Medicinal uses of *Boswellia serrata* Roxb (*Kundur*) with special reference to its ulcer healing property

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DOI: [https://doi.org/10.22271/phyto.2021.v10.i5a.14205](https://doi.org/10.22271/phyto.2021.v10.i5a.14205)

**Abstract**

*Boswellia serrata* is known as *Kundur* in Unani Medicine and the plant is found in Arabia, South Africa and west Asia. The white to yellow colored aromatic oleo resin gum is obtained from the stem bark of this pant and the main constituents of *Boswellia serrata* Roxb is Boswellic acid. This article was aimed to investigate and compile the pharmacological profile mentioned in Classical text of Unani medicine with special attention to its ulcer healing action and to scientifically recognize those pharmacological actions through the already published scientific studies. Pharmacological activities of *kundur* mentioned in Unani medicine are astringent, desiccative to the ulcer, antiseptic, haemostatic, cicatrizant, memory tonic, siccative to the secretion of phlegm, carminative, tissue formation and ulcer healing action. The active constituents of *Boswellia serrata* had proved effective in many experimental and clinical studies for various disease conditions.

**Keywords:** *Boswellia serrata* Roxb., *Kundur*; unani medicine, ulcer healing, medicinal uses

**Introduction**

*Boswellia serrata* (*Kundur*) is a medium to a large tree which grows up to 18 meters in height and 2.4 meters in girth. This is generally found in India, Yemen, Oman and Saudi Arabia. The suitable environment for the tree is dry, hot and rocky hill. Leaves are imparipinnate, 30-45 cm long; leaflets 2.6 - 6.3 cm to 1.2- 3.0 cm, ovate or ovate-lanceolate. Flowering occurs during January to April when the tree is almost leafless. The tree, on the injury, exudes an oleo gum resin. Oleo gum resin is secreted from cortex is transparent, fragrant, golden yellow and solidifies [1, 2].

To obtain the oleo-gum-resin of *Kundur*, trees are tapped by shaving off a thin band of bark about 20 cm wide and 30 cm long or high, at the height of 15 cm from the base of the tree. Oleo gum resin burns with a clear flame and diffuses an agreeable odor. The therapeutic uses indicated in Unani system of medicine mainly for the treatment of inflammatory conditions (*waram*), cancerous diseases (*sartan*), non-healing ulcer (*guruhe khabisa*), skin disease (*amaze jild*) and blood disease (*amraze dam*) [3, 4, 5]. Crude extracts of *Kundur* are used by traditional medicine practitioners and the identity of the constituents is not well recognized due to the availability of numerous grades of this drug [6].

This review was carried out to study the active principles and to review the pharmacological activities with special reference to ulcer healing property of *Kundur* through previous study findings and published literatures.

**Materials and Methods**

Data were collected from various Unani texts namely; Al Qanoon fit tibb, Bustan ul Mufradat, Muheet-e-Azam, Kitab ul Mukhtarat fil tibb, Kitab al Kulliyat, Khazain ul Advia, Aljami Li Mufradat al Adavia Wal Aghzia, Kitabul Mukhtarat Fil Tibb and Makhzanul Mufradat etc. Indexed Journals were searched in various scientific databases like Scopus, Pubmed, Elsevier, Google scholar, Medline, Research scholar, Research Gate, Science direct, orchid etc. using terms like Medicinal uses of *Boswellia serrata*, Medicinal uses of *Kundur* and Ulcer healing property of Boswellia serrata and Ulcer healing property of *Kundur*. After a rigorous literature review, the collected data were organized in a logical sequence.

**Results and Discussion**

**Taxonomical Classification** [5, 6]

- **Kingdom:** Planate
- **Order:** Sapindales
Family: Burseraceae  
Genus: Boswellia  
Species: serrata

Vernacular Names [5, 6]  
Arabic Luban  
English - Indian frankincense tree / Indian olibanum tree  
Hindi- Salai  
Tamil - Parangisambrani  
Persian - Kundur  
Urdu - kundur  
Sanskrit – Ashwamithra / Shallaki  
Kannada- Chilakdhupa / Tallaki

Chemical Composition [5]  
Chemical compositions found in oleo gum resin of Kundur are: Moisture-10-11%, volatile oil 8-9%, resins 55-57%, Gum 20-23%, Insoluble matter 4-5%. The constituents are fixed oil, Terpenoids and Gum, Boswellic acid.

Unani Medicinal description  
Parts used (Hasase Mustamela): Gum, Bark [7, 8, 9, 10]  
Temperament (Mizaj): Hot in 20 and dry in 10 [11]  
Hot in 30 and dry in 20 [12, 13]  
Pharmacological action (Afa’ al)  
Astringent (Qabiz) [7, 14]  
Detergent (Jali) [10]  
Siccative to the ulcer (Mujaffife wa mundammile quruhi) [7, 12, 15, 16]  
Haemostatic (Habissudam) [7, 8, 12]  
Tissue growth promoter (Munbite Laham) [11, 15]  
Cicatrization to a corneal ulcer (Mundammile qarha chashm) [7, 12]  
Memory tonic (Mugawanwie zehan wa hifz) [12, 14]  
Siccative to the secretion of phlegm (Mujaffife balgham) [11, 12, 14]  
Siccative to the secretion of the brain (Mujaffife ratubate dimagh) [12]  
Carminative (Kasire riyah) [12]  
Stomachic (Mugawwie meda) [7, 8, 10]  
Antidote (Triyag samoom) [14, 18]  
Expectorant (Munafis e balgham) [17]  
Antiseptic (DafeTauffun) [17]

Therapeutic uses (Mawaqe Istemal)  
Diarrhoea (Ishaal) [7]  
Stomach and intestinal ulcer (Quruhe meda wa ama’a) [11, 15]  
Insomnia (Nisyan) [10]  
Vomiting (Qaj) [11]  
Epistaxis (Nakseer) [11, 12]  
Syphilis (Atishak) [12]  
Gonorrhoea (Nafe Sozak) [12]  
Loss of libido (Zofe Baah) [12]  
Brain disorders (Dimaghi Amraza) [12]  
Skin diseases (Amraze jild) [12]  
Stomach and intestinal ulcer (Quruhe Meda wa Ama’a) [11, 15]  
Corneal ulcer (Quruhe Chashm) [7, 15]  
Cough (Sualal) [14]

Unnab  
Shikanjabeen

Substitutes (Badal) [10, 12, 13]  
Behman  
Mastagi

Dose (Miqdare Khurak) [10, 12, 13]  
3-4 gms

Compound formulations (Murakkabaat) [5, 19]  
Majoone Kundur  
Dawa-ul-kibrit  
Habbe Sozak  
Majoone Nisyan  
Majoone Masikul Baul  
Jawarish-e-Kundur

Action Mentioned in Ethnomedicine  
Analgesic, anti-allergic, anti-alzheimer an, anti-arthritic, anti-asthmatic, anti-cancer, anti-complementary, anti-edemic, anti-inflammatory, antileukemic, antileukoatriene, antipyretic, hepatotonic, hypoglycemic, sedative, stomachic, tonic, anti-rheumatic, astringent, carminative, CNS depressant, collyrium, demulcent, diuretic, antidysenteric, expectorant [22, 23] antiseptic [23]

Indications and Uses Mentioned in Ethnomedicine  
Bark is used in diarrhea, piles and skin diseases; Bark mixed with butter applied as a poultice on bleeding and suppurating wounds [23]  
Oleo-gum-resin is beneficial in urinary disorders, goiter, gout, piles, rheumatism, cutaneous and nervous diseases [24]  
Gum-resin oil is used in gonorrhea, and gum-resin is used with butter for syphilis [25]  
Powdered flowers are used in colds and fever. [25]

Scientific studies  
Antimicrobial Activity  
A study conducted by Rajendra CE et al., to evaluate the antimicrobial activity of Boswellia serrata revealed that methanolic extract of the drug had a potent antimicrobial activity [26]  
Ismail et al., reported that the resin extract of Boswellia serrata powder confirmed antimicrobial activity in different concentration against gram negative and gram-positive microbes. They observed the inhibition zone and compared with ciprofloxacin [27].
Ulcer healing property

A recent single blind compression clinical trial conducted in a Hospital setting of OPD/IPD revealed that using a poly herbal formula in which Boswellia serrata was one of the main ingredients and the trial concluded that the formulation was significantly effective in healing peptic ulcer [28]. Shah Alam et al., had tested with an Unani formulation with non-healing ulcers in which Boswellia serrata was a chief ingredient, and it was proved that the Unani formulation with Boswellia serrata was efficacious in curing non-healing ulcers in terms of decreasing the healing time and reducing the patient’s discomfort [29].

Zeeyauddin K et al., described that petroleum ether and aqueous extracts of the bark of Boswellia serrata revealed significant antiulcer activity in aspirin induced Albino rats’ model at the dose of 250 mg/kg body weight [30]. Gupta I et al., conducted a follow-up study in chronic colitis patients taking gum resin of Boswellia (900 mg daily in three divided doses for six weeks) and sulfasalazine (3 g daily in three divided doses for six weeks) had shown improvements. Furthermore, 14 out of 20 patients (70%) treated with Boswellia serrata gum resin went into remission compared to 4 out of 10 patients (40%) treated with sulfasalazine [31].

Gupta I et al., in another trial compared Boswellia extract (350 mg three times daily) to sulfasalazine (1 g three times daily) in ulcerative colitis patients. Patients on the Boswellia serrata extract showed better improvements than patients on sulfasalazine; 82 percent of Boswellia extract treated patients went into remission compared with 75 percent on sulfasalazine [32].

Zhang P et al., evaluate the wound healing activity of standardized extract of Boswellia serrata against the experimental model of diabetic foot ulcer. Zhang et al., concluded that treatment with B. serrata (200 and 400 mg/kg) significantly increased the rate of wound contraction via modulation of oxido-nitrosative stress and elevated the hydroxyproline level at the wound area [33].

Surjeet Singh et al., evaluated the activity of boswellic acids derived from Boswellia serrata on animal models and study results discovered that boswellic acids possess a dose dependent antiulcer effect against different experimental models. It also showed different degree of inhibition of the ulcer score towards different ulcerogenic agent [34].

Anti-inflammatory Activity

An animal study conducted by Siddiqui MZ et al., observed that the mixture of boswellic acids of Boswellia serrata inhibited 25-46% paw oedema in rats, demonstrating the anti-inflammatory property of boswellic acids of Boswellia serrata [35].

Conclusion

This review enlightens that Boswellia serrata is useful in ailments such as ulcer, diarrhea, cough, arthritis, inflammation, skin diseases, chronic bronchitis, depression, hematemesis, and other bleeding conditions. In aforementioned disorders Boswellia serrata (Kundur) had been pharmacologically and clinically proven as it has anti-ulcer, anti-diarrhoeal, anti-inflammatory, antimicrobial properties and useful in inflammatory bowel diseases. These activities are attributed to its phyto-chemical constituents such as boswellic acid, tannin, phenol, β-sitosterol, etc. Thus, this comprehensive review significantly acclaims that the traditional herb, Boswellia serrata (Kundur) has versatile pharmacological properties, especially its ulcer healing property as claimed in classical manuscripts of Unani Medicine.

Acknowledgment

Authors acknowledge the scholars whose articles are cited and included in references of this manuscript. The authors are also grateful to authors/editors/publishers of all those articles, journals and books from where the literature for this manuscript has been reviewed and discussed.

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