



Review Article

## UNRAVELING THE PHARMACOLOGICAL MARVELS OF “AQARQARHA”- EXPLORING ITS PHYTOCHEMISTRY AND THERAPEUTIC PROSPECTS

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### ABSTRACT

*Anacyclus pyrethrum*, commonly known as “*Aqarqarha*” in Unani medicine has been a prominent herb in traditional medicine systems for centuries due to its diverse therapeutic properties. In recent years, there has been growing interest in exploring its medicinal uses and pharmacological effects. This review aims to provide a comprehensive overview of *Aqarqarha*, encompassing its traditional uses, phytochemical composition, pharmacological activities, and potential therapeutic applications. *Aqarqarha* exhibits a wide array of pharmacological activities, including neuroprotective, anti-inflammatory, analgesic, aphrodisiac, antioxidant, and immunomodulatory effects, making it a promising candidate for the management of various health conditions. Moreover, its phytochemical profile comprises various bioactive compounds such as alkaloids, sesquiterpene lactones, flavonoids, and polyacetylenes, which contribute to its medicinal properties. This review aims to consolidate the existing knowledge on *Aqarqarha*, providing a basis for further research and development in both traditional and modern medicine. Furthermore, it highlights gaps in current knowledge and identifies areas for future research, such as clinical trials, mechanistic studies, formulation development, and regulatory considerations. By synthesizing existing information and proposing future directions, this review seeks to facilitate a deeper understanding of *Aqarqarha*'s therapeutic potential and promote its integration into evidence-based healthcare practices.

### INTRODUCTION

Within the realm of Unani medicine, the term “*Aqarqarha*” serves as a well-known reference to the plant species scientifically identified as *Anacyclus pyrethrum* or “Spanish chamomile” belonging to the Asteraceae family. It is a perennial herb native to North Africa, the Mediterranean region, and Central Asia. In Unani medicine, it is known as *Aqarqarha* and has been used for centuries to treat various ailments due to its potent medicinal properties. The roots of *Aqarqarha* are particularly valued for their therapeutic effects and are utilized in different formulations to address diverse health issues.

In Unani medicine, *Aqarqarha* is esteemed for its efficacy in the treatment of several conditions, including rheumatism, arthritis, paralysis, neurological disorders, sexual dysfunction, and respiratory ailments. The roots are commonly administered in the form of decoctions, powders, or pastes for therapeutic purposes. *Aqarqarha* harbours a rich phytochemical profile, with various bioactive compounds identified in its roots. It is highly valued for its therapeutic potential in addressing various neurological problems, including hemiplegia and Parkinsonism. Various studies and anecdotal evidence support the aphrodisiac efficacy of *Aqarqarha*. It is often recommended for enhancing reproductive health. It is important to note that *Aqarqarha* also possesses other therapeutic properties, including anti-inflammatory, analgesic, and immunomodulatory effects, which contribute to its overall health benefits. However, its role as an aphrodisiac remains one of its most prominent functions reported in human beings. The objective of this review is to consolidate existing knowledge and also aims to shed

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light on areas where gaps in understanding persist, paving the way for future investigations. Emphasizing the importance of bridging these gaps, the review identifies avenues for further research, including the necessity for clinical trials, mechanistic studies, formulation advancements, and regulatory

considerations. Through the amalgamation of current insights and the proposal of future trajectories, this review endeavors to deepen our comprehension of *Aqarqarha's* therapeutic capacities, advocating for its integration into evidence-based healthcare frameworks. [1,12, 14-16]



(a)



(b)



a) *Anacyclus pyrethrum* var. *pyrethrum* (L.), (b): *Anacyclus pyrethrum* var. *depressus* (Ball) c) *Anacyclus pyrethrum* root

Source: (a), (b): Jawhari and et al., MDPI, 2021 (c): Tauheed and et al., J. Pharm. Sci. Innov. 2017.

### Unani Classical Literature of *Aqarqarha*

References to *Aqarqarha* are abundant in classical Unani literature. Some classical Unani texts and contemporary works which mention *Aqarqarha* and its medicinal properties as in "*Al-Qanun fi al-Tibb*" (The Canon of Medicine) by Ibn Sina (Avicenna): This monumental work by Ibn Sina is one of the most important texts in the history of medicine mentions *Aqarqarha* among its discussions of medicinal herbs. "*Kitab al-Hawi fi al-Tibb*" by *Al-Razi* (Rhazes) encyclopedic work on medicine is another significant text in the Unani tradition contain references to *Aqarqarha* and its uses in various formulations. "*Kitab al-Kulliyat*" (The General Principles of Medicine) by Ibn Rushd (Averroes) also mentions the pharmacology and medicinal plants of *Aqarqarha*. Likewise other classical Unani literature which mentions about *Aqarqarha* are "*Makhzan al-Adwiyah*" (The Treasure of Remedies) by Muhammad Akbar Arzani, and "*Mufradat al-Qanoon*" by Zakariya Razi (Rhazes) also gives detailed information on *Aqarqarha*, including its botanical description, pharmacological actions. Its therapeutic uses were mentioned in Standardization of Single Drugs of Unani Medicine - Part I" by Central Council for Research in Unani Medicine (CCRUM). These are just a few examples of Unani texts where you might find mentions of *Aqarqarha*. Unani medicine has a rich literary tradition, so there are likely many other texts that discuss this medicinal herb and its properties. [1-11, 13,17]

### Therapeutic Benefits

In Unani medicine, *Aqarqarha* (*Anacyclus pyrethrum*) is believed to exert therapeutic effects on various pathological conditions and diseases through its actions on the body's humors (*Akhlāt*),

temperaments (*Mizaj*), and organs (*A'zā*). Here are its actions on different pathological conditions. *Aqarqarha's* multifaceted actions on various pathological conditions make it a valuable herb in Unani medicine, contributing to its widespread use and popularity in traditional healing practices. Some of these effects mentioned in Unani texts include

**Musculoskeletal Disorders as in Rheumatism & Arthritis (*Waja-ul-Mafāsīl*)** - *Aqarqarha's* hot and dry nature is thought to help disperse cold humors accumulated in the joints, thus alleviating pain and inflammation associated with rheumatism and *Waja-ul-Mafāsīl* (arthritis). Its analgesic and anti-inflammatory properties make it beneficial in reducing joint pain, swelling, and stiffness in arthritis. [19,20]

**Neurological Disorders: Hemiplegia (*Falij*):** *Aqarqarha* acts as a nervine tonic, aiding in the restoration of nerve function and muscle strength in hemiplegia (*Falij*) & facial paralysis (*Laqwa*). It is believed to stimulate nerve regeneration and improve blood circulation to the affected area, facilitating recovery from facial paralysis. Similarly, in *Daul Shalal al Ra'ash* (Parkinsonism) which is understood in Unani medicine as a disorder stemming from an imbalance in nerve function due to excessive cold and moist humors, *Anacyclus pyrethrum* is employed to address these underlying causes. Its warming and stimulating effects on the nervous system are thought to improve dopamine function and enhance nerve conductivity, thereby alleviating symptoms such as tremors and rigidity. [18]

**Sexual Dysfunction as in *Jiryan*:** *Aqarqarha* is renowned for its aphrodisiac properties, enhancing libido and sexual vigor in individuals experiencing low desire or sexual weakness.

**Erectile Dysfunction (*Istinsākh*):** Its stimulant action on the reproductive organs improves erectile function and enhances sexual performance.<sup>[21]</sup>

**Respiratory Disorders** such as in *Warm-e-Sho'batur Riya Muzmin* (Chronic Bronchitis): *Aqarqarha's* expectorant properties help in expelling phlegm from the respiratory tract, relieving cough and congestion in bronchitis. *Ḍīq al-Nafas* (asthma): Its bronchodilator effects relax the bronchial muscles, easing breathing difficulties and wheezing in asthma.<sup>[19]</sup>

**Digestive Disorders:** Indigestion (*Qabz-e-Mi'dā*): *Aqarqarha's* hot and dry qualities stimulate digestion and relieve symptoms of indigestion such as bloating, flatulence, and abdominal discomfort.

**Loss of Appetite (Suqūt-e-shahwat-e-ghidhā):** It acts as an appetizer, increasing appetite and promoting the secretion of digestive juices.<sup>[11]</sup>

**Skin Disorders:** Topical Applications: *Aqarqarha* paste or oil preparations are used to treat skin conditions like boils, abscesses, and eczema due to its antiseptic and anti-inflammatory properties.<sup>[13]</sup>

**Muqawwi** (Health tonic): *Aqarqarha* is often included in formulations as a general health tonic (*Muqawwi*), promoting overall vitality and well-being.<sup>[17]</sup>

### Phytochemistry

*Aqarqarha* is often used as an ingredient in *Murakkab* (compound) formulations in Unani medicine, where it combines with other herbs to enhance therapeutic effects or mitigate potential side effects. *Aqarqarha* (*Anacyclus pyrethrum*) contains a variety of chemical constituents, some of which have reported activity in human beings. Here are the main chemical constituents of *Aqarqarha* along with their reported activities:

**Alkamides:** Alkamides such as pellitorine and anacycline, which exhibit analgesic and anti-inflammatory properties. They are believed to contribute to *Aqarqarha's* pain-relieving effects, particularly in conditions like rheumatism and arthritis.<sup>[29,30,42]</sup>

**Flavonoids:** Flavonoids such as quercetin and luteolin, which possess antioxidant and anti-inflammatory properties. These flavonoids help in scavenging free radicals and reducing oxidative stress, thus protecting cells from damage.<sup>[32,32]</sup>

**Sesquiterpene Lactones:** Including pyrethrin and inulin, which have been associated with anti-inflammatory, antioxidant, and immunomodulatory activities. These compounds contribute to *Aqarqarha's* ability to reduce inflammation and boost immune function.<sup>[33,41]</sup>

**Tannins:** These compounds possess astringent and antioxidant properties. They contribute to *Aqarqarha's* ability to promote wound healing and protect against oxidative damage.<sup>[34,40]</sup>

**Polyacetylenes:** These compounds have been reported to exhibit antimicrobial, antifungal, and anticancer activities. They contribute to *Aqarqarha's* potential in combating infections and supporting overall health.<sup>[34]</sup>

**Essential Oils:** *Aqarqarha* contains essential oils with various constituents, such as camphene, pinene, and limonene, which have been associated with analgesic, anti-inflammatory, and antimicrobial effects.<sup>[35-37]</sup>

These chemical constituents collectively contribute to the pharmacological activities of *Aqarqarha* observed in human beings, including its analgesic, anti-inflammatory, immunomodulatory, antioxidant, and aphrodisiac effects. However, further research is needed to elucidate the specific mechanisms of action and therapeutic potential of each constituent individually and in combination within the whole plant extract.

### Pharmacological and Research Studies on *Aqarqarha*

*Aqarqarha* (*Anacyclus pyrethrum*) exhibits diverse pharmacological actions, which have been investigated in several research studies. Here are some of its pharmacological actions and notable research findings:

**Anti-inflammatory Activity:** Studies have demonstrated *Aqarqarha's* significant anti-inflammatory properties. Research published in the "Journal of Ethnopharmacology" (2009) indicated that *Aqarqarha* extracts exhibited potent inhibitory effects on pro-inflammatory cytokines and mediators, suggesting its potential in the management of inflammatory conditions.<sup>[22,38]</sup>

**Analgesic Effects:** *Aqarqarha* has been shown to possess analgesic properties in animal studies. Research published in the "Journal of Anesthesia, Essays and Researches" (2017) reported that *Aqarqarha* extract administration resulted in a significant reduction in pain response in experimental models, indicating its potential as a natural analgesic agent.<sup>[23,39]</sup>

**Spermatogenic effect:** In a 28-day randomized control study involving Wistar rats weighing 150-180g, conducted by Vikas Sharma *et al.*, treatment with an ethanolic solution extract of *Anacyclus pyrethrum* DC, rich in alkylamide, resulted in a significant increase in body weight, sperm count, motility, and viability, as well as serum testosterone, luteinizing hormone, follicle-stimulating hormone concentrations, spermatogenic activities, and seminal fructose content

across all groups receiving different doses of the test drug (containing 13 N-alkylamides). This effect was observed in comparison to both control and testosterone-treated groups, indicating the androgenic potential of the test drug and its potential to enhance spermatogenesis, thereby potentially improving male infertility. [24,26]

**Immunomodulatory Activity:** *Aqarqarha* has been found to modulate the immune response in various studies. Research published in the "Journal of Pharmaceutical Biology" (2015) demonstrated that *Aqarqarha* extracts exhibited immunomodulatory effects by enhancing the activity of immune cells and cytokine production, suggesting its potential in enhancing immune function. [27,28]

**Antioxidant Effects:** Several studies have investigated the antioxidant properties of *Aqarqarha*. Research published in the "Journal of Ethnopharmacology" (2003) reported that *Aqarqarha* extracts showed significant antioxidant activity by scavenging free radicals and reducing oxidative stress markers in experimental models. [27]

**Antimicrobial Activity:** *Aqarqarha* has demonstrated antimicrobial activity against various pathogens in vitro. Research published in the "International Journal of Pharma and Bio Sciences" (2014) evaluated the antimicrobial potential of *Aqarqarha* extracts against a range of bacteria and fungi, indicating its potential as a natural antimicrobial agent. [43,44,45]

**Neuroprotective Properties:** Studies have suggested that *Anacyclus pyrethrum* exhibits Neuroprotective properties through its antioxidant and anti-inflammatory effects. The bioactive compounds present in *Aqarqarha*, such as alkylamides and sesquiterpenes, have demonstrated the ability to modulate neurotransmitter levels, including dopamine, thereby potentially mitigating the neurodegenerative processes underlying Parkinson's disease. Additionally, *Anacyclus pyrethrum* has shown promise in improving motor function and reducing neuroinflammation in preclinical studies. [46,47,48,49]

**Wound Healing Properties:** Studies have explored *Aqarqarha's* wound healing properties. Research published in the "Journal of Ayurveda and Integrative Medicine" (2019) investigated the wound healing activity of *Aqarqarha* extract in animal models and observed significant improvements in wound closure and tissue regeneration.

**Memory-enhancing activity:** Ronald Darwin et al. investigated the memory-enhancing activity of *Anacyclus pyrethrum*, while Devasankariah et al. demonstrated its local anesthetic effect in vivo, inducing a pterygomandibular block with infiltration of the long buccal nerve. They observed a superior depth

of anesthesia in 90 out of 100 patients compared to Xylocaine, with similar effects of anesthesia between the two substances. [25]

**Antidepressant activity:** Badhe et al. found that the root extract exhibited anti-depressant activity by increasing ambulatory behavior, indicating a stimulant effect on the actophotometer. This extract also demonstrated significant antidepressant effects in both the Forced Swim Test (FST) and Tail Suspension Test (TST) by reducing immobility. Furthermore, it effectively reversed hypothermia induced by clonidine and reserpine and inhibited haloperidol-induced catalepsy. [31,47,50]

These research findings highlight the diverse pharmacological actions of *Aqarqarha*, supporting its traditional uses in various therapeutic applications. Further research is warranted to elucidate its mechanisms of action, optimize dosage forms, and explore its potential clinical applications in modern medicine.

## CONCLUSION

*Anacyclus pyrethrum*, or *Aqarqarha*, is a valuable medicinal herb with a long history of use in traditional medicine systems, particularly in Unani medicine. Its diverse pharmacological actions, supported by its rich phytochemical composition, underscore its therapeutic potential in various health conditions. Further research exploring its mechanisms of action, efficacy, and safety profiles will contribute to its integration into modern healthcare practices, providing novel therapeutic options for addressing contemporary health challenges.

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