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Review Article

Jund Bedastar (Castoreum): Medicinal Potential of an Animal Origin Drug of Unani Medicine

Mohd Afsahul Kalam[1]*, Amjad Saifi[2], Mohd Naved[3] and Abdul Habib[3]

[1]Regional Research Institute of Unani Medicine, Naseembagh Campus, Habak, Srinagar, J&K, India

[2]Department of Moalajat, National Institute of Unani Medicine (NIUM), Bengaluru, Karnataka, India

[3]Department of Ilmul Advia, Regional Research Institute of Unani Medicine, University of Kashmir, Naseembagh Campus, Habak, Srinagar, J&K, India

***Corresponding Author:** Mohd Afsahul Kalam, Research Officer (Unani), Regional Research Institute of Unani Medicine (CCRUM, Ministry of AYUSH, Govt. of India), Naseembagh Campus, Habak, Srinagar, J&K, India.

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Abstract

Pharmaceutics in Unani System of Medicine (USM) comprises of medicinal plants, animal and minerals origin materials called Mawalid-i-Thalatha. The USM literature comprises description of many animal based drugs and medications, which was written by various imminent physicians. Jund Bedastar (castoreum) is one among the drug substances obtained from animal source. It is one of the most important drugs which have profound application in pharmaceuticals. It was used by Unani physicians since age old. It is used as main ingredient in various compound formulations such as Habb-i-Jund, Habb-i-Sar', Roghan Jund etc. This attempt has been made to accumulate all the scattered literature in one place for easy and better understanding and to explore the importance of Jund Bedastar with special reference to the therapeutic uses, adverse effect, substitution as per Unani perspective along with its bioactive compounds and pharmacological studies.

Keywords: Unani System of Medicine; Jund Bedastar; Epilepsy; Habb-i-Jund; Paralysis; Castoreum

Abbreviations

USM: Unani System of Medicine; WHO: World Health Organization

Introduction

In USM, the drugs are derived from natural sources i.e. Nabāt (plants), Mā'dan (minerals) and Haiwān (animals) which are collectively known as Mawālīd Thalātha (three sources). Apart from plants and mineral sources, a number of animal families provide drug and drug substances like Regmahi (*Scincus scincus*), Abresham (*Bombyx mori*), Qarn al-Aiyyel (Hart's horn), Mushk (*Moschus moschiferus*), Lulu (*Mytilus margaritiferus*), Sadaf (*Ostrea edulis*), Sangdana Murgh (ventriculus), Sartan (*Scylla serrata*), etc. These drugs have been used by Unani physicians since time immemorial to cure various ailments. Among them, Jund Bedastar is a well-known Unani drug obtained from the castor sacs of a semi aquatic animal (rodent) located between the pelvis bones of the both male and female beaver along with oil glands. In USM, this secretion is used medicinally to cure various diseases, from the time immemorial. Today, it is an important ingredient used by perfume industry. There are three grades of castor mentioned. One which is clean, pods with full of castoreum and no holes; second, with holes, large castor with only small amount of castoreum in

the pods, and that is too dry to be fractured; third, that are small, shells and too poor to be fractured. Dioscoroides (1st Century) has mentioned this drug with the name of Qasturiyun. This medicine came to the knowledge of Europeans in 17th century. The English word 'beaver' comes from the old English word Beofor or Befor and is connected to the German word Biber and the Dutch word Bever. The genus name Castor has its origin in the Greek kastor and translates as beaver. Beavers are large, semiaquatic rodents in the genus Castor. Generally, there are two species (1) North American beaver (*Castor canadensis*) and (2) European beaver (*Castor fiber*). American beavers are found throughout forested parts of North America to Northern Mexico, including the southwestern United States and northern Florida. Eurasian beavers were once found throughout temperate and boreal forests of the region (including Britain) except for the Mediterranean area and Japan. In the beginning of the 21st century indigenous populations survived only in the Elbe and Rhone river drainages, southern Norway, France, Mongolia, China, Northwestern Siberia and the Altai region [1]. One more species *Lutra lutra* L. (*Eurasian otter*) is obtained from the UK, South-West England, Scotland, Northern Ireland, Eurasia and North Africa. Beavers can be found in freshwaters habitats like rivers, streams, lakes and ponds. They are medium sized mammals; they have dense fur, valvular nostrils, enlarged hind feet, scaly, paddle-like tails, small eyes and ears. They are herbivorous, consuming tree bark, aquatic plants, grasses and sedges. Beavers hold territories and mark them using scent mounds which is made up of mud, debris and castoreum, this may advertise their defense area. Ecologists often refer beavers as 'ecosystem engineers' because of their ability to alter the landscapes in which they live [1]. Beavers have two pairs of glands known as castor sacs, which are part of the urethra and anal glands. These castor sacs secrete castoreum, which is a liquid substance used by beavers to mark their territory. Castoreum is an oily, viscid glandular secretion contained in two pairs of membranous sacs between the anus and external genitals of both sexes of beaver [1]. Pliny the Elder used castoreum for the treatment of dental pain, stomach ailments, flatulence, epilepsy, vertigo, sciatica and seizures. He also stated that it can be used to stop hiccups with vinegar. Castoreum has been used in medicine, perfume and food flavouring industries [2].

As per the classical Unani literature the exact source of Jund Bedastar is to be established, usually Udbilaw is said to be the source. For medicinal purpose Jund Bedastar, is ground either in dried form or with a suitable Arq or Roghan and then used as required in the respective formulas [3].

Material and Methods

For the preparation of this review, classical books of Unani medicine and printed and electronic publications were taken into account. The materials were searched by the name i.e. Jund Bedastar, castoreum, beaver, *Castor canadensis*, *Castor fiber* and *Lutra lutra* for its description, pharmacognostical characteristics, phytochemical constituents, pharmacological studies, etc. All relevant articles up to 2022 were referred including 17 Unani books, 03 website and 03 research papers published in PubMed, Science Direct Google Scholar and Research gate. Appropriate Unani Terminologies were taken from Standard Unani Medical Terminology Published by Central Council for Research in Unani Medicine in collaboration with the World Health Organization (WHO).

Animal classification

Classification

Kingdom: Animalia

Phylum: Chordata

Sub-phylum: Vertebrata

Class: Mammalia

Order: Rodentia

Family: Castoridae

Subfamily: Castorinae

Genus: *Castor*

Species: *Castor fiber* L.

Classification

Kingdom: Animalia

Phylum: Chordata

Class: Mammalia

Order: Carnivora

Family: Mustelidae

Subfamily: Lutrinae

Genus: *Lutra*

Species: *L. lutra* L.

Classification

Kingdom: Animalia

Phylum: Chordata

Class: Mammalia

Order: Rodentia

Family: Castoridae

Genus: *Castor*

Species: *C. canadensis*

Description in unani literature

It is a well-recognized drug of USM. It is testes of sea creature whose skin is called Qundus or Qundaz. This sea creature looks like small dog which lives with fishes and eats fishes, crabs, etc. but, it is not the species of sea dog. It has limbs, hairs are reddish black, body fatty, lives both in water and land. Jund Bedastar is found in pair which look like two leaves of climber and both are present in one sac. It is covered with a thin layer of skin. It is brittle in nature and can be break with mild rub. In Persian it is called Gand Bādastar, literally, Gand means testes, Bād means air and Astar means to cut i.e. a drug that resolves pneuma from the body. Its outer layer is thin which can be break even by touch and testes came out easily. After removal of sac, their wound heals-up easily and they remain live. They are found abundant in North Sea and Qafjan region. It is of three types: (1) yellow (2) red and (3) black. Yellow coloured is the best and used medicinally. Then strong odour red is recommended for medicinal use. Black is poisonous and fatal. According to Khajandi Unani Scholar it shelf- life is around 15 years [4]. Castoreum (part used) is a chemically complex secretion, stored in a sac found between the pelvis bones under the skin at the base of the tail, in both the male and female beaver. When the secretion dried, looks like honey. It is found in pair and looks like testes so called Khussiyah (testes) but in actual it is not Khussiya. These glands are known as castoreum and Jund Bedastar, which is believed to have many medicinal properties. It is adulterated in the market by mixing Jaoshīr (*Fraxinus ornus*), *Gond* (*gum acacia*) and Blood with Jund Bedastar and dried on the bladder [5].

Organoleptic (physical) characters

Colour: It is yellow or yellow-brown in colour [1]

Consistency: Butter-like [1]

Odour: Strong and non-tolerable [6]

Taste: Taste is sour and bitter [7]

Fracture: Easy to fracture (dried) [4]

Solubility: Soluble in alcohol [1] and ether [8]

Shape and Weight: It looks like Injir (*Ficus carica*) [8]

Mutaradifat (Vernacular names)

Arabic: Khusiya al-Bahr-i-Fahisha [9]

English: Castoreum [9,10]

German: Bibergeil [9]

Greek: Qasturiyun [9], Aksayanos, Fastra, Qastur, Qastura, Qasturin, Qasturiyus, Qasturas, Qandas, Qori, Qandus and Qairus [4]

Gujrati: Zinada Bedastar [9]

Hindi: Jund, Gindha [9]

Persian: Ash Sage Abi, Ash Bachgan, Khaya Tandra, Khazmayan, Gand Badastar, Gand Bedastar [4,9,10]

Sindhi: Ladhre ja Khushiya [10]

Urdu: Jund Bedastar [9]

Roman: Aorash [4]

Ajza-i-Musta'mala (parts used)

Resinous secretary matters collected in a perianal sac is used for medicinal purpose.

Mizaj (temperament)

According to Masīh Ibn Hakam, its temperament is hot 3rd degree and dry in 3rd degree [4,8], hot 3rd degree and dry 2nd degree [10], hot 2nd degree and dry 2nd degree [8], hot 4th degree and dry 3rd degree [8], hot 4th degree and dry 2nd degree [5].

Khalis (purity)

Allama Qutubudin Shīrazi had written in Sharah-i-Kulliyat Qanun that pure and original Jund Bedastar is enclosed in leather sac, black in colour neither dark black nor faded, fatty, strong smell, tasteless and adulterated one is white, easy-to-break, less smell and has salty taste [8].

Af'al (action)

Jund Bedastar temperament is hot and dry but has supreme lightness, hence it is more potent than other hot and dry temperament medicines. No other medicines of hot and dry temperament can produce hotness and dryness in cold and wet body as compared to Jund Bedastar [8]. It has Muḥallil (resolving), Mujaffif (siccatrizant), Musakhkhin (calorific), Mujaffif (desiccant) Mulaṭṭif (demulcent) [4], Muqawwi-i-A'sāb (nerve tonic), Muharrik-i-A'sāb (nerve stimulant), Taryāq-i-Samum Bārida (antidote of cold toxins), Kāsir-i-Riyāh (carminative), Mudirr-i-Bawl (diuretic), Mudirr-i-Ḥayḍ (emmenagogue), Musakkin Awja' (analgesic) [10], Mufattih Sudad (deobstruent), Muqawwī-i-Rahim (uterine tonic), Musleh Rahim (corrective of uterus), Dāfi'-i-Tashannuj (anticonvulsant) and Dāfi'-i-Ta'affun (antiseptic) properties [9].

Iste'malat (uses)

It is used for the treatment of Awarām (inflammations), Qurūḥ (ulcers), Buthūr (boil), Jarha (wound), Amrād-i-A'sāb (nerve diseases), Amrād-i-Balghami (phlegmatic diseases), Amrād-i-Rehi (diseases caused by gas), Du'f-i-A'sāb (nerve weakness), Fālij (hemiplegia), Laqwa (bell's palsy), Ra'sha (chorea), Tashannuj Ratab, (spasm), Sar' (convulsion), Kuzāz (tetanus), Istirkha (flaccidity), Sarsām Balghami (cold meningitis), Shaqīqa (migraine), Suda' (headache), Waja' al-Mafāsil (arthritis) etc. [11]. It is used in the treatment of infantile convulsion (Umm al-Sibyān). It is also used in the treatment of Afiyun (opium) addiction and in the scorpion bite [9].

Tarkib-i-iste'mal (mode of administration)

Amrāḍ-i-Ra's wa A'sāb (diseases of brain and nerves)

- Ṣudā'(headache): Sa'ut (snuff) of Jund Bedastar is beneficial in Ṣudā' which occurs due to cold and also for Balghami (phlegmatic) diseases of head. Its Ḍimād (paste) or Dhūnī (fumigation) is used to treat headache originated from Rīh (flatus) [11].

- Lītharghas (chronic meningitis): Jund Bedastar along sirka (vinegar) and Roghan-i-Gul (rose oil) is beneficial in Lītharghas and Subāt (coma). If fever is present in Lītharghas, then it can be used with Filfil Siyāh (Piper nigrum) and honey [6,9].

- Subāt (coma) with Tap (fever): Powder of Jund Bedastar mixed with Piper nigrum and honey is used for the treatment of Subāt (coma) with Tap (fever) [11].

- Ṣar' (epilepsy): For the treatment of epilepsy, it is mixed with any oil and applied on the head [6].

- Umm al-Ṣibyān (infantile epilepsy): For the treatment of infantile convulsion, it is applied into nostrils [6].

- Ra'sha (tremor): Oral use of castoreum or giving fumigation on affected part is beneficial for tremor or chorea [6].

- Istirkhā (atony/flaccidity): It is mixed with suitable oil and applied in Khadar (numbness), Istirkhā (atony/flaccidity) [6].

- Fālij (paralysis): It is beneficial for paralysis, when it mixed with suitable oil and applied as massage [6].

Amrāḍ-i-Udhun (diseases of ear)

It is useful in the deafness due to cold; it is also beneficial in the accumulation of gas in ear (Rīḥ al-Udhun). It is applied in the quantity of Masūr (*Lens culinaris*) dissolved in Roghan Nardīn (oil of *Valeriana wallichii*) and pour in the ear [6].

Dard-i-Gosh (earache)

- Pain in the cartilage of ear which occurs due to Burūdat is benefitted by Jund Bedastar [11].

- Jund Bedastar in the dose as lentils mixed with Roghan Nardīn (*Valeriana officinalis*) and put in the ear is the best remedy for earache due to Rīḥ [11].

Amrāḍ-i-'Ayn (diseases of eyes)

Surma (corylum) of Jund Bedastar increases vision [6].

Amrāḍ-i-Liththa wa Asnān (diseases of gingiva and tooth)

Toothache can be relieved when Castoreum mixed with oil is poured in the same side of ear [2].

Amrāḍ-i-Ri'a (lungs)

Its fumigation and smelling has a resolving action on the inflammatory conditions of the lungs which occurs due to cold [4,11]. It is also used in the treatment of breathlessness occurs due to poisoning of Kharbaq (*Helleborous niger*) [6].

Amrāḍ-i-Qalb wa Dawrān-i-Khūn (cardiovascular)

Its enema has a therapeutic effect in the palpitation of cold origin [6].

Fuwāq (hiccups)

Jund Bedastar dissolved in honey water is taken to checks hiccough which occurs due to phlegm and flatulence [4].

Waja' al-Baṭn (abdominal pain)

If it is taken with vinegar, it is useful in the irritation of intestine, anal pain and tenesmus [4].

Niẓām-i-Ālāt Bawl wa Tanāsul (genitourinary system)

- If it is put in the urethral orifice of male patient, it helps to benefits in the flow of Balghami urine [4].
- Around 7 to 9 g Jund Bedastar with Podina Nahri (*Mentha spicata*) or Barri taken along Ma al-'Asal (honey water), this formulation is powerful emmenagogue. This formulation is used after venesection of saphenous vein [4].
- Along sirka (vinegar), it is used to induce menstruation, cures tenesmus, expels fetus. After venesection of saphenous vein, Jund Bedastar along honey or extract of Podina (*Mentha arvensis*) used as emmenagogue, abortificiant and to expels placenta [9].
- If it is put as vaginal suppository helps to treat coldness of uterus and dissolves Riyah [4].
- Istirkhā'al-Qaḍīb' (erectile dysfunction): It is used in the form of Tila (a liquid formulation for local application) to stimulate the nerve which helps in the erection of male sex organ [9].
- If 10 g Jund Bedastar with Mentha arvensis is consumed, menstrual flow increases and it expels placenta also [6].

Amrāḍ-i-Mafāṣil (diseases of joints)

- The pieces of skin of Jund Bedastar placed beneath the foot is useful in the treatment of Niqris (gout) [6].
- Local application of castoreum after mixing with suitable oil is beneficial for gout [6].

Taryaq-i-Samum (antidote)

Its consumption is useful in the management of poisoning due to intake of cold temperament poisons of animal or plant origin. It is an antidote of opium poisoning [6].

Miqdar Khurak (dose)

The therapeutic dose of *Jund Bedastar* is 500 mg to 1 g [10]. But the recommended dose is up to 3 g along other medicines. If it is given alone, then its dose is 10 mg to 875 mg. according to some scholars it is fatal in a dose of 6 g [8].

Mazarrat (adverse effects)

It is harmful for the person having hot temperament [10]. Symptoms of acute toxicity is dry mouth, papules eruption on tongue, chest pain, and breathlessness like asthma or diphtheria, bleeding from natural orifices, delirium, restlessness, if not treated, then it may proceeds to meningitis. In this situation, vomiting is induced with the decoction of Soya (*Anethum graveolens*), Podina (*Mentha arvensis*), Sapistan (*Cordia myxa*) and *Shahad* (honey). After vomiting, patient is given lemon as it is antidote. Other citrus fruit or vinegar or milk of female donkey (Jenny) is also given [8]. Black variety of Jund Bedastar in the quantity of 3.5 g orally may cause death within 24 hours [6].

Musleh (correctives)

Roghan Kaddu (*bottle gourd* oil), Katira (*gum tragacantha*) [10], Sharbat Banafsha etc. can be used as correctives.

Badal (substitutes)

Waj (*Acorus calamus*) [10], Filfil Siyah (*Piper nigrum*) [11], Zarambad (*Curcuma zurumbet*) and Mushk (*Moschus moschiferus* L.) are used as substitute for different diseases according to their particular actions.

Murakkabat (Compound formulations)

Various compound formulations having Jund Bedastar as one of the most important ingredients are Afloniya Farsi; Anqardiya Kabir; Habb-i-Jund, Habb-i-Favaniya, Habb-i-Sar';Majun Murawwah al-Arwah, Majun Sa'lab; Sanjrina etc. (see detail in Table 1).

Table 1: Compound formulations of *Jund Bedastar* with their doses, action and indications.

S.N.	Compound formulations	Dose and mode of use	Action and indication
1.	Afloniya Farsi	1 Dirham (3.5 g) orally	Brain tonic, increases memory, headache, uterine tonic, reduce flatulence, foetus protective, analgesic [12]
2.	Anqardiya-i-Kabir	4g with 12g Arq-i-Badiyan (*Foeniculum vulgare* extract) or fresh water (empty stomach in the morning) orally	Paralysis, Bell's palsy, epilepsy, dementia, phlegmatic disorders [13]
3.	'Atus	Blow the powder in the nose with the help of pipe as required.	Paralysis, apoplexy, Bell's paralysis, phlegmatic diseases of brain, helps in expulsion of placenta [12,14]
4.	Dawa-i-Mudirr-i-Hayd	5g orally	Amenorrhea [3]
5.	Habb-i-Afiyun	125 mg to 250 mg orally	Cold and catarrh [15]
6.	Habb-i-Fālij Mulaiyyin	5 to 10g orally	Paralysis, Bell's palsy, constipation, weakness of nerve [16]
7.	Habb-i-Istarkha wa Sar'	2.5 Dirham (8.75 g) orally	Chorea [12]
8.	Habb-i- Jund	125 mg to 500 mg orally	Infantile epilepsy, epilepsy, paralysis [7,16]
9.	Habb-i-Favāniya	125 mg to 250 mg orally	Chorea, convulsion [17]
10.	Habb-i-Favāniya Mushil	125 mg to 250 mg orally	Epilepsy [17]
11.	Habb-i-Mumsik Qawi	125 mg to 250 mg orally	Sexual weakness, premature ejaculation [16]
12.	Habb-i-Muntan Kabir ba Naw'	2 *Dirham* (7 g) orally	Paralysis, colitis, Bell's palsy, gout, resolve *Riyah Galeez* and *Kham Balgham,* polyarthragia [12]
13.	Habb-i-Musakkin	0.5 *Dirham* (1.75 g) to 1 *Misqal* (4.2 g) orally	If there is possibility of syncope due to severe pain of colitis. It provides immediate relief [12]
14.	Habb-i- Ra'sha	3 g orally	Chorea, tremor [3]
15.	Habb-i-Sakta	3 to 10 g orally	Stroke [3]
16.	Habb-i-Sar'	Children: 1 pill grounded in the mother's milk (morning) orally Adult: 3 pills with fresh water in the morning orally	Epilepsy, Um-us-Sibyan (infantile epilepsy) [13]
17.	Habb-i-Sar' Khas	1 pill twice daily orally	Epilepsy, infantile convulsion [18]
18.	Habb-i-Ushaq	1 to 3 g orally	Asthma [17]
19.	Habb-i-Zahir	2 *Dirham* (7 g) orally	Chronic diarrhoea [12]

20.	Iyarij-i-Loghaziya	5 to 10 g	Epilepsy, Bell's palsy, paralysis, headache, leucoderma, leprosy, sciatica, gout, scrofula, polyarthralgia [16]
21.	Jawarish Shahnshāhi Ambari	5 to 6 g with Arq Gajar (extract of *Daucus carota*) 60 ml or Arq Amber 60 ml or Arq Gaozaban (*Onosma bracteatum*) 84 ml or fresh water (morning) orally	Palpitation, brain and cardiac tonic, gastralgia, flatulence [13]
22.	Ma'jūn Badmoraj	2 Dirham (7 g) to 2 Misqāl (8.4 g) orally	Cold temperament of stomach and uterus, Ghaleez Riyāḥ, amenorrhoea [12]
23.	Ma'jūn Biladur Muhammad Zakriya	5 g orally	Epilepsy, chorea [12]
24.	Ma'jūn Fiqra	1 Nakhūd to Dirham (3.5 g) orally	Epilepsy, paralysis, palpitation (cold), gastralgia (cold), hiccup (congestive), obstruction [12]
25.	Ma'jūn Ibn Ebad	1 Misqāl (4.2 g) orally	Hiccup, dyspepsia [12]
26.	Ma'jūn Jograj Guggal	3 to 5 g	Paralysis, Bell's palsy, tremors, syphilis, polyarthritis [13]
27.	Ma'jūn Mia'	2 Dirham (7 g) orally	Chronic dysentery [12]
28.	Ma'jūn Murawwah-al-Arwah	1 g with Ma-ul-Laham do Atsha (60 ml) or milk (250 ml) orally	Sexual weakness, weakness of vital organs [13,19]
29.	Ma'jūn Akhtilaf	0.5 Dirham (1.75 g) with extract of Behi (*Cydonia oblonga*) or cold water or extract of Sumaq (*Rhus coriaria* L.) orally	Phlegmatic diarrhoea and dysentery [12]
30.	Ma'jūn Aswad	1 Dirham (3.5 g) with extract of Murad (*Myrtus communis*) or Behi (*Cydonia oblonga*) orally	Dysentery, chronic diarrhoea [12]
31.	Ma'jūn Ruba'	5 g orally	Episodic fever [12]
32.	Ma'jūn Salab	7 to 12 g with milk in the morning orally	Sexual weakness, nerve tonic, spermatorrhoea, low viscosity of semen [13]
33.	Ma'jūn Suqrat	7 g to 24 g orally	Epilepsy, phlegmatic and melancholic diseases, headache, tonic of brain, kidney and heart, general weakness, melancholia, Junūn (insanity), dementia, tuberculosis, diarrhoea, wound, gout, chronic cough, leukoderma, pain of stomach, liver and spleen, jaundice, elephantiasis, pleurisy, quatrain fever, aphrodisiac, haemorrhoids, vision loss, calculus of kidney and bladder [14]
34.	Qurs Īlā'ūs	1 Misqal (4.2 g) orally	Dynamic intestinal obstruction [12]
35.	Qurs Anisun	3 g orally	Gastralgia [3]
36.	Roghan Jund	1 to 2 drop in children for oral use	Epilepsy, hysteria, infantile epilepsy [17]
37.	Roghan Mubarak	Suppository	Uterine cold temperamental diseases, resolve Ghaliz Riyāḥ [12]
38.	Sanjrina	4 Ratti (500 mg) to 9 g orally	Produce heat to stomach, dyspepsia, deobstruct the liver obstruction, gastralgia, dental pain, decay of teeth, colitis, dysuria [14]

39.	Shiyāf Farfiyun	Suppository	Aphrodisiac, hernia, bladder weakness, increase frequency of urination [12]
40.	Shafa Jund Bedastar	Use internally as required	Clear intestine from phlegm [12]
41.	Tiryāq-i-Asnan	Local application, as required	Dental pain due to cold.
42.	Tiryāq-i-Baligh un Nafa'	2 to 3 g orally	Opium poisoning, antidote of poison of cold temperament [12,17]
43.	Tiryāq-i-Afiyun	2 to 3 g orally	Opium poisoning [17]
44.	Tiryāq-i-Aqrab	3 to 5 g orally	Scorpion bite, colitis, abdominal pain, visceral pain [17].

Bioactive compounds

Around 24 chemical compounds have been isolated from beaver castoreum. Some of them are phenols 4-ethylphenols and catechol. But ketones acetophenone and 3-hydroxyacetophenone are the strongest pheromones. There are other five compounds which showed lesser response are 4-methylcatechol, 4-methoxyacetophenone, 5-methoxysalicyclic acid, salicylaldehyde and 3-hydroxybenzoic acid. Oxygen containing compounds i.e. monoterpenes, such as 6-methyl-I-heptanol, 4, 6-dimethyl-I-heptanol, isopinocamphone, pinocamphone. Also, two linalool oxides and their acetate are present. Other compounds are: benzoic acid, benzyl alcohol, borneol, O-cresol, 4-(4'-hydroxyphenyl)-2-butanone, hydroquinone, phenol. It also contains nupharamine alkaloids and castoramine and c/s-cyclohexane-1, 2-diol [20].

Pharmacological studies

Anticonvulsant activity

In both MES and PTZ-induced convulsions, the formulation Habb-i-Jund (HJ) demonstrated considerable antiepileptic action in a dose-dependent manner. The outcomes point to the GABA/benzodiazepine receptor complex's Cl^- channel as the mediating mechanism for the formulation of anticonvulsant effects. Anticonvulsant action was not observed at lower doses (30 mg/kg), but 100 mg/kg of the formulation considerably lowered the seizure threshold and decreased the likelihood of death. The inhibition of MES-induced convulsions predicts activity against generalized tonic-clonic seizures (Grandmal epilepsy) and cortical-focal seizure and inhibition of PTZ-induced convulsions against partial or absence seizures. This study signifies the beneficial role of HJ in generalized tonic-clonic and absence seizures. HJ in Unani system of medicine is prescribed only for febrile convulsions. This study showed its beneficial effects even in generalized tonic-clonic and absence seizures [21].

Antioxidant activity

The free radical scavenging activity of Habb-i-Jund (HJ) was evaluated through its ability to reduce the DPHH using ascorbic acid (AA) as standard. The HJ showed free radical scavenging activity and the IC_{50} values of HJ and AA were found to be 83 ± 6.6 µg/ml and 20.3 ± 2.3 µg/ml, respectively. HJ interfered with chelation of Fe^{2+} ions in a dose dependent manner reducing the intensity of the colour of Fe^{2+} ferrozine complex. Concentration of inhibition 50% of metal chelation by HJ was found to be 60 ± 6.2 µg/ml and that of disodium EDTA was 10.7 ± 0.6 µg/ml [22].

Habb-i-Sar', a compound having Jund Bedastar showed considerable antiepileptic and antioxidant activity. By its free radical scavenging and metal chelating activity, Habb-i-Sar' besides antiepileptic activity, might reduce the free radical generation and quench the radicals already formed and inhibit neuronal damage. The free radical scavenging activity of Habb-i-Sar' was evaluated through its ability to quench the DPPH using ascorbic acid as standard. Habb-i-Sar' showed free radical scavenging activity and the IC_{50} values of Habb-i-Sar' and amino acid (AA) were found to be 83 ± 6.6µg/ml and 20.3 ± 2.3 µg/ml, respectively.

Metal chelating activity

The chelation of ferrous ions was estimated by method of Dinis., *et al*. To the tubes containing 1.7 ml of deionized water, 50 µl of 0.2 mM $FeCl_2.4H_2O$ and 50 µl of different concentrations of Habb-i-Sar' (20, 40, 60, 80, 100 µg/ml) were added mixed and kept aside for 1 minute. The reaction was initiated by the addition of 0.2 ml of 5mM ferrozine, mixed on a vortex mixer and after 10 min the absorbance of the solutions were measured at 562 nm in a UV-Vis Spectrophotometer. All tests and analyses were made in triplicates. Concentration for Inhibition 50% of metal chelation by Habb-i-Sar' was found to be 60 ± 6.2 µg/ml and that of disodium EDTA was 10.7 ± 0.6 µg/ml [23].

Results and Discussion

In USM, animal origin drugs have a pivotal role in the management of incurable diseases, as is clear from the review. Enormous research on animal origin drugs had been done by Unani physicians, and it was thoroughly documented in the traditional Unani literature. Jund Bedastar is one of the prime important drugs in USM. In traditional Unani medicine, the classical textbooks Muheet-i-Azam, Kitab-ul-Mukhtarat fi'l Tibb, Al-Jami Li Mufradat al-Advia wa al-Aghzia and Qarabadeen Qadri contain a description of Jund Bedastar. In the first phase of this review, we identified the Jund Bedastar and its different zoological sources as mentioned in both classical Unani and modern books. It is interesting to note that Jund Bedastar have been used by Unani physicians in the treatment of brain, nerves, ears, eyes, lungs, gastrointestinal, cardiovascular, genitourinary and joint diseases. It has been documented by various scientific studies as mentioned in this review paper. Its role in treating various ailments as stated in his review may be due to the presence of ketones, phenols, oxygen containing compound, monoterpenes, alkaloids nupharamine and castoramine. The present review is important because it provides a comprehensive overview of the identification, classification, purity, action, therapeutic uses, dose, toxicity and scientific studies of Jund Bedastar containing compound formulations.

Figure 1: Showing dried Castoreum (Jund bedastar) in the sac, obtained from market.

Conclusion

Based on the information amassed as above, it can be concluded that drugs and substances obtained from animal sources have always played a significant role in the healing practices in USM. However as compared to the documentation in Unani literatures the therapeutic use of animal origin drugs has been little researched. Thus the present article is an attempt to document all the information of castoreum regarding its medicinal uses, compound formulations and scientific researches. Sufficient information in respect of morphological, physicochemical and medicinal properties of Jund Bedastar is available but very few scientific studies have been conducted. So there is a need for extensive scientific studies to validate most of the claims of USM regarding Jund Bedastar.

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