



Application of the *Tang Ye Jing Fa Diagram* in Chikungunya Fever through a Traditional Chinese Medicine Prescription Framework Integrating Heat-Clearing, Dampness-Resolving, and Exterior-Releasing Therapy

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Abstract

Chikungunya Fever (CHIKF) is an acute arboviral illness characterized by high fever, debilitating polyarthralgia, and rash. Despite its global emergence, specific antiviral treatments remain elusive. Traditional Chinese Medicine (TCM) offers an individualized approach to epidemics, grounded in classical theories and rich clinical heritage. This review explores the theoretical integration of the ancient TCM diagram *Tang Ye Jing Fa Diagram* (from the Dunhuang manuscript *Fu Xing Jue*) with clinical TCM practice in managing acute CHIKF. *Tang Ye Jing Fa Diagram* encodes fundamental principles of herbal prescription that define the relationships between the five flavors, five Zang organs, and the reinforcing or reducing therapeutic actions. We examine how this five-flavor logic can illuminate the syndrome differentiation and formula design for CHIKF, which TCM classifies as a “warm pestilence” with damp-heat invasion.

Subject Areas

Internal Medicine

Keywords

Chikungunya Fever, *Tang Ye Jing Fa Diagram*, Traditional Chinese Medicine, Flavor-Organ-Action Framework, Dampness-Heat Syndrome

1. Introduction

Chikungunya Fever (CHIKF) is an acute mosquito-borne viral disease that has

caused periodic epidemics across Africa, Asia, and more recently the Americas [1]. Clinically, CHIKF presents with sudden high fever, intense bilateral polyarthralgia, rash, and other flu-like symptoms [2]. While the illness is usually self-limiting over 1 - 2 weeks, joint pains can persist for months, imposing a significant burden on affected populations [3]. In the absence of a targeted antiviral therapy or vaccine, management is largely supportive. The recent surge of CHIKF cases (e.g., in Guangdong, China, mid-2025) underscores the need for complementary treatment strategies. Traditional Chinese Medicine (TCM), with its holistic and individualized approach, has been applied in epidemic diseases and is reported to alleviate CHIKF symptoms such as fever, rash, and joint pain [4] [5]. This suggests that TCM herbal therapy could be a valuable adjunct in CHIKF care. Moreover, emerging studies provide evidence for its efficacy, showing that arctigenin (a lignan from burdock seed) was recently shown to inhibit chikungunya virus in vitro, blocking viral entry and replication [6]. Such findings support the antiviral potential of TCM interventions in CHIKF.

TCM's approach to epidemics is grounded in a rich classical literature—over 500 ancient texts address “warm epidemic” diseases and their remedies. One such classical framework is the *Tang Ye Jing Fa Diagram* (“Decoction Classic Formulas Diagram”), recorded in the Dunhuang manuscript *Fu Xing Jue* dated to the Tang dynasty. *Tang Ye Jing Fa Diagram* is essentially a schematic elucidating how the five flavors of herbs (pungent, salty, sweet, sour, bitter) correspond to the five Zang organs (Liver, Heart, Spleen, Lung, Kidney) in effecting tonification (reinforcement) or draining (reduction). It expands on earlier theories (e.g., *Huang Di Nei Jing*) by providing a more systematic and clinically relevant mapping of flavors to organ treatment strategies [7]. Modern research has provided concrete support for the *Tang Ye Jing Fa Diagram*'s logical framework. For instance, the diagram's five-flavor allocation forms a non-redundant matrix for organ treatment. Since sweet flavor tonifies the Spleen in this system, the diagram designates a different flavor to drain the Spleen, never assigning sweet to purge the Spleen [8]. This systematic pairing of flavors and organs underscores the diagram's mathematical rigor in formula design.

Given CHIKF's complex pathology, involving acute fever immune hyper-reactivity and joint inflammation, a traditional perspective may enrich our understanding of treatment. CHIKF can be viewed through the lens of TCM warm disease theory and dampness-related syndromes. Integrating this with *Tang Ye Jing Fa Diagram* offers a unique theoretical approach that we can analyze CHIKF's TCM patterns to identify which Zang-organs are in excess or deficiency, then apply the diagram's flavor-organ principles to select herbs that precisely reinforce weakened organs or purge pathogenic excess. By doing so, we aim to uncover the classical rationale behind effective CHIKF herbal treatments and demonstrate their relevance to modern phytomedicine.

2. Theoretical Background of *Tang Ye Jing Fa Diagram* and Five-Flavor Prescription Logic

Tang Ye Jing Fa Diagram is a schematic theory from the Dunhuang manuscript

Fu Xing Jue, an ancient medical text rediscovered in the early 20th century. This diagram is regarded as a distillation of classical herbal formula principles in TCM. It encodes how each of the five fundamental flavors of TCM, such as aromatic (also known as pungent), salty, sweet, sour and bitter, interacts with each of the five Zang organs (Liver, Heart, Spleen, Lung, Kidney) to either tonify a deficient organ or drain an organ in excess. In addition, it defines a third category of flavor action for each organ, often termed the “urgent” or transforming flavor, used to quickly neutralize acute imbalances. Together, this forms a matrix of 5 organs \times 3 flavor-actions = 15 specific organ-flavor relationships. Notably, *Tang Ye Jing Fa Diagram* differs from the simplistic one-to-one pairing of flavors and organs commonly cited, a scheme that alone cannot fully guide clinical formula design. Instead, *Tang Ye Jing Fa Diagram* provides a multi-dimensional mapping in that each flavor is assigned a distinct role for a given organ, and each organ is associated with three different flavors. This overcomes contradictions in earlier texts and aligns more closely with empirical herbal usage.

Crucially, each flavor appears exactly once in each column of this matrix. For example, in the tonification category, the five organs are each nourished by a different one of the five flavors (Liver by aromatic, Heart by salty, Spleen by sweet, Lung by sour, Kidney by bitter). The same is true for the sedating flavors and the urgent flavors, each following the same cyclic order of flavors but applied to a different starting organ. This elegant distribution, described as conforming to “the mathematical logic of the outer product of a five-dimensional space vector”, implies a comprehensive and non-redundant coverage of therapeutic actions. In contrast, the flavor-organ relations described in the canonical *Huang Di Nei Jing* are less consistent. For instance, *Neijing* suggests sweet flavor sedates the Heart, which clashes with clinical experience. The *Fu Xing Jue* version instead assigns bitter to sedate Heart fire, aligning with the use of bitter-cold medicinals to purge Heart heat. Overall, comparative analyses affirm that *Tang Ye Jing Fa Diagram* presents a more logical and rigorous framework than earlier sources, as each organ’s functions are regulated by three distinct flavors and each flavor has a unique targeted role. No flavor is redundantly assigned to the same organ for multiple actions, and no organ uses the same flavor for both reinforcement and reduction. For example, since sweet flavor tonifies the Spleen, *Tang Ye Jing Fa Diagram* stipulates that sweet should not also be the Spleen’s draining flavor—instead pungent performs the draining role for Spleen (in *Neijing*, by contrast, one finds bitter listed both as Spleen’s sedative and “urgent” flavor, which *Fu Xing Jue* avoids). This internal consistency reflects the classical understanding that an herb’s taste is indicative of its directional effect in the body, and that a balanced formula often requires a blend of tastes to holistically correct an imbalance.

The *Tang Ye Jing Fa Diagram* provides a blueprint for herbal formulation. In practice, it means that for a given patient’s syndrome one should identify which organ is primarily deficient and which may be in an excess/pathological state. Then, one selects herbs with the flavors that *Tang Ye Jing Fa Diagram* prescribes

for those specific actions on those organs. This approach can elucidate why certain prescriptions work for certain syndromes, essentially revealing the “deep-level logic of medicinal selection and compatibility” behind classical formulas. In summary, *Tang Ye Jing Fa Diagram* offers a theoretical integrative tool that links the macroscopic TCM concepts of organs and patterns with the pharmacological properties of herbs. By employing this framework, a practitioner or researcher can rationalize the inclusion or omission of certain flavors in a formula for a given condition.

3. TCM Understanding of CHIKF

In TCM nosology, Chikungunya fever can be classified under “warm pestilence” or “epidemic damp-warm disease,” reflecting an externally contracted febrile illness caused by a pathogenic *shi qi* (seasonal pestilential factor). Specifically, CHIKF is described as being triggered by an *epidemic toxin* transmitted by mosquito bite, which corresponds to a combination of *wen du* (warm toxin) and *shi qi* (damp pathogenic factor) entering the body. The mode of transmission via mosquito is significant in TCM terms, and the insect vector is seen as “borrowing the power” to introduce the pathogen, akin to an externally invading evil that breaches the defensive exterior of the body. Thus, CHIKF’s cause is an acute invasion of damp-heat pestilence.

The acute phase of CHIKF is characterized by an abrupt onset and intense symptomatology, which TCM texts map onto specific syndromes involving the Wei (defensive) and Qi levels of the body’s qi dynamic. The disease’s pathogenic course follows the classic *Wei Qi Ying Xue* progression of warm diseases, but with unique features. Notably, CHIKF shows a rapid transition from the Wei to Qi level, often simultaneous involvement of both Wei and Qi, while typically not reaching the Ying or Blood levels. In practical terms, this means that at onset, the pathogen invades the exterior layers, then quickly penetrates to the interior Qi level, without usually causing the severe delirium, bleeding, or collapse associated with deeper Ying/Blood level heat. This pattern explains why CHIKF patients present with significant fever and systemic signs early on, yet can also have prominent superficial symptoms like rash and chills. As summarized in **Table 1**, each acute-phase CHIKF syndrome corresponds to distinct therapeutic principles and representative formulas, many of which originate from classical TCM prescriptions for damp-heat and epidemic febrile diseases.

These principles align well with the known approach for damp-warm epidemic fevers documented in TCM warm disease literature (e.g., early-stage Damp-Warmth often treated with formulas that both release exterior and clear interior damp-heat). Indeed, one cited clinical strategy for CHIKF was combining cold and warm measures. In practice, this meant using aromatic-warm herbs (e.g., schizonepeta, saphoshnikovia, notopterygium, angelica pubescens) to sweat out the pathogen at the exterior, alongside cold, bitter herbs (e.g., gypsum, pueraria) to clear interior heat and generate fluids, thereby expelling the pathogen without injuring Yin.

Table 1. Primary TCM syndromes, key therapeutic principles, and representative formulas in CHIKF.

Primary TCM Syndrome in Acute CHIKF	Key Therapeutic Principles	Representative Formulas
Damp-heat attacking the exterior	Release the exterior, resolve dampness, relieve fever and joint pain	<i>San Ren Tang</i> (Three-Seed Decoction), <i>Huo Xiang Zheng Qi San</i> (Agastache Powder)
Damp-heat obstructing the qi level	Clear heat, drain dampness, detoxify, relieve swelling and inflammation	<i>Gan Lu Xiao Du Dan</i> (Sweet Dew Special Pill to Eliminate Toxin), <i>San Ren Tang</i> modifications
Concurrent exterior-interior syndrome	Harmonize the exterior and interior, release pathogens, regulate qi and relieve pain	<i>Ge Gen Qin Lian Tang</i> (Pueraria, Scutellaria, and Coptis Decoction)
Wind-damp-heat bi syndrome (persistent joint pain)	Dispel wind, clear heat, resolve dampness, unblock collaterals, relieve pain	<i>Qiang Huo Sheng Shi Tang</i> (Notopterygium Decoction to Overcome Dampness), <i>Juan Bi Tang</i> (Remove Painful Obstruction Decoction)

Additional herbs to resolve toxic heat (e.g., isatis root) and to “open the collaterals” in the joints (e.g., luffa vine, honeysuckle stem) were used as assistants. This comprehensive approach—venting the exterior, clearing interior damp-heat, and freeing the channels—corresponds to the combined Wei/Qi level syndrome of CHIKF. In summary, TCM views acute CHIKF as a damp-heat epidemic pathogen attacking the body, primarily at the defensive and Qi levels, with a strong propensity to obstruct the Spleen and the channels (especially joints). Treatment must be tailored to expel the damp-heat pathogen while supporting the patient’s Qi and fluids.

Applying an ancient warm-disease framework to a modern arboviral infection like CHIKF has inherent limitations. Warm-disease theory, formulated for historical epidemics, may not fully account for CHIKV’s virological characteristics or the prolonged arthritic sequelae seen in some patients. Practitioners should be cautious not to over-generalize classical diagnoses to every CHIKF case. In addition, the use of traditional formulas must consider safety and herb-drug interactions relevant to CHIKF patients. For example, the herb Ephedra (Ma Huang), often used to release the exterior and dispel dampness, has sympathomimetic properties that can elevate blood pressure and heart rate; it should be avoided or used with extreme caution in patients with hypertension or cardiac risk. Similarly, Glycyrrhizae Radix (Gan Cao, licorice), frequently employed to harmonize formulas and alleviate toxicity, can cause sodium retention and hypokalemia, and may potentiate the effects of corticosteroids or interact with diuretics. Furthermore, if CHIKF patients are taking anti-inflammatory or analgesic drugs, certain herbs could enhance side effects such as edema or blood pressure changes. These examples underscore the need for careful patient monitoring and a tailored approach. While TCM offers useful therapeutic avenues for CHIKF, its application should be judicious, complementing modern medical care rather than replacing it, and always accounting for contraindications and potential herb-drug interactions.

4. Integration of *Tang Ye Jing Fa Diagram* Theory with CHIKF Syndromes

The *Tang Ye Jing Fa Diagram* framework can be a valuable tool for dissecting and guiding the herbal treatment of CHIKF's TCM patterns. By correlating the identified affected organs and their imbalance with the appropriate flavors, we can achieve a formula design that is both theoretically sound and clinically precise. The key aspects of CHIKF syndromes with *Tang Ye Jing Fa Diagram* principles are shown in **Table 2**.

Table 2. Alignment of acute CHIKF syndromes with *Tang Ye Jing Fa Diagram* flavor-organ-action principles.

Primary TCM Syndrome in Acute CHIKF	Key Organs Involved	Corresponding Flavors (<i>Tang Ye Jing Fa Diagram</i>)	Flavor-Organ-Action Principle	Therapeutic Focus
Damp-heat attacking the exterior	Lung, Spleen	Aromatic, Bitter, Sweet	Aromatic drains and urgently disperses Lung; Bitter urgently dries Spleen dampness; Sweet tonifies Spleen qi	Release exterior, resolve dampness, clear heat, relieve joint pain
Damp-heat obstructing the qi level	Spleen, Heart	Bitter, Aromatic, Sweet	Bitter drains Heart fire and urgently dries Spleen dampness; Aromatic drains Spleen dampness; Sweet tonifies Spleen qi	Clear heat, drain dampness, detoxify, reduce swelling
Concurrent exterior-interior syndrome	Lung, Spleen, Heart	Aromatic, Bitter, Sweet	Aromatic urgently disperses Lung and drains Spleen dampness; Bitter drains Heart fire; Sweet tonifies Spleen qi	Harmonize exterior and interior, regulate qi, relieve pain
Wind-damp-heat bi syndrome (persistent joint pain)	Liver, Spleen	Aromatic, Bitter, Sweet	Aromatic tonifies Liver qi flow and drains Spleen dampness; Bitter urgently dries Spleen dampness; Sweet tonifies Spleen qi	Dispel wind, clear heat, resolve dampness, unblock collaterals

5. Representative Formulas and Analysis for Acute CHIKF

In this section, we examine several herbal formulas that exemplify the TCM approach to treating the acute phase of Chikungunya fever. For each formula, we describe its context of use (pattern indication), list its key ingredients with flavor characteristics, and analyze how the formula's design follows the principles outlined by *Tang Ye Jing Fa Diagram*—specifically, how it employs the five flavors to target the corresponding Zang organs and pathogenic factors in CHIKF (**Table 3**).

These representative formulas, classical San Ren Tang and Gan Lu Xiao Du Dan, illustrate the practical embodiment of *Tang Ye Jing Fa Diagram* in treating CHIKF. San Ren Tang is typically prepared as a decoction. A standard adult daily dose consists of approximately 60 - 90 grams of raw herbs in total, divided into two servings. For example, a typical recipe uses about 15 g Apricot Seed (Xing Ren), 18 g Coix Seed (Yi Yi Ren), 6 g White Cardamom (Bai Dou Kou), 6 g Magnolia

Table 3. Representative formulas and analysis for CHIKF.

Representative Formula	Main Composition (Key Herbs)	Tang Ye Jing Fa Correspondence	Key Therapeutic Principles	Expected Pharmacological Actions
San Ren Tang (Three-Seed Decoction)	<i>Amomum kravanh</i> (Aromatic), <i>Coix lacryma-jobi</i> (Sweet), <i>Prunus armeniaca</i> (Aromatic), <i>Magnolia officinalis</i> (Bitter/Aromatic), <i>Talcum</i> (Sweet), <i>Polyporus umbellatus</i> (Sweet)	Aromatic drains Spleen dampness and urgently disperses Lung; Sweet tonifies Spleen qi; Bitter urgently dries Spleen dampness	Release exterior, resolve dampness, clear heat	Anti-inflammatory, antipyretic, diuretic, immune-regulating
Gan Lu Xiao Du Dan (Sweet Dew Special Pill to Eliminate Toxin)	<i>Scutellaria baicalensis</i> (Bitter), <i>Coptis chinensis</i> (Bitter), <i>Lonicera japonica</i> (Sweet), <i>Artemisia capillaris</i> (Bitter), <i>Agastache rugosa</i> (Aromatic), <i>Amomum kravanh</i> (Aromatic)	Bitter drains Heart fire and urgently dries Spleen dampness; Aromatic drains Spleen dampness; Sweet tonifies Spleen qi	Clear heat, drain dampness, detoxify	Antiviral, antibacterial, anti-inflammatory, hepatoprotective
Ge Gen Qin Lian Tang (Pueraria, Scutellaria, and Coptis Decoction)	<i>Pueraria lobata</i> (Sweet/Aromatic), <i>Scutellaria baicalensis</i> (Bitter), <i>Coptis chinensis</i> (Bitter), <i>Glycyrrhiza uralensis</i> (Sweet)	Aromatic urgently disperses Lung; Bitter drains Heart fire; Sweet tonifies Spleen qi	Harmonize exterior and interior, clear heat, resolve dampness	Antipyretic, anti-inflammatory, modulating gut microbiota
Qiang Huo Sheng Shi Tang (Notopterygium Decoction to Overcome Dampness)	<i>Notopterygium incisum</i> (Aromatic), <i>Angelica pubescens</i> (Aromatic/Bitter), <i>Cang Zhu</i> (Aromatic/Bitter), <i>Fang Feng</i> (Aromatic), <i>Chuan Xiong</i> (Aromatic), <i>Glycyrrhiza uralensis</i> (Sweet)	Aromatic tonifies Liver qi flow and drains Spleen dampness; Bitter urgently dries Spleen dampness; Sweet tonifies Spleen qi	Dispel wind, clear heat, resolve dampness, unblock collaterals	Anti-inflammatory, analgesic, immunomodulatory

Bark (Hou Po), 9 g Pinellia (Zhi Ban Xia), 18 g Talcum (Hua Shi), 6 g Tetrapanax pith (Tong Cao), and 6 g Lophatherum (Dan Zhu Ye) in one day's formula. These herbs are simmered in water to yield a decoction, which is taken in two divided doses per day (e.g., morning and evening). Furthermore, modern research lends support to their efficacy. For instance, a recent study found that arctigenin (from a TCM herb used in San Ren Tang) has significant anti-CHIKV effects in vitro, aligning with the expected antiviral and anti-inflammatory actions of these formulas. The classical formulas inherently balanced aromatic, bitter, and sweet flavors to treat damp-heat, even if the physicians who designed them did not explicitly reference *Tang Ye Jing Fa Diagram*. The modern examples show conscious attempts to fulfill multiple roles (exterior vs interior, clearing vs supporting) by selecting herbs of appropriate taste and temperature, which is essentially *Tang Ye Jing Fa Diagram* in action. For each organ or layer affected, use the flavor that corrects that organ's imbalance.

6. Conclusions

The treatment of acute Chikungunya fever with Traditional Chinese Medicine offers a vivid example of how classical medical wisdom can inform modern clinical practice. Through the theoretical prism of *Tang Ye Jing Fa Diagram*, we have

illuminated the flavor-based logic underlying TCM herbal prescriptions for CHIKF's damp-heat syndrome. The ancient diagram's emphasis on five flavors corresponding to five Zang organ actions provides a structured rationale for the complex herbal combinations used to manage CHIKF's fever, rash, and joint pains. We found that acute CHIKF patterns, marked by an external damp-heat pestilence attacking the Wei and Qi levels, align with a treatment approach dominated by aromatic flavors to disperse and dry dampness and bitter flavors to purge pathogenic heat. Supporting sweet flavors are woven in to safeguard the Spleen and Yin, reflecting the need to uphold the patient's vitality amidst aggressive pathogen expulsion.

By analyzing representative formulas, from the classical San Ren Tang and Gan Lu Xiao Du Dan to modern tailored prescriptions, we demonstrated that their ingredients and therapeutic effects can be systematically understood through their flavor composition and organ targets in line with *Tang Ye Jing Fa Diagram*. Aromatic herbs like Agastache, Mint, and Notopterygium relieve surface and channel blockages as the diagram prescribes for Lung and Liver malfunction; bitter herbs like Scutellaria, Coptis, and Isatis root eliminate heat and inflammation as needed for Heart and Spleen excess syndromes. This confluence of theory and practice not only validates the relevance of classical knowledge in treating contemporary diseases, but also provides a more *intelligible language* to bridge TCM with modern medicine. We emphasize that TCM formulas are not ad hoc mixtures. Rather, they are intentional assemblies of medicinal ingredients designed to restore balance across organ systems, guided by empirical logic encoded in frameworks like the *Tang Ye Jing Fa Diagram*.

For the global health community and phytomedicine researchers, this work advocates for deeper integration of such classical diagrams in research and development. By leveraging *Tang Ye Jing Fa Diagram*, researchers can deconstruct traditional formulas to identify key flavor-active constituents, possibly streamlining the search for antiviral and anti-inflammatory agents for CHIKF and similar illnesses. It encourages an approach where instead of testing herbs randomly, one ensures representation of certain flavors known to be crucial for the condition. Moreover, this integration pushes for a holistic yet systematic method in designing combination therapies, much as CHIKF requires both symptomatic relief and etiological treatment, a *Tang Ye Jing Fa Diagram*-guided herbal design inherently covers those bases via flavor synergy.

In conclusion, the marriage of *Tang Ye Jing Fa Diagram* theory with clinical TCM practice in CHIKF management exemplifies how ancient medical wisdom remains profoundly applicable. It enhances our understanding of why specific herbs heal and it underscores the sophistication of traditional prescription logic. Embracing these insights can lead to more rational use of herbal medicine, improved therapeutic outcomes, and innovative pathways in ethnopharmacological research. As emerging infectious diseases continue to challenge us, the timeless principles captured in diagrams like *Tang Ye Jing Fa Diagram* may well guide us to effective

solutions, bridging the gap between old and new, East and West, tradition and science.

Conflicts of Interest

The authors declare no conflicts of interest.

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