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## Review on *Aqarqarha* (*Anacyclus pyrethrum*); A Unique Mufrad Advia (single drug) of Unani System of Medicine

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### ABSTRACT

*Anacyclus pyrethrum* is a botanical origin drug that used by Unani Scholars as a name of *Aqarqarha* since antiquity. Although, all parts of *Aqarqarha* used in Unani system of medicine but therapeutically root is most commonly used. The aim of this study was to review the role of *Aqarqarha* in the management of *Amrad Asab wa Dimag* (disease of nerve & brain), *Amrad Asnan* (disease of teeth), *Amrad Bah* (sexual disease) and *Amrad Khilt-i-balgham* (phlegmatic disease) as mentioned in Unani literature. The pharmacological actions of *Aqarqarha* mentioned in ancient literature by renowned Unani scholars as an Abortifacient, anti-inflammatory, Sialagogue, Tonic, Gastrosis, Inflammation, Lethargy, Stimulant, Rubefacient, Cordial, antidepressant, Immunostimulating effect, Memory enhancing activity, Antioxidant effect and Interactions with Hormones. A review of literature on *Aqarqarha* was undertaken using the bibliographic database viz. Pub Med, Google Scholar, Science Direct and Scopus. The search was conducted using the terms '*Aqarqarha*', '*Anacyclus pyrethrum*', '*Majoon Aqarqarha*', '*Aqer Qarha*', '*Pellitory*' and '*Spanish Pellitory*'. Further, books published in Urdu and English were used to compile the information as representative literature in Unani medicine. Unani medicine highly claims the usefulness of *Aqarqarha* and its formulations in the management of above mentioned ailments. Modern scientific reports though scarce, also suggest the possibility of such pharmacological effects of this lesser known drug. Therefore, this review based to reveal all possible scientific action of *Anacyclus pyrethrum*.

**Keywords:** *Anacyclus pyrethrum*; *Aqarqarha*; Spanish Pellitory; Unani medicine

### INTRODUCTION

The Unani system of Medicine started in Greece and was developed by Arabs into an elaborate medical science based on the frame work of the teaching of Hippocrates and Galen. Since that time Unani medicine has been known as Greco-Arab Medicine. This system is based on Hippocratic theory of four humours viz. blood, phlegm, yellow bile and black bile, and the four qualities of states of human body like hotness, coldness, moisture and dryness. Physically these four states are represented by fire, water, air and earth, The Greek ideas were put by Arabian physician as seven principles (Umoor-e-Tabbiya) and included, element (Arkan), temperament (Mizaj), humours (Akhlat), organs (Aaza), spirit (Arwah), faculties (Quwa) and functions (Afaal). These seven factors are believed to be responsible for the proper functioning of body, and any derangement in them leads to diseases [1]. Drugs of plant origin include root, stem, bark, leaf, flower, seed, fruit, gum, resin, extract; drugs of mineral origin (Adviya Madniya) include different metals, metal ores and non-metals in natural form, while drugs of animal origin comprise of animal glands, tissues, physiological and pathological products [2]. *Aqarqarha* (*Anacyclus pyrethrum*) is botanical origin drug in Unani system of medicine and it found most commonly in Mediterranean area [3, 4]. Some countries of world are not familiar to *Aqarqarha* root like North Africa, Algeria, Asian and Europeans [5]. The root and leaf of *Aqarqarha* used very effectively in Traditional system of medicine [6]. In Unani system of medicine root of *Aqarqarha* is used in single or as compound formulation to treats several ailments by Unani scholar since antiquity. These ailments are Waja al-Mafasil (Joint Pain) [7], Ihtibas al-Tamth (Amenorrhoea) [7, 8, 5], Amrad Balghamiyya (Phlegmatic disease) [8, 9, 5, 10], Du'f al-Bah (weak sexual activity) [8, 5, 10], Burudat-i-badan (Coldness of body) [9], Mukhhrij-i-Balgham, (Elimination of phlegm from stomach) [9, 10], Qabd (Constipation), Fasad al-Hadm (indigestion), Du'f al-Badan (Weakness of body) Istisqa' Ziqqi (Ascites) [8], Muharrika-i-badan (Body Stimulant) and Burudat-i-badan (coldness of body) [10].

The pharmacological actions of *Aqarqarha* reported in ancient literature by renowned Unani scholars as an Abortifacient, Anti-inflammatory, Sialagogue, Tonic, Gastrosis, Inflammation, Lethargy [11], Stimulant [11, 12, 13, 14, 15], Rubefacient [12, 15], Cordial [13, 14], antidepressant, Immunostimulating effect, Memory enhancing activity [6, 16], Antioxidant effect and Interactions with Hormones [6]. The root of *Aqarqarha* is also an important ingredient of several formulations viz. Barshasha, Tiryaaqi-Aqrab, Tiryaaqul Isnan, Jawarish Zarooni, Jawarish Zafran, Jawarish Luluwi [17], Majoone Asfar Saleem, Majoone Aswad Saleem, Majoone Feeroznosh [18], Laboob Sagheer, Majoone-e-Baladur, Majoone Salab,

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Roghan-e-Seer, Raughan-e-Sudab, Tilae-Mulazziz, Habb-e-Mumsik Qawi, Majoon-e Zabeeb, Raughan-e-Qust, Sunoon-e-Mujalli [19].

The survey of Unani literature shows that *Aqarqarha* has a long history of its use as an important drug for the treatment of Amrad Asab wa Dimag (disease of nerve & brain), *Amrad Asnan* (disease of teeth), Amrad Bah (sexual disease) and Amrad Khilt-i-balgham (phlegmatic disease) as mentioned in Unani literature. So, *Aqarqarha* root and its compound formulation is indicated in ailments of various systems of the body in both traditional as well as conventional system. Since literature available on this important drug is very scant, therefore, in the present study an attempt has been made to compile the available information on *Aqarqarha* and its different formulations so as to bring to light the therapeutic potential of this lesser known drug.

## MATERIALS AND METHODS

A review of literature on *Aqarqarha* was undertaken using the bibliographic database viz. Pub Med, Google Scholar, Science Direct and Scopus. The data of information was also collect from classical textbook of Unani medicine like Khazain-Al-Advia, Muhit-i-Azam, Makhzan-Al-Mufradat, Qarabadin Najm-Al-Ghani, Bustan-Al-Mufradat, Qarabadin-i-A'zam, and Kitab Al-fath fi Al-Tadawi as well as conventional book on botany like Flora Medica, Glossary of Indian Medicinal Plants, Indian Materia medica, Indian Medicinal Plants, Handbook of Medicinal Herbs and Compendium of Indian medicinal Plants.

## RESULTS

### Description of *Aqarqarha* root in Ancient Literature

According to ancient Unani physicians *Aqarqarha* is herbaceous plant and roots of this herb most commonly used for medicinal purposes. Unani scholar described the unique characteristics of this herb as a weed with branches of *Aqarqarha* spread over the soil, numerous

hairy root emerge from a single root and has yellow colour (Zard) flower but in conventional medicine the colour of the flowers are mentioned yellowish white. The size of the root is approximately one finger long and thick. The taste of the root of *Aqarqarha* is Charpara (pungent acrid) and the tongue became swell up after touching [5]. In conventional systems, *Aqarqarha* root is fusiform, hard, solid, and size 2 - 4 inch long and 1-2 cm thick. It appears brown colour with a vertical groove from outside and whitish in colour internally [7]. There are many procumbent stems (lying along the ground). The leaves are radical, petiolated, and divide pinnately and one head branches. Thalamus where the flower part attached is convex and the colour of the flower is white [7], and gives pricking sensation with salivation after chewing. The best season for collection of roots, dry and storage of roots are during autumn [20, 21, 22, 23, 24].

### Distribution of *Aqarqarha*

The *Aqarqarha* is a native of North Africa, Arabia, Syria, Algeria, elsewhere in the Mediterranean region and varieties of it also found in some area of India like J & K, Bengal. In India for commercial purpose taken from Algeria and Africa [6, 8, 12, 13, 16].

### Properties of *Aqarqarha* in Unani Medicine

#### a) Botanical name

The scientific name of *Aqarqarha* is mentioned as an *Anacyclus pyrethrum* DC in various authentic books [8, 11, 12, 13, 14, 15, 10].

#### b) Synonyms

The synonym of *Anacyclus pyrethrum* DC is written as an *Anthemis pyrethrum* L in different authentic books [3].

#### c) Vernacular Name

The vernacular name of *Aqarqarha* in several part of the world and its pronunciation in different language that mentioned in table 01 [3, 6].

**Table 1:** Vernacular name of *Aqarqarha* in different languages

Language	Name	Language	Name
Arabic	<i>Aqer Qarha</i>	Kaannada	<i>Akkalakar</i>
Bengali	<i>Akarkara</i>	Malyalam	<i>Akkalakar</i>
English	Spanish Pellitory, Pellitory	Marathi	<i>Akarkara</i>
French	Racine de pyrethre d Afrique	Persian	<i>Kakra, Kalu, Bekhe Tarkhoon</i>
German	<i>Bertramwurzel</i>	Portugese	Pyrethro da Africa, Parietaria de Espanh
Greek	<i>Tarkhoon, Forusoon, Forsoon, Qoos</i>	Spanish	Raiz de pelitre pyrethro, salivaria
Gujrati	<i>Akarkaro</i>	Tamil	<i>Akkirakar</i>
Hindi	<i>Akarkara</i>	Telgu	<i>AkkalaKara</i>
Italian	<i>Piretro</i>	Urdu	<i>Aqarqarha</i>

#### d) Mizaj (Temperament)

Temperament of *Aqarqarha* has been described to be Har and Yabis (Hot & Dry) in fourth degree [5, 7]. But according to another statement the temperament of *Aqarqarha* has been described to be Har and Yabis (Hot & Dry) but in third degree [5, 7, 8, 9, 10].

#### e) Part of Use -

In Unani System of Medicine, *Aqarqarha* roots most commonly used as single or compound form [5, 6, 7, 8, 10, 13, 25] but in other therapeutic system leafs also used to manage several ailment [6].

#### f) Dosage

*Aqarqarha* is used in powder form and its recommended dose is 0.5-3.5gm [5, 7, 8, 11, 26].

#### g) Pharmacological Actions

Qaat-i-balgham [7], Musakkin-i-Akhlat (anti-inflammatory) [8], Mukhrij-i-balgham [7, 8], Mudirr-i-Hayd (emmenagogue) [5, 7, 8, 27], Mufattih (Deobstruents) [5, 7, 9, 82, 27], Eliminate waste of Dimagh [5, 7, 8], Muwawi-i-Bah (Sexual Tonic) [5, 8, 27], Diminish balgham (Reduce phlegmatic humour) [5], Beneficial for Balghami al-Mizaj Mu'arriq, Muqawwi-i-Badan (body Tonic) [5] and Muharrik (Stimulant) and Mukhrij-i-balgham [10].

#### h) Therapeutic Uses

*Aqarqarha* is therapeutically uses as a Waja al-Mafasil (Joint Pain) [7], Ihtibas al-Tamth (Amenorrhea) [7, 8, 5], Amrad Balghamiyya (Phlegmatic disease) [5, 8, 9], Du'f al-Bah, [5, 8, 10], Burudat-i-badan (Coldness of body) [9], Mukhrij-i-Balgham Mi'da (Elimination of phlegm from stomach) [9, 10], Qabd (Constipation), Fasad al-Hadm (indigestion), Du'f al-Badan (Weakness of body) Istisqa' Ziqqi (Ascites) [8], Muharrika-i-badan (Body Stimulant), Burudat-i-badan (coldness of body), and Amrad Balghamiyya (Disease of sputum) [10]

#### i) Naf'akhas

There several function of a drug but some of them predominantly occur that called naf'akhas (Main function). The main functions of *Aqarqarha* are Qaat-i-Balgham (phelemenagogue), and Muqawwi-i-Bah (Sexual Tonic) [7, 8].

#### j) Substitute

Abdal-e-Advia (Substitute/Interchange of drugs) is one of the important principles that govern the rules pertaining to drug substitution in Unani medicine. In case of non-availability of a drug like *Aqarqarha*, Unani scholars have suggested substitutes of this drug namely Darr filfil (Piper longum) and Pudeena (Mentha Pipepretha) [7, 8, 27].

#### k) Adverse Effects

Some of the drugs having pharmacological activity may also produce toxic effect by their inherent nature. In order to optimize their therapeutic effect, such agents are subjected to certain corrective measures (Islah-e-Advia) as described in Unani literature. The Musleh of *Aqarqarha* like Kateera (*Sterculia urenus*) is used in Unani medicine. *Aqarqarha* little bit adverse affect on Ri'a (lungs) [5, 7, 8, 27].

#### l) Advantages of Compound Formulation of *Aqarqarha*

In Unani System of Medicine treatment of disease are done through Mufrad Advia (single drug viz. *Aqarqarha*) as well as Murakkab Advia (combination of more than one drug). The Murakkabat (compound formulation) of *Aqarqarha* are posses several advantage over its Mufrad Advia. The combination form of *Aqarqarha* reduces its unwanted effects, to reduce or enhance desired effects, to change unpleasant taste to make palatable, counter act toxic properties and also for synergistic action [5].

#### m) Commonly Used Formulations of *Aqarqarha* in Unani Medicine

There are several compound formulations of *Aqarqarha* used in various ailments. They are namely known as Arastoon Kabeer, Arastoon Sagheer [17], Majoone Asfar Saleem, Majoone Aswad Saleem Majoon Abi Muslim, Faloonyae Roomi Tarsoosi, Faloonyae Farsi, Majoone Feeroznosh, Dawa Atiyatullah Majoon Ameer [18], Barshasha, Tiryaqi-Aqrab, Tiryaqul Isnan, Jawarish-i-Buqrat, Jawarish-i-Qaisar, Jawarish Zarooni, Jawarish-i-Zarooni Ambari Ba Nuskha Kalan, Jawarish Bakarmajit, Jawarish Zafran, Jawarish Hazrat Suleman, Jawarish Luluwi [17], Anqaroya-e-Kabir, Laboob Sagheer, Majoon-e-Baladur, Majoone Salab, Roghan-e-Seer, Raughan-e-Sudab, Tilae-Mulazziz, Sunoo-e-Muluk, Habb-e-Falij Mulayin, Habb-e-Mumsik Qawi, Majoon-e Zabeeb, Raughan-e-Qust, Sunoon-e-Mujalli, and Qairooti-e-Arad-e-Karsana [19].

#### n) Pharmacognostical studies, Physicochemical and Clinical Studies on *Aqarqarha*

Kumar K (2016) was conducted a study on Pharmacognostical studies in which he told that *Aqarqarha* is a perennial herb. The root of *Aqarqarha* is brown in color, cylindrical in shape, aromatic in odour and pungent in taste. The stems are numerous, branched, run prostrate, upper part more hairy then lower and arise from the root crown. The taper vertical root is about 7-15 cm long with few hairy rootlets and surface rough, brown, wrinkled and about 3 mm thick bark. The author was also mentioned the physiochemical properties of *Aqarqarha* root [28].

Munna K., *et al* (2016) was mentioned a Pharmacognostical studies in which he told that mature root has cork composed of tubular cells and rosette crystals of calcium oxalate found in inner cork cells. Secondary cortex made up by iso-diametric, elongated and thin wall parenchymatous cells with few scattered cell of sclerenchyma. Secondary phloem consist of 2 -5 layers of cambium while secondary xylem consist of vessels, tracheids and parenchyma. Numerous medullary run straight from primary xylem to secondary cortex, the secondary cortex cell, secondary phloem cell and medullary rays' posses Inulin with scattered resinous schizogenous glands. Rosette form of calcium oxalate crystals found in secondary cortex cell, secondary phloem cell, secondary xylem and medullary rays cells [29].

#### o) Chemical constituent

Pandey S., *et al* (2018) was mentioned a study on Chemical composition and medicinal uses of *Anacyclus pyrethrum* in which he analyzed the secondary metabolites of *Anacyclus pyrethrum*. He was found that presence of Alkaloids, reducing agents, catechic tannins and other chemicals such as gallic tannins, triterpenes, sterols, mucilage, coumarins, saccharids and holosids [30, 31], Anacyclin, Inulin [6, 12], Pyrethrine [6, 8, 13, 14], and Some trace elements viz. Zn, Fe, Cu, Cd, Cr, Ni & Pb [30, 32].

#### p) Clinical Studies on *Aqarqarha*

Jani DK (2007) was done a study in which he told that *Anacyclus pyrethrum* equally as effective as *S. acmella* in erectile dysfunction and premature ejaculation. The action of *A. pyrethrum* is found to be more effective as compare to *S. acmella* in all parameters except in ejaculation of semen [33].

## q) Pharmacological Studies on *Agarqarha*

### q1) Antioxidant

Sujith K *et al.*, (2011) was conducted a study in which he told that an experimental modal used ethanolic extract of *Anacyclus pyrethrum* to evaluate antioxidant effect in different dose of 25 - 400 microgram/ml [34].

Another study also showed that *Anacyclus pyrethrum* extracts (aqueous or methanolic) produces similar antioxidant activity, especially in DPPH (2,2- diphenyl-1-picrylhydrazyl) test with IC50 values of  $12.38 \pm 0.28 \mu\text{g/ml}$  and  $13.41 \pm 0.67 \mu\text{g/ml}$  respectively [35].

One more study also indicates that Phytochemicals like Phenol, Flavinoids, Alkaloids and Tannins may responsible for antioxidant effect [6].

In another antioxidant study the aerial parts of *Anacyclus pyrethrum* easily accessible source of natural antioxidant in food cosmetic as well as pharmaceutical industry [36].

### q2) Activity on blood glucose level

Tyagi S, *et al.*, (2011) conducted an Antidiabetic Effect of *Anacyclus pyrethrum* DC in Alloxan Induced Diabetic Rats in the dose of 150 - 300 mg/kg aqueous root extract and he was found that blood glucose level was lower in the experimental animal [6, 35].

In another antidiabetic study aqueous root extract of *Anacyclus pyrethrum* (250 mg/Kg) was used in streptozotocin-induced diabetic rats and he was concluded that its aqueous extract showed best reducing the elevated blood glucose level [37].

### q3) Antidepressant activity

Badhe SR, *et al.*, (2010) was done antidepressant activity on *Anacyclus pyrethrum* root extract and found that root extract of *Anacyclus pyrethrum* produces antidepressant effect significantly in Forced Swim Test and Tail Suspension Test [6, 38].

Another antidepressant study was also conducted on *Anacyclus pyrethrum* root extract and was produce antidepressant activity by interaction with adrenergic and dopamine receptor. It increased the level of nor adrenaline and dopamine in brains of mice [38].

### q4) Anticonvulsant activity

Mandgary A *et al.*, (2003) investigated an anticonvulsant activity on ethanolic root extract of *Anacyclus pyrethrum* and found that the activity of sodium channel was reduced [6]. *Anacyclus pyrethrum* was also significant muscle relaxant activity in dose dependent manner [39].

### q5) Action on memory

Ronald DC *et al.*, (2012) was investigated a Memory Enhancing activity of *Anacyclus pyrethrum* in albino Wistar rats and was found that *Anacyclus pyrethrum* increases memory in albino Wistar rats [40].

In another study the ethanolic root extract of *Anacyclus pyrethrum* (50-200 mg/kg) was increased level of cholinesterase in brain. Therefore, it increases activity of memory in scopolamine induce amnesia in albino rat through enhancing central cholinergic neurotransmission [34].

### q6) Aphrodisiacs

This study was demonstrated that Petroleum extract of *Anacyclus pyrethrum* change accessory sexual organ weights, sexual behaviour, penile erection and sexual performance with low dose of 50 mg/kg in albino rate [41]. Other study of *Anacyclus pyrethrum* was also showed that potentially enhanced libido in experimental animal by increasing penile erection frequency, mounting and intromission frequency and latency instance for mounting and intromission [6].

### q7) Antibacterial

Selles C, *et al.* (2012) performed a study on the methanolic extract of *Anacyclus pyrethrum* produces antimicrobial activity against three gram-positive bacterium *Listeria monocytogenes* (100%) *Bacillus cereus* (69%) and *Staphylococcus aureus* (66%), as well as against *Candida albicans* (81%) [36].

In another anti bacterial study the extract of *Anacyclus pyrethrum* showed little antibacterial activity. It is effective against *Staphylococcus aureus* and *Streptococcus sanguis* but not effective against *Streptococcus mutans* and *Pseudomonas aeruginosa* [42].

### q8) Local anesthetic agent

In this study the ethanolic root extract of *Anacyclus pyrethrum* showed local anaesthetic activity [43].

In another study anesthetic gel of the *Anacyclus pyrethrum* root was found to be equally effective to 2% lignocaine gel in reducing pain due to needle stick prior to administration of inferior alveolar nerve block [44].

### q9) Anti-inflammatory function

This study was suggested that *Anacyclus pyrethrum* decreased activity of cyclooxygenase and 5 lipoxygenase pathways through isolated alkalimides and showed anti-inflammatory action [6].

In another study the author was told that aqueous extracts of *Anacyclus pyrethrum* (62%) and methanol extracts of *Anacyclus pyrethrum* roots produces higher anti-inflammatory activity than indomethacine (49%) in mice [35].

### q10) Antinociceptive

In this preclinical study the author was assessed root extract (aqueous or Methanolic) of *Anacyclus pyrethrum* in dose of 250 and 500 mg/kg and found that the mechanical hypersensitivity induced by CFA in mice was significantly reduced [35].

### q11) Immunomodulation

This immunomodulatory study showed that the petroleum ether extract (50-100 mg/kg) of *Anacyclus pyrethrum* was found to be significant immunomodulatory activity in an experimental model [6, 45].

In another immunomodulatory activity of *Anacyclus pyrethrum* was found to be increased immunomodulatory activity by two fold when doubling the dosage of petroleum ether extract [45].

It was also seen that hot water polysaccharide extracts of *Anacyclus pyrethrum* act as Immuno-boosting agent in immune system of mice in the dose of 50mg/kg [6, 46].

### q12) Endocrine function

Sharma V et. al (2010) was conducted a study on petroleum ether extract of *Anacyclus pyrethrum* DC root on sexual behaviour in male rats and was found that it increased the level of testosterone and luteinizing hormone may be due to alkylamide [47].

In another preclinical study showed that level of Testosterone, LH and FSH significantly increase in AT group as compared to other groups [48].

### q13) Aphrodisiac activity

In this preclinical study the comparative study of two drugs was done. The sperm count significantly increased (55-57 %,) in all treatment groups (*Anacyclus pyrethrum* (AP) group, *Tribullus Terrestris* (TT) group, or *Anacyclus pyrethrum* and *Tribullus Terrestris* (AT) group) compared to control group. In AT and AP groups it was found that significantly increased in sperm viability & Motility [48].

In another preclinical of aqueous extract of *Anacyclus pyrethrum* root in the dose of 50, 100 and 150 mg/kg showed increased weights of body and reproductive organs. It was also found that sperm count increased in epididymis and right and left vas deferens [49].

In another study the ethanolic root extract of *Anacyclus pyrethrum*, testicular weight and seminal parameters in albino rat was increased [50].

## CONCLUSION

*Anacyclus pyrethrum* has great values to use in Unani system of medicine. Today it may be uses for various therapeutic purpose based on experimental model. *Anacyclus pyrethrum* used certain ill-health of body system in animal like improve sperm count, increase weight of sexual organs, increase level of testosterone, LH and FSH, lower blood glucose level in diabetes mellitus, Immunomodulation in autoimmune disease and reduce inflammation or pain in inflammatory disease. The central nervous system disease may also treated by extract of *Anacyclus pyrethrum* e.g. amnesia, seizure and depression. Oxidative stress of body may be reduced by using *Anacyclus pyrethrum*. Locally, gel prepared from root extract of *Anacyclus pyrethrum* used as local aesthetic agent equally effective as 2% lignocaine and also used in toothache. These experimental models need clinical trial to validate efficacy and safety of *Anacyclus pyrethrum* which is found in preclinical trial.

**Conflict of interest:** None

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