



# LOBAN (*STYRAX BENZOIN DRYAND*): A POTENTIAL RESINOUS DRUG IN UNANI SYSTEM OF MEDICINE

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**Abstract:** Loban is a plant origin drug, which is used by Unani physicians as antiseptic, astringent, carminative, dissolvent, aphrodisiac, expectorant, antispasmodic, absorbent, antiviral, aromatic, bactericidal, cardiogenic, tonic for liver and stomach etc. Benzoin incense fumes can also prevent bacterial growth, sterilize the environmental air, and promote a healthy atmosphere by minimizing airborne transmission. In this communication information about Loban (*Styrax benzoin Dryand*), a versatile medicinal resin is described in detail. Introduction, distribution, pharmacological action, temperament, botanical description, medicinal applications, toxicity and side effects, correctives, substitutions, compound formulations, chemical ingredients, and additional scientific studies are all included.

**Index terms-** Loban, *Styrax benzoin Dryand*, Benzoin, Resin, Unani System of Medicine.

## I. INTRODUCTION

Loban is an important drug of Unani system of Medicine which is used since old times. It is resinous exudates from the plant *Styrax benzoin*, which belongs the styraceae family. Loban is a Hindi word<sup>1</sup>; its scientific name is *Styrax benzoin Dryand*<sup>2,3,4</sup>. The name *Styrax* originates from the Greek word *Sturax* and benzoin is derived from Arabic word *luban jawi* which means java incense<sup>5</sup>. There are two groups of species namely 'Siam Benzoin' and 'Sumatra Benzoin'. Sumatra Benzoin consists of *Styrax benzoin* and *Styrax paralleloneurm* and '*Styrax tonkinensis*' is known as 'Siam benzoin'<sup>6,7,8</sup>. According to Groom (1994) it was first described in the 14th century by Ibn Battuta, who found it in Sumatra<sup>9</sup>. There are several names for *styrax benzoin* depending on where you are located in the world. The common names of the *Styrax Benzoin* are Benjamin, Gum benjamine, benzoin resins, benzoin trees, Sumatra benzoin, Belly benzoin, Head benzoin. *Styrax* in Swedish is known as *benzoin*. In German, it is called as benzoebaum. It is commonly referred to as balsamo de Benjuí in Spanish and arbre à Benjoin in French. In Chinese it is known as xi xiang<sup>7,8</sup>. The Arabs call benzoin, *Luban Jawi* meaning Frankincense of Java, from which the names Benjamin and Benzoin derive<sup>6,9</sup>.

## II. DISTRIBUTION

Trees in *Styrax* species are native to warm temperate to tropical regions of the Northern Hemisphere, with the majority in eastern and southeastern Asia, but also crossing the equator in South America. Natural home of *Styrax benzoin* is Sumatra, Indonesia but it is also available in Malacca, Malaya, Java and Borneo and the Western countries from ancients. The largest importer of benzoin resins is Singapore, followed by Europe for use in medicines, and Japan, the Indian subcontinent and other countries of Middle East as direct importers of Sumatra benzoin<sup>2,5,10,11,12</sup>.

### III. BOTANY

*Styrax benzoin Dryand* grows up to 34 m tall and 100 cm in diameter, occasionally with buttresses. The bark is smooth to vertically cracked or finely fissured. Leaves are ovate to elliptic. Flowers appear in racemes or panicles, and are terminal and axial. The growing fruit is indehiscent, depressed-globose to globose, with a diameter of 2.8–3.8 cm. Flowering and fruiting are not periodic and occur from January to December. In Sumatra, the Malay Peninsula and West Java (rare), it is found in the lowlands up to 800 m (rarely 1000 m) in primary and disturbed forest, mostly on fertile soils. *Styrax benzoin* was historically cultivated in Palembang and is still cultivated in North Sumatra below 1000 m. Usually; it is cultivated in dry rice fields<sup>10</sup>. *Styrax benzoin* originated in rainforest that has medium to high altitude. Cultivation periods require 1300 millimetre rain per year or 3 to 6 dry months. Plants can survive temperatures as low as -4°C and as high as 45°C. Soil having low base saturation and high acid content (pH below than 4.5) is required for best growth<sup>5</sup>.

### IV. SCIENTIFIC CLASSIFICATION:<sup>13,14,15</sup>

Kingdom: Plantae, Sub-kingdom: Tracheobionta, Phylum: Tracheophyta, Division: Magnoliophyta, Class: Equisetopsida, Sub-class: Magnoliidae, Order: Ericales, Group: Dicot, Duration: Annual, Family: Styracaceae, Genus: *Styrax*, Species: *S. benzoin Dryand*

### V. TEMPERAMENT (MIZAJ)

Hot 2° and Dry 1°<sup>16,17</sup> and Hot 2° and Dry 2°<sup>19</sup>

### VI. THERAPEUTIC ACTION AND USES (AFAAL WA KHAWAS)

Antipyretic (*Dafe Humma*)<sup>18</sup>, Anesthetic (*Mukhaddir*), Antibacterial, Anticancer (*Manne sartan*), Anti-inflammatory (*Tahallil e warm*), Antimutagenic, Antioxidant, Antiseptic (*Da'afe ta'ffun*), Antispasmodic (*Da'afe tashannuj*), Absorbent (*Nashif*), Antiviral, Aphrodisiac (*Mulazziz*), Aromatic, bactericidal<sup>20</sup>, Carminative (*Kasir riyah*), Cardi tonic (*Muqawwi qalb*), *Muqawwi jigar Wa meda*, Detergent (*Jali*), Deodorant, Diuretic (*Mudir baul*), Expectorant (*Munaffis balgham*), Fungicide, Haemostatic (*Habis dam*)<sup>17</sup> Immunostimulant, Insecticide, Insectifuge, Larvicidal, Laxative (*Mulayyan Ama'a*), Lithotryptic (*Mufattit hisat*), Narcotic, Nematicidal, Sedative, Styptic (*Qabiz*)<sup>21</sup>, Stimulant (*Munaash*), Vermifuge (*Mukharrij deedan shikam wa am'aa*)<sup>16</sup>.

It is used to treat Arthrosis, Asthma, Bronchosis, Cancer, Cardiopathy, Catarrh, Cold Sore, Cold cough, Colic, Constipation, Corn, Coryza, Cough, Cramp, Cystosis, Dermatitis, Dropsy, Enterosis, Fever (especially in Phlegmatic fever/*Balghami bukhar*),<sup>18</sup> Fungal infection, Gastritis, Gout, Hemorrhoid, Herpes, Immunodepression, Infection, Inflammation, Insomnia, Itching, Joundice<sup>21</sup> Laryngosis, Mastosis, Mycosis, Nervousness, Pain, Pharyngosis, Phthisis, Polyp, Pulmonosis, Respirosis, Rheumatism, Rhinositis, Ringworm, Shingle, Spermatorrhea, Stomachache, Stroke, Syncope, Tuberculosis, Toothache, Ulcer, Urine incontinence in children,<sup>21</sup> Viral infection, Whooping cough, Water Retention, Worm, Wound<sup>16,22</sup>.

### VII. TOXIC OR ADVERSE EFFECT (MAZARRAT)

Headache in Hot temperament (*haar mizaj*)<sup>16</sup>

### VIII. CORRECTIVES (MUSLEH)

Roghan banafsha (Oil of *Viola odorata*), Khashkhash (*Papever somniferum Linn.*) and Kahu (*Lactuca sativa Linn.*) are used as corrective to avoid its toxicity and adverse effect<sup>16,17</sup>.

### IX. ALTERNATIVE OR SUBSTITUTE (BADAL)

Some time in absence or unavailability of drug Mastagi (*Pistacia lentiscus Linn.*) and *Lazin* can be used as substitute<sup>17</sup>.

## X. DOSE (*MIQDAR KHURAK*)

Benzoin resin is used in crude form in a dose of 2-3 masha<sup>16</sup> or 3-5gm<sup>17</sup>

## XI. COMPOUND FORMULATIONS (*MARAKKABAT*)

Different compound formulations in Unani Medicine having Loban are as follows: *Habbe momyayi*, *Zimad Zafrani*<sup>23</sup>, *Tiryag e Farooq*<sup>24</sup> etc.

## XII. MAJOR CHEMICAL CONSTITUENTS

Benzoin's chemical constituents differ from those of other traditional herbs—even those belonging to the same class of typical medicines—will help us better understand benzoin's properties. Previous research has shown that benzoin is made up of a variety of chemical substances, such as lignans (benzofuran lignans, tetrahydrofuranoid lignans, neolignane and oxyneolignan), sesquiterpene, terpenoids, and balsamic acid esters. Furthermore, the most prevalent components of benzoin, free Balsamic acid esters (Cinnamic acid, benzoic acid), and their derivatives, are essential to bioactivity. The amount of cinnamic acid is usually double that of benzoic acid. It also contains triterpenic acids like siaresinolic acid (19-hydroxy-oleanolic acid) and sumaresinolic acid (6-hydroxy-oleanolic acid); traces of vanillin, phenylpropyl cinnamate, and phenylethylene. Resin Alcohol (Resinotannols, Resinols) are also present in Loban<sup>10,25,26,27,28</sup>.

## XIII. PHARMACOLOGICAL ACTIONS:

**1. Antioxidant:** Antioxidant property of the Loban methanolic extract was tested with the use of UV spectrophotometer. The reaction mixture was prepared by taking 2 ml sample of different concentration and 3.5 ml ABTS solution. After six minutes in complete darkness, the absorbance at 734 nm was measured. The methanolic extract of *Styrax benzoin* showed significant antioxidant activity against different extract with IC<sub>50</sub> Value<sup>29</sup>. Another study of Antioxidant test results in the form of IC<sub>50</sub> value for black Sumatran incense is 90.03. The antioxidant results showed that black Sumatran incense has active antioxidant properties against DPPH (IC<sub>50</sub> value 50-100µg/mL)<sup>30</sup>.

**2. Nematicidal activity:** Study of nematicidal activity of *Styrax benzoin* extract is done by Yusra Ghani et. al. 50 µl of plant extract (10,000, 1000, and 500 ppm concentration in DMSO) was added in each cavity blocks of juvenile *Meloidogyne javanica* (a nematode) containing 2 ml of sterile water. Three replicates of each treatment were made. Observation were taken after 24, 48, 72 hours. Nematodes were dead<sup>29</sup>.

**3. Antibacterial:** After extraction of essential oils of resin, the obtained extracts was tested for the two types of pathogenic bacteria *Staphylococcus aureus* (Gram (+), ATCC 25922) and *Escherichia coli* (Gram (-), ATCC 25923). The Laboratory of Microbiology at Sliman Armart Hospital in Touggourt, Algeria, was the site of tests on the antibacterial activity of essential oils. They prepared five concentrates (100, 75, 25, 50 and 5%) for each extract using ethanol as solvent. The antibacterial activity test for the essential oil of three types of resin was followed by the direct method proposed by National Committee for Clinical Laboratory Standards (NCCLS) for the testing of antibiotics with the replacement of antibiotics with essential oils<sup>4,5</sup>.

**4. Antiviral:** Benzoin Sumatra resinoid has the most prominent antiviral activity. A completely replication-competent SARS-CoV-2 strain in VeroE6-GFP cell culture was used to assess the antiviral efficacy of the most potent protease inhibitors. The benzoin Sumatra resinoid showed selective inhibition (half maximal effective concentration (EC<sub>50</sub>) = 31.5±2.4µg/mL) with limited toxicity (50% cytotoxic concentration (CC<sub>50</sub>) = 85.5±1.9 µg/mL).

**5. Disinfectant:** The use of Benzoin incense fumes can prevent bacterial growth, sterilize the environment air, and promote a healthy atmosphere by minimizing airborne transmission. The average inhibition rate of clinical bacterial isolates by burning 1 g of benzoin resin for 90 min ranged from (100-55)%. The inhibition of microbial growth (*S. aureus*, *P. aeruginosa*, and *C. albicans*) reached 100% after exposure to resin fumes for 90 min within a confined space. The benzoin resin had a weaker inhibition effect on *K. pneumoniae*, *E.*

*coli*, and *E. aerogenes* after 90 min of exposure. However, there was a notable inhibitory effect (79%, 68%, and 55%, respectively). Bacterial growth inhibition was observed even after the fumes were exposed to the bacteria for 30 and 45 minutes (greater than 18% in all isolates, with the exception of *E. aerogenes*, which showed essentially no effect after 30 minutes of exposure)<sup>4,20</sup>.

#### XIV. NON-PHARMACOLOGICAL USES

In perfumery, benzoin is used as a fixative, slowing the dispersion of essential oils and other fragrance material into the air. Benzoin is used in cosmetics, veterinary medicine, scented candles. It is used in flavouring in alcoholic and non-alcoholic beverages, baked goods, chewing gums, frozen dairy, gelatins, pudding, and soft candy.

#### XV. RESULT & DISCUSSION

Loban, a crucial drug in the Unani system of Medicine, has been used since ancient times. It is a resinous exudate from the plant *Styrax benzoin Dryand*. Benzoin contains various chemical constituents, including lignans, sesquiterpenes, terpenoids, and balsamic acid esters. The primary components are free balsamic acid esters (cinnamic acid and benzoic acid) and their derivatives, which are crucial for its bioactivity. Benzoin also contains triterpenic acids, vanillin, phenylpropyl cinnamate, and phenylethylene. Benzoin contains the compounds like benzoic acid, benzaldehyde and benzyl benzoate which are most effective bactericidal, germicidal, antiviral substances and fungicidal. Benzoin oil is used as sedative and relaxant and relieves the tension, stress, anxiety and nervousness. It brings out the neurotic or nervous system to normal. The Benzoin Resins can be used in antibacterial activity, Antioxidant activity, many Pharmacological activities. There is some evidence that benzoin might act as a skin protectant, and also help to break up chest congestion by thinning. *Styrax benzoin* resin is widely used as an ingredient in the incense and is believed that it helps to drive out the evil spirits. Benzoin is also used as a preservative and fragrance compound in the perfumes, soaps, cosmetics and toiletries. Benzoin is also used as a flavouring agent in the food, alcoholic beverage and soft drinks. Benzoin resins act as powerful antioxidants and help to prevent the rancidity of fats. *Styrax benzoin* is also used in the healing of wounds. If smoke of benzoin resin is spread then smoky zone become free of germs. Benzoin oil also has anti- flatulent and carminative properties.

#### XVI. CONCLUSION

From the above review work it can be clearly concluded that, Loban (*Styrax benzoin Dryand*) is a versatile and significant resinous drug in the Unani system of Medicine, with a wide range of pharmacological and non-pharmacological uses. Its chemical composition and therapeutic properties make it valuable in treating various ailments and conditions, highlighting its importance in traditional medicine.

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#### ABBREVIATIONS:

ABTS: 2,2'-azino-bis(3-ethylbenzothiazoline-6-sulfonic acid)

IC50: Half-maximal inhibitory concentration

DPPH: 2,2-diphenyl-1-picrylhydrazyl

DMSO: Dimethyl sulfoxide

µl: Microlitre

µg: Microgram