives. *Advances in Experimental Medicine and Biology*, 1343, 171-174.