



COMMIPHORA MYRRHA LINN (MURR MAKKI) A MULTIFACETED MEDICINAL PLANT IN UNANI SYSTEM OF MEDICINE: A REVIEW OF PHARMACOLOGICAL STUDIES

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ABSTRACT

In spite of great advances of modern scientific medicine, traditional medicine is still the primary form of treating diseases by majority of people in developing countries. In traditional oriental medicine, Commiphora myrrha Linn and its resinous exudate (myrrh) are used as herbal remedy to treat various disorders. It is a yellow fragrant oleo-gum resin, found mainly in dry tropic of Africa and Arabia. Traditional practices and textbooks advocate that it possess many properties, even innumerable phytochemical studies supported the text, and conclude that these characteristics are directly attributable to terpenoids (especially furano- sesquiterpenes) the active compound present in myrrh essential oil, steroids, flavonoids, lignans, carbohydrates, and alcohol derivatives that makes it a potent herbal medicine. Unani physicians used this wonderful drug in various ailments as a single drug and in combination with other herbs in the form of decoction, syrup, paste, powder both orally as well as locally. Several in-vitro and in-vivo studies had conducted and they revealed that murr is an emmenagogue, anti-hyperlipidemic, hepatoprotective, anti-dysmenorrhoeic, anti-inflammatory, analgesic, antimicrobial, antifungal, antiulcer, anticancer, hypoglycemic drug. Few clinical trials were conducted to evaluate the effectiveness of this drug in different disorders such as incomplete abortion, early wound healing after tooth extraction but still there is a need of further more human trials on large groups of patients to assess the efficacy and safety of this drug.

KEYWORDS: Murr makki, Commiphora myrrha, Unani medicine, phytochemical and scientific studies.

INTRODUCTION

The use of herbal medicine represents a long history of human interactions with the environment. According to World Health Organization more than 80% of the world's population depends upon traditional medicine for their primary healthcare needs. As they contain a wide range of bioactive substances that can prevent and treat many diseases.^[1] The plant derived medicines are based upon the premise that they contain natural substances which can promote health and alleviates illness.

Murr makki (*Commiphora myrrha* Linn) is one of the mystic drug which is used from a long time for a variety of illnesses. Our ancestors have been using it as a remedy for respiratory, digestive, genitourinary disorders, eye, ear and mouth ailments, different types of ulcers and other skin diseases due to its emmenagogue, expectorant,^[2,3,4] tonic, stomachic,^[2-5] stimulant,^[6,7] antiseptic,^[2-5,8,9] disinfectant,^[6,7] astringent,^[3,5,6,8-10] anti-inflammatory,^[11] bacteriostatic, antiviral, carminative,

blood purifier,^[2] laxative,^[3] immuno-modulator deodorizing, granulation promoting^[11] properties. The demonstration of the presence of natural compounds such as volatile essential oil myrrhol,^[3] terpenoids, steroids^[12-14] flavonoids, lignans, carbohydrates,^[13,14] and secondary metabolites in this oleo-gum resin will provide a scientific validation for the popular use.

However, less is known about its beneficial effects as an antioxidant, antilipemic, antidiabetic, and anticancer agent. This review highlights the diverse effects which can increase its use as an adjunct in complementary and alternative medicine.

MATERIAL AND METHODS

The current review was conducted using an organized exploration of the available Unani authentic books and Unani pharmacological literature on the medicinal plant *Murr makki* (*Commiphora myrrha* Linn). The searches were performed using various databases, including PubMed, Science Direct, flora journal, omics journal and

Google Scholar under the headings such as phytochemical studies on *Commiphora myrrha* Linn, original research papers on *murr*, human trial on *myrrha* etc.

BRIEF REVIEW OF THE DRUG

The *Commiphora* genus belongs to the family Burseraceae comprises over 200 species, and is a native that belong to the seasonally dry tropic of Africa, Arabia and some European countries. Myrrh, a yellow fragrant oleo-gum resin, is a famous traditional herb, which oozes out from the damaged bark of *Commiphora myrrha* genus.^[13] The name 'myrrh' is probably derived from the Arabic and Hebrew word-'murr' which means 'bitter'.^[7,12] It is mainly obtained from Mecca, hence called as 'Murr Makki'. Myrrh was known to the ancient Egyptians^[6,7] under the names of *bola*, *bal* or *bol* and they used its fumes in prayer areas for fragrance.^[15] The drug is still known to the Indian traders as "heerabol",^[5,7] while the Somali call it "mulmul" or "ogo".^[7] Myrrh is widely used in India, it is a rare, costly product and often adulterated with *Commiphora mukul*.^[3]

Habitat: Myrrh is found in the dry and arid regions of North-Eastern Africa, mainly Ethiopia and Somali

Republic, Southern Arabia,^[2,3,5,6,8] Abyssinia, Persia, Siam,^[3] Erythrea, Yemen, Sudan^[11] and are not found in India, but it is imported in India since long time.^[5]

Ethanobotanical description (fig. 1): A low, stunted bush or small tree,^[6,11] not reaches more than 9 feet in height,^[6,9] but with a trunk of considerable thickness,^[6] and numerous irregular, stunted, spiny,^[4,11,16] knotted branches. Bark is smooth, thin flaking off in small portions, pale orange-brown, becoming ash grey when detached. Leaves are few, in small fascicles at the ends of short, rudimentary, wart like branchlets, trifoliolate, leaflets sessile.^[16] Fruits are globose, drupaceous,^[4,17] with a depressed umbilicus at the point, short stalked, smooth, brown, ovate, rather larger than a pea.^[17]

The oleo-gum resin, which is at first yellow, is formed in schizogenous secretion^[4,11] reservoirs in the bark and pith. It exudates spontaneously through natural fissures in the bark and through induced incisions. After hardening it becomes brownish-yellow to reddish-brown and is usually collected^[4,7,9] in goat's skin. Myrrh found in somewhat irregular tears or masses of varying sizes,^[11] weighing up to 250 gm. Myrrh has a balsamic and aromatic odour, bitter and acrid taste.^[3,6,7,9]

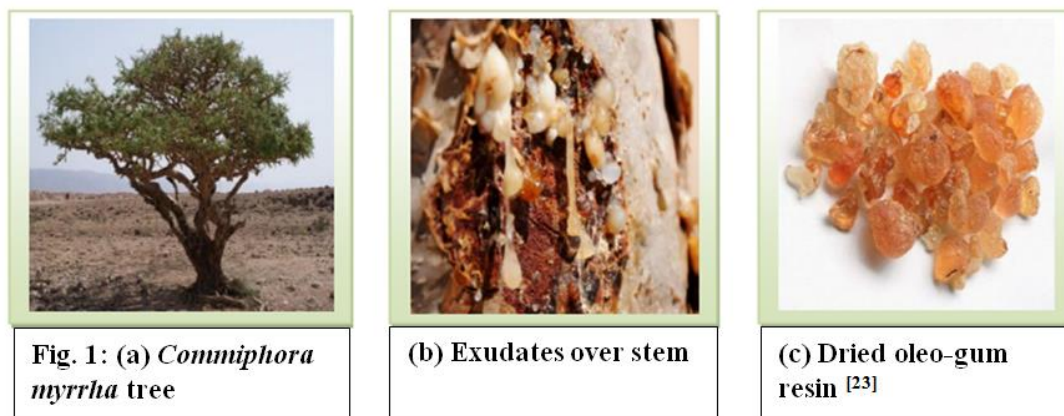


Fig. 1: (a) *Commiphora myrrha* tree

(b) Exudates over stem

(c) Dried oleo-gum resin^[23]

Temperament: Hot 2⁰ Dry 2⁰ ^[15,18-21], Hot 3⁰ Dry 2⁰ (*Ibn Sina*).^[15]

Recommended dose: 0.75 gm (minimum),^[15] 1 gm,^[19] 1-2 gm,^[20-22] 3-5 gm.^[2]

Chemical Constituents

- **Volatile oil:** 2-10%,^[2,3,9,13,24] It contains volatile essential oil called myrrhol, an oxygenated ethereal essential oil.^[3] Other, including heerabolene, furano-sesquiterpenes and monoterpenes.^[2,12,24] Also have terpenes, sesquiterpenes, esters, cuminitic aldehyde such as eugenol,^[2,3,7-9] metacresol, pinene, dipentene and limonene.^[3,7]
- **Gum:** 30-60%,^[2,3,7,9,13,24] contains acidic polysaccharides,^[2,3,12] salts as calcium phosphate and carbonate, glucoside which is a bitter principle of myrrh.^[3,4] It also contain proteins.^[12]

- **Resin-myrrh:** 27-50 %, ^[3,4,9,13,24] which is by fusion converted into myrrhic acid.^[3]
- **Phytochemicals:** Terpenoids, Steroids^[12-14] Flavonoids, Lignans, Carbohydrates, and alcohol derivatives.^[13,14]
- **Impurities:** 3-4%^[7,9]

Actions: *Commiphora myrrha* Linn. possess countless activities which makes it a wonderful herbal medicinal plant. The actions are emmenagogue (*mudir-i-hayd*), expectorant (*munaffis*),^[2-4] tonic (*muqawwi*), stomachic,^[2-5] stimulant (*muharrik*),^[6,7] antiseptic (*dafa-i-ta'fin*),^[2-5,8,9] disinfectant,^[6,7] astringent (*qabiz*),^[3,5,6,8-10] anti-inflammatory (*muhallil-i-waram*),^[11] bacteriostatic, antiviral, carminative (*kasir-i-riyah*), blood purifier (*musaffi*),^[2] laxative (*mulayyan*),^[3] immuno-modulator or immunity enhancer, deodorizing, granulation tissue promoting.^[11]

Uses of the *Murr Makki*

Myrrh has many medicinal powers and has been used to treat various diseases, such as fever, epilepsy, uterine affection,^[6] dyspepsia,^[2,3] skin problems, atherosclerosis, haemorrhoids, hepatitis, stomatitis, hypercholesteremia, and hyperglycemia.^[3] Unani physician used *Commiphora myrrha* in various systemic disorders such as

Urogenital diseases

- Tincture of myrrh is useful in various menstrual disorders, mainly in irregular menses, dysmenorrhoea, and chlorosis of young girls.^[2,3,5]
- Aloe compound containing myrrh as one of the ingredients, promotes conception in primary and secondary infertility.^[5]
- Myrrh is mixed with molasses and used for eleven days after confinement to purify the uterus.^[6]
- *Murr* induces the ceased menstruation, use of 1.75 gm *murr* with *baize-i-neem barisht* (egg yolk) when taken orally helps in withdrawal bleeding.
- Local use of leave's juice in *humul* (pessary) form arrest the excessive menstrual blood loss.
- It resolves inflammatory conditions of uterus (*waram-i-rahim*) and reduces dysmenorrhea (*dard-i-rahim*).
- Juice of *naan'a* (mint) and *murr* as a douche, eliminates bad smell from the genitalia.^[15]

Respiratory diseases

- Myrrh is used as an internal remedy in cough.^[6]
- In diphtheria, the tincture of myrrh combined with glycerine is given internally every one or two hours.^[3]
- In folk medicine, the drug is sometimes used internally as an expectorant.^[11]
- *Murr* powder used in the form of inhaler, as it is helpful to eliminate common cold (*nazla*), cleansing of brain, and provokes sleep.
- Inhalation of *murr* leaf juice is beneficial in epistaxis.^[15]

Circulatory and Cardiovascular disease

- It prevents the putrefaction of humours as it is a bacteriostatic drug.
- *Murr* with iron is beneficial in anemia.
- *Murr* stimulates the lymphatic system and increases the WBC count as well as macrophages which act as phagocytes and eliminates the dead organism from the body.^[15]
- It is a leucocytogenic agent, as it increases number of white cells in the blood.^[2]

Inflammatory diseases

- Myrrh is mixed with equal parts of honey and rectified spirit and dissolved in rose water or infusion of rose petals, and this mixture is good for mouth wash and also for internal administration in stomatitis.

- *Murr* with borax can be used as mouth paint in stomatitis or thrush.^[3]
- In China, the gum is used as an ingredient to prepare ointments for inflammation inhibition and tissue growth promotion.^[5]

Eye disease

- Myrrh is dissolved in human milk and used as an eye drop to cure purulent ophthalmia.^[3,6]
- Fine powder of *murr* is used as *kuhal* (eye liner) to increases the vision, heals eye wounds and prevent opacity of eyes.^[15]

Ear, nose and throat diseases

- *Murr* is finely powdered with *jundbedaster*, *mamisa* and *afiyun*, and used as ear drops to remove pus from the ear (*Jalinoos*).
- *Murr* in the form of tooth powder removes bad smell from mouth.^[15]
- It is often a constituent of mouth washes and dentifrices;^[5,7-9] used in dental caries, either alone or mixed with other drugs.^[3]
- In topical treatment of mild inflammations of oral and pharyngeal mucosa eg. pharyngitis and gingivitis, used as a gargle or mouth rinse for the treatment of aphthous ulcers, tonsillitis, common cold.^[2,3,4,11]
- It is taken as a powder or a tincture, rather than as an infusion and used externally or internally as gargle.^[2]

Gastrointestinal diseases

- Three grains each of powdered Myrrh and Rhubarb with five grains of morning glory flower is a good stomachic and laxative.^[3]
- Myrrh is used as an internal remedy in atonic dyspepsia, diarrhoea, worms, ulcers and sores.^[6]
- The drug is sometimes used internally as a carminative in folk medicine.^[11]
- *Murr*, vinegar, juice of beet root is beneficial in hernia and diseases of spleen.^[15]

Skin diseases

- It is used externally for treating acne, boils, pressure sores and internally as a blood purifier.^[2,6,7]
- It prevents the hair fall.
- It is a detergent, siccative, aperients, a disperser of cold tumour, and one of the most important medicine, as it prevents the humours from alteration.
- Myrrh is used as an internal remedy in ulcers and sores.^[6]
- It liquefies the blood which gets accumulated below the skin.
- Powder (*zarur*) of *murr* is helpful in healing of scalp wounds, even paste (*zimad*) prepared with *murr* and *kundur* is useful in healing of wounds if applied locally.

- *Murr* mixed with *ro'ghan gul* is helpful in dry itching of skin and its burned powder in wet itching of skin.
- Radish juice and *murr* is beneficial in pigmentation and wrinkling of skin when applied topically.
- *Murr* when grinded with vinegar than it abolishes tinea infection (*quba'a*), and take out warts when applied with *lehaj*, *piyaz dashti* and honey over it.^[15]

Musculoskeletal diseases

- Paste of *murr* is helpful in regeneration of skeletal muscular tissue, when it get detached from the bones.
- *Murr* is beneficial in rheumatism and gout if used either orally or locally.^[15]

Other uses

- Myrrh is used in perfumery as incense^[5,7,9] and for embalming.^[5]
- The Greeks and Romans used myrrh to flavour their wine.
- They also massaged their hair with a perfumed lotion made from *murr makki*.^[6]
- Greek soldiers used its poultice on their wounds during battle.^[12]

Harmful or Side effects: It is harmful for hot temperament individuals^[15,21,22] and people having urinary or bladder problems,^[15,18] it causes headache on inhalation, giddiness and fainting.^[15]

Unani action and Uses With Pharmacological Studies

1. Abortifacient and emmenagogue

Unani action: *mudirr-i-hayd wa bawl* (emmenagogue and diuretic), *mukhrij-i-janin* (abortifacient/ expulsive of placenta and fetus), *muharrik-i-rahim* (uterine stimulant)

Unani Formulation

- *Murr* with aloe and *khabsul hadeed* (iron rust) is beneficial in amenorrhoea (*ihitbas-i-tams*) as it act by stimulating uterine muscles.
- It is an abortifacient and causes expulsion of dead foetus from the uterus, when used with wine locally as pessary (*humul*).^[15]

Study: In ancient traditional Persian manuscripts, it has been noted that myrrh may act as uterine stimulant and probably cause complete abortion. A study shows that myrrh is effective and safe in the resolution of the retained product of conception (RPOC) and may be considered as an alternative option for treatment of patients with incomplete abortion.^[25]

2. Anti-ulcer activity

Unani action: *mudammil-i-quruh* (cicatrizant), *mujaffif* (siccative/desicative).

Unani formulation

- Powder of *murr* is helpful in healing of scalp wounds.^[15]
- *Murr* with coriander is used in different types of ulcers.^[33]
- *Murr* with rose water is used in aphthous ulcer.^[20]

Study: Aqueous suspension of oleo gum resin exhibit antiulcer and cytoprotective activity on ethanol-induced and indomethacin-induced ulcer on animal study in rats.^[2,7]

3. Anti-hyperlipidemic activity

Unani action: *munzij* (concoctive), *mukhrij-i-balgham* (expulsion of altered phlegm), *musakhkhin* (calorific), *mudir-i-bawl* (diuretic).

Unani Formulation

Murr is helpful in atherosclerosis, hypercholesteremia and obesity.^[3]

Study: Myrrh significantly lowered the elevated serum levels of total cholesterol, triglyceride, and low density lipoprotein and reduced atherogenic index in obese hyperlipidemic rats. The bioactive steroids guggulsterones have been attributed for potent hypolipidemic effect of *C. molmol* resin.^[1]

4. Hepato-protective activity

Unani action: *muqawwi-i-qabid* (hepatotonic), *muhallil* (resolvent)

Unani formulation

- *Dawa-ul-kurkum* a compound formulation having *murr* as an ingredient, is used in non-alcoholic fatty liver disease.^[26]
- *Murr* is useful in hepatitis.^[3]

Study: *C. myrrha* is a hepatoprotective, as it considerably reduces the oxidative stress induced hepatic injury on animal study via multiple pathways including a down regulation of inflammatory mediators and cytokines. Such a property of plant might be sufficient to combat cellular damage caused by various conditions that resemble fulminant hepatitis.^[27]

5. Anti-microbial activity

Unani action: *musaffi* (purifier), *dafa-i-ta'fin* (antiseptic).

Unani formulation

➤ *Murr* is finely powdered with *jundbedaster*, *mamisa* and *afiyun*, and when used as ear drops, it is helpful to remove pus from the ear.^[15]

Study: Oleo-resin of *C. molmol* is likely of same potential as of ciprofloxacin and tetracycline against various strains of *S. aureus*, *S. enteric* and *K. pneumonia*. *E. coli*, *P. aeruginosa* and *C. albicans*.^[144] Alkaloid, saponins, phenolic and flavonoids^[29,30] components

detected in *C. molmol* may be responsible for antibacterial activity of the plant species on *in-vitro* study.^[29]

6. Anti-inflammatory

Unani action: *muhallil-i-warm* (resolvent), *nafa-i-awram balghami*.

Unani formulation

- *Murr* is used as topical treatment in mild inflammations of oral and pharyngeal mucosa eg. pharyngitis and gingivitis, also as a gargle or mouth rinse for the treatment of aphthous ulcers, tonsillitis.^[2-4,11,]
- *Murr* is beneficial in rheumatism and gout if used either orally or locally.^[15]

Study: Myrrh oil exhibit anti-inflammatory activity by suppressing the fibroblast production and inflammatory cytokines, PGE₂^[1,29] on clinical study. The ethanol extract of myrrh decreases the inflammation of skin and is useful for repairing or regenerating of the elastic tissues.^[29]

7. Anti-dysmenorrhoeic activity

Unani action: *musakkin* (analgesic), *mufattih-i-sudad* (deostruent), *muhallil warm* (resolvent),

Unani formulation

Murr if used either orally or locally, reduces inflammatory condition of uterus (*waram-i-rahim*) and dysmenorrhoea (*dard-i-rahim*).^[15]

Study: Extract of myrrh exhibit significant antidysmenorrhoeic activity on animal study as it reduces the uterine contraction and aromatase inhibitory activity.^[13]

8. Anti-fungal activity

Unani action: *dafa-i-ta'fin* (antiseptic), *musaffi* (purifier)

Unani formulation

- *Murr* abolishes tinea infection if applied with vinegar.
- *Murr* mixed with *ro'ghan gul* (rose oil) is helpful in dry itching of skin or scabies^[9,15] and its burned powder in wet itching.^[15]
- *Murr* with borax is used in stomatitis and oral thrush as a mouth paint.^[3]

Study: In-vitro study of *C. myrrha* oil and ethanol extract of oleo-gum resin revealed antifungal activity against dermatophytes as well as *Aspergillus* species,^[29,31] due to the presence of Furanoeudesma 1,3-diene and menthofuran in myrrh oil and 2-tert-butyl-1,4-naphthoquinone, benzenemethanol,3-methoxy-a-phenyl, and curzerene in myrrh ethanol extract.^[29]

9. Analgesic activity

Unani action: *musakkin* (analgesic), *muhallil* (resolvent), *dafa'i suda'a* (relieves headache),

Unani formulation

- *Murr* is beneficial in rheumatism and gout if used either orally or locally.^[15]
- It is useful in backache, muscular pain and spasm.^[29]
- It is helpful in dysmenorrhoea to decrease the pain intensity.^[15]

Study: *C. molmol* extract exhibit significant analgesic activity on animal study due to its bioactive substances that raised pain threshold by depressing pain receptors centrally in the brain.^[1]

10. Anti-cancerous activity

Unani action: *nafa-i-quruh khabisa* (beneficial in malignant ulcers), *mundammil-i-quruh* (cicatrizant)

Unani formulation

➤ Paste of *murr* is useful in non-healing ulcers, malignant ulcer.^[5,32,33]

Study: The oleo-gum resin reported cytotoxic and antitumour activities on animal studies in mice.^[5] The fat-soluble extracts and chemical components exhibits significant anti-cancer activity on human gynecological cancer cell due to the presence of diterpene resin acid, which possess anti-proliferation and anti-angiogenic properties.^[13]

11. Wound healing

Unani action: *mudammil-i-quruh* (cicatrizant), *mujaffi-i-quruh* (dessicative), *dafa-i-ta'fin* (disinfectant), *qabiz* (astringent).

Unani formulation

- Powder and paste (*zimad*) prepared with *murr* and *kundur* is useful in healing of wounds if applied locally.
- Gargle with decoction of *murr*, strengthen the teeth, helpful in glossitis and bleeding gums and prevent dental caries.^[15]

Study: *Commiphora molmol* (myrrh) extract is used as a mouthwash in 0.5% conc. twice a day for 7 days from the first day of tooth extraction in a group of 20 patients. The result was statistically significant between-group difference in postoperative surgical site edema, tenderness, and socket size, showing greater improvements. This study demonstrated that myrrh mouthwash has an enhancement effect on wound healing during the early period after tooth extraction.^[34]

12. Antioxidant activity

Unani action: immune-modulator.

Unani formulation

Murr with *zafran* and *aloe* (*Tiryag-i-wabai*) is an immunity enhancer.^[35]

Study: The various solvent extracts and essential oil of *C. myrrha* resin showed antioxidant activity on *in-vitro* study,^[27,29,36] due to the presence of phenolic and flavonoid contents of extract.^[27,29]

13. Anthelmintic activity

Unani action: *qatil kirm-i-shikam* (vermicide),

Unani formulation

Murr kills intestinal worms when used with castor.^[21,33]

Study: The study aimed to investigate the effects of ivermectin and myrrh on experimental trichinosis in ninety albino mice who were orally infected with 300 *T. spiralis* larvae. Anthelmintics are used to eliminate intestinal adults as well as tissue-migrating and encysted larvae. Myrrh was effective and could be a promising drug against the Egyptian strains of *T. spiralis* with results nearly comparable to ivermectin.^[37]

CONCLUSION

In literature of Unani medicine, physicians had used *murr* in various systemic disorders. Recent scientific studies conducted on animal and human, has proven its efficacy in some properties which plays a key role in the advancement of human health. However, there are many indications of the drug mentioned in Unani system of medicine whose efficacy is yet to be proved. Hence, there is need for further clinical trials to establish the efficacy of other indications and to provide additional clinical evidence for the traditional uses of this drug against many disease conditions as mentioned in classical Unani text.

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