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Bombyx mori Cocoon (Abresham): A potent Unani drug

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Abstract
Silkworm (*Bombyx mori*) is a highly domesticated and economically important insect which is the primary producer of silk. Apart from silk production by *Bombyx mori* had a lot of applications in biological and scientific research. The silk cocoon in Unani medicine is popularly known as Abresham Muqriz (muqriz mean's cut). It is one of the most common animal origin drug used in Unani system of medicine (USM) for various diseases. Silk cocoons are extensively used as an ingredient of various Unani formulations. It is a natural fiber produced by silk worm and silk derived from the domesticated silkworm, *Bombyx mori* L. (Lepidoptera, Bombycidae), is widely exploited.

Keywords: Silkworm, abresham, unani ststem of medicine and disease

Introduction
Unani System of Medicine dealing with traditional system of medicine, it has own theory of health and diseases [1]. It is based on the drugs originated from plants, animals and minerals. It has been documented that about 200 drugs of animal origin are described in Unani System of Medicine (USM) which are claimed to be beneficial for the treatment of various ailments [2]. Approximately 80% of animal species on earth are insects, 99% are invertebrates. They shar0e a large proportion of our genetic material with all life on earth down to the simplest worms [3]. Silkworm (*Bombyx mori*) is an invertebrate insect widely used as a model organism in life sciences [4]. It is one of the most important insect feed on the leaves of the mulberry (Moraceae) family and genus *Morus* [5]. *Bombyx mori* is an economic insect whose silk is emerging as a resource for solving a broad range of biological problems [6]. Generally, the main factor that affects the physiology of insects is the temperature and humidity. Most insects can adapt to daily environmental temperature fluctuations. *Bombyx mori* is very sensitive to fluctuations in the environment, and cannot survive to the extreme temperature fluctuations [7].
Besides, silk has been abundantly used traditionally in diverse cultures as a natural therapy or yarn-related trade. The silk cocoon layer is constructed from two major proteins: fibroin and sericin, in which fibroin, the fibrous protein, is the central part, and sericin, the globular protein, is the sticky part that envelopes the fibers and coheres them together. Furthermore, impurities like carbohydrates, salts, and waxes known as "non-sericin" constituents impart water repellency to the silk cocoon [8]. Likewise, silk, particularly fibroin silk, has been used in medical commodities, food additives, novel drug de livery methods, and scaffold development for tissue engineering of different organs due to their biocompatibility and a broad spectrum of outstanding physiochemical features [9, 10]. Silks are well-known polymers used as sutures since ages [11]. In Persian medicine literature, the silk cocoon is called abresham (Abre sham), which is generally known as abresham muqriz (Muqriz means cut) [28].

Development of silkworm
The life cycle of *Bombyx mori* is very short and simple which includes four major stages *viz*., eggs, larvae, pupae, moths and its products, by products and waste products as a potential medicinal source has been indicated [13]. Cocoon consists of yellow, oval and rounded capsule like structure. Cocoon is nearly 2cm to 5cm long composed of fibroin (silk) threads paved together with a sheet of silk paste (sericin) secreted by silk worm as transitory from caterpillar to the chrysalis or pupa. These worms take food from the leaves of *Morus Alba* (Shaitut) which are nearly an inch long and half an inch wide.

The powdered form of cocoon is utilized in medicines [14]. Silkworms spin composites of two silk fibers out of two converging silk glands. These fibers are surrounded by a glue-like sericin protein coating that holds the fibers and thus the cocoons together. The individual silkworm silk fibers (Brin) are 10–12 µm in diameter with a triangular cross section, resulting in a composite fiber (bave) of up to 65 µm in diameter. For most uses of silk, the sericin layer is boiled off with an alkaline or soap solution. Silkworm silk is the most commonly used silk material due to the domestication of this source of the protein for textile manufacturing [15].

Classification
Kingdom: Animalia
Phylum: Arthropoda
Class: Insecta
Order: Lepidoptera
Family: Bombycidae
Genus: Bombyx
Species: B. mori

Vernacular Names of Abresham
Urdu: Abresham
Arabic: Abresham
Persian: Abresham
English: Raw Silk Cocoon
Hindi: Resham
Marathi: Reshmi-Chi-Keed
Sanskrit: Pat
Tamil: Putloo puchie

Photo 1: ERI Silk Worms

Photo 2: Live Silk Worms

Photo 3: *Bombyx mori* Cocoon (Abresham)

In Unani system of medicine: The Canon of Medicine (Al-Qanoon fi al tib), Avicenna mentioned a tract of cardiac drugs, which contains 64 drugs of herbal and mineral origin. *Bombyx mori* (Abresham) cocoon is one of the main drugs of this tract [16]. Ibn Sina in his book "Al-Advia Wal Qalbiya" mentioned the properties of Abresham (*Bombyx mori*) as strong exhilarant bardiotonic and brain tonic; therefore, it is mainly incorporated as chief ingredient in various Khamirajat [27]. It is known as Abresham popularly known as abresham Muqirz (Muqriz means cut) in Unani [18] and is used as a raw drug in various formulations for many cardiac and neurological disorders. The protective role in hyperlipidemia of the crude extract of *Bombyx mori* cocoons along with two other drugs *Nepata hindostana* (Badranjboya), and *Terminalia arjuna* (Arjan) [18, 19]. Also in Unani pharmacopoeia several formulations with large or small number of ingredients have been described for the treatment of cardiovascular and cerebrovascular disorders. Some of the formulations are being used in Unani medicine with good results [20].

Important Formulation developed in Unani system
Abresham with different ingredients from natural sources formulated in various reputed poly pharmaceutical Unani formulations; namely, Khameer-e- Abresham Sada, Khameere Abresham Arshad Wala, etc., are used to treat various cardiac and nervous ailments. Others compounds are, Khameere Abresham Ood Mastagi Wala, Dawa-ul-Misk Motadil Jawahirwali, Dawa-ul-Misk Motadil Sada, Khamira Gaozaban Sada, Majoon-e-Chobchini, Sharbat-e-Abresham Sada etc. [21].

Temperament
The concept of Mizaj is fundamental for the understanding the drug action and disease processes as per Unani System of Medicine (Reesha, 2018). *Bombyx mori* silk is attributed the qualities 'hot' and 'dry' in its temperament (Garm – o – Khushk) [22].

Phytochemistry
Phytochemical studies has shown that the Silk cocoon consist of total protein (12-16%), fat (11-20%), carbohydrate (1.2- 1.8%). Glycine, alanine, and serine constitute about 82% of the amino acids present in the cocoon. Rest of the amino acids found in the cocoon are – histidine, lysine, aspartic acid, arginine, threonine, cystine, proline, tyrosine, tryptophan, valine, phenylalanine, methionine, leucine, isoleucine, glutamic acid. Whereas, fat contents include alpha linolenic acid (ALA)- the essential fatty acid along with palmitic acid. There are five flavonol glycosides identified in silk cocoon responsible for potent anti-oxidant activity of *B. mori* [28].

Action
It is a *Muqawwī-i-Qalb* (cardiac tonic) and *Muḥarrik-i-A'ṣāb* (Nervous stimulant). It is an *Mukhrij-i-Balgham* (Expectorant) [22]. *Mufarreh* (Exhilarant) & *Muqawwī-i-Azae Raeesa* (Tonic for vital organs). Muḥallil (Resolvent), *Mulattif* (Demulcent), *Mufattiḥ-i-Sudad* (Deobstruent), *Muṣaffī-i-Dam* (Blood purifier), *Mukhrij-i- Balgham wa Sawdā'* (Expulsion of phlegm and black bile), *Mujaffif* (Desiccant), *Muqawwī-i-Mi'da* (Stomachic), *Muqawwī-i-Dimāgh* (Brain tonic), *Muqawwī-i-Jigar* (Liver tonic), *Muqawwi-e-Bah* (Aphrodisiac) [28].

Therapeutic Uses

Recent advancement has shown that it is been used to treat palpitations, hypertension and heart diseases, which occurs due to hardening of arteries (*Salabath – e – Shiryani*) [18]. When silk thread is not extracted from Silk cocoon, cut by scissor into small pieces, decoction (3-10 g) is prepared which is used to treat palpitation and other cardiovascular diseases. Syrup and other compound formulation is used to treat diseases of eyes, Pneumonitis, Diphtheria, Memorigenic, Eczema. Moreover, its syrup can be used for the fairness of skin. Powdered is prepared by burning the silk cocoon that can be used to resolve Menstrual problems, Leucorrhoea, Gastritis & Chronic diarrhea [23, 24].

Sericin has antimicrobial, antioxidant, anticancer, coagulant, antityrosine, UV protection, as well as humidifying activities [25]. Mulberry silkworm cocoons carbonisata as a charcoal-based drug in traditional Chinese medicine used to relieve pain and halt bleeding [26].

Conclusion

The silkworm B. *mori*, the source of natural silk, from eggs to adults, has been reported to have wide potential in pharmaceutical, cosmetic and food industries. In addition to its economic importance arising from applications in agribusiness. The cocoon shell of the silkworm *Bombyx mori* consists of silk fibroin fiber (70 %) surrounded by a sericin layer made up of sericin (25 %) and non-sericin (5 %) components. Silk cocoon is one of the well-known naturally occurring agents with several therapeutic activities. In traditional medicine, silk cocoon is also known as a tonic for the heart, liver and use in various disease condition.

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Conflict of Interest

Not available

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