TANG [HUMANITAS MEDICINE]

Review article

Cuttlefish bone/ sepia officinalis (kafe dariya): recovery of long forgotten Unani drug

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ABSTRACT

A cuttlefish bone is not a bone, but the internal shell of the Cuttlefish/ sepia officinalis, a small, squid-like cephalopod of phylum molusca, an animals of the order Sepiida. Cuttlefish bone comprises up to 90 percent of its content of calcium carbonate with the abundance of different bioinorganic elements such as magnesium, strontium, iron, even trace amounts of copper, zinc, aragonite and β-chitin which makes it extremely valuable and worthwhile to be used for biomedical research. Unani system of medicine has been using cuttlefish bone under the name of 'kafe dariya' for the treatment various disorders and ailments since centuries. Unani scholars were well aware of the valuable medical and cosmetologically aspect of cuttlefish bone. However, the drug has been forgotten for its beneficial effect and went deep away from the scientific researches. The purpose of the present review is to highlight and revive the data on cuttlefish and cuttlefish bone for its morphology, composition, types, pharmacological actions, temperament, therapeutic dosage, contraindications, correctives, alternatives and therapeutic uses with special reference of Unani medicine to attain its the beneficial features in biomedical sciences.

Keywords Sepia, cuttlefish bone, kafe dariya, Unani medicine, sepia officinalis

INTRODUCTION

Cuttlefish/ sepia officinalis are animals of the order Sepiida, and are marine cephalopods of phylum molusca, small relatives of squids and nautilus. (Checa AG, 2015; Kalhage A, 2018; Anonymous, 2018)

The calcareous internal shell of the sepia is called as cuttlefish bone. In the cuttlefish, the cuttlefish bone is filled with gasses and helps control the fish's buoyancy in the water. While for years people have harvested and used cuttlebones for various purposes, the most widely recognized use of the cuttlebone is as a supplement and exercise toy for bird. (Kalhage A, 2018; Verma PS, 2002) The cuttlebone is a lightweight, oblong, chalky object that is mainly composed of calcium making it an ideal way to supplement a birds' calcium intake. In cuttlefish bone, calcium carbonate comprises up to 90 percent of its composition, which makes it extremely valuable is aragonite, β-chitin and the abundance of different bioinorganic elements, such as magnesium, strontium, iron, even trace amounts of copper and zinc. All these elements are naturally combined by their optimal amounts in the bone structure. (Anonymous, 2018; Kotpal RL, 1985-86; Lal SS, 1911)

Cuttlefish bone is also known by the name of 'kafe dariya' in Unani medicine due to its resemblance to 'froth of the sea'. It is used as a drug of mineral origin in Unani medicine as a treatment in variety of the diseases. (Hakim A, 1911; Ghani N, 1920; Karim N, 1980) However, the drug lost deep down from the scientific world since decades, lacking researches on its therapeutic potentials.

Scientific classification (Checa AG, 2015; Kalhage A, 2018; Anonymous, 2018; Verma PS, 2002; Kotpal RL, 1985-86; Lal SS, 1911; Hakim A, 1911**)**

Phylum : Molusca
Class : Cephalopoda
Subclass : Dibranchia
Order : Decapoda
Genus : Sepia

Vernacular names (Checa AG, 2015; Kalhage A, 2018; Anonymous, 2018; Verma PS, 2002; Kotpal RL, 1985-86; Lal SS, 1911; Hakim A, 1911)

Common name :Os Sepia, sea biscuit, cuttlefish shell (bone)
English : Cuttlefish bone, sea froth
Latin : Sepia officinalis
Arabic : Zabdul bahr, queetman
Urdu : Samundar jhag
Hindi : Dariya ka kaf
Persian : Kafe dariya
Sanskrit :Samundra kaf, jal bas, phenk, udbimal, shupatdhama, samundar phena, thandar, phen, dindir, dhandhiyahoo, abid kaf, arnvajmal, arnavaj, sindhu kaf, sindeer, lavasandhavisembhav, vardhiphen, papudhijsu phen, abidh dindeer samundra, shushank, dadhi phen, sarmal
Unani : Farenoon
Roman : Qatumas, plasiyus

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Sepia/ cuttlefish (Verma PS, 2002)

Phylum: Molusca : Body unsegmented, bilaterally symmetrical and consist of head, foot, mantle and visceral mass. Comprising such a diverse forms as: whales, snails, slugs, oysters, cuttle fishes, squids, octopodes, nautilus etc.

Class : Cephalopoda : Head bears large eyes and mouth, foot modified into arms and tentacles encircling the mouth.

Subclass: Dibranchiata : Shell internal and reduced. Foot modified into 8 or 11 suckers. Being arms; ink gland present; Gills, kidneys, auricles and branchial hearts are two in numbers.

Order : Decapoda : Arm 10, of which 8 short and 2 long, 8 smaller arms bear stalked suckers; shell internal and well developed; nidomental glands usually present.

Habit and habitat

Sepia is commonly found in sea in India, very favorite classroom specimen and a very good animal to study the nervous system. Commonly called as cuttlefish. (Kotpal RL, 1985-86)

Kafe dariya or sepia is a marine cephalopod, found in coastal waters in coral reefs. It is a good swimmer. It is usually swim at night and rest flat on the bottom during day time. It can also burrow by using fins as shrouds. It is carnivorous, living on small fishes, crustaceous and other animals, of shallow to mid water forms. Sexes are separate, the males are slightly smaller. In male, fourth arm is hector-cutilized. Single kidney is excretory organ. A pair of gills performs the respiratory functions. (Lal SS, 1911)

Source and collection

Kafe dariya is the internal shell of cuttlefish, Sepia officinalis Linn, order dibranchiate, family sepidae, a large mollusk commonly found round the coast of Great Britain and abundant in the Mediterranean and Atlantic seas and in Indian oceans. (Lal SS, 1911) It is found in Persian sea and in 'Dariya-e-Kulzum'. (Lal SS, 1911; Hakim A, 1911; Ghani N, 1920; Karim N, 1980) It is a backbone of aquatic animal. (Baitar I, 1985; Safiuddin A, 1999; Kabiruddin H, 1935)

Collection

The animal consist of flattened ovoid body, about 20 by 15cm with two lateral extensions or fins. Body is fleshy, brownish and differentiated head and visceral hump or trunk. It is truncated anteriorly where the narrow head is attached having the mouth at the center, eight arms each about 13cm long and two tentacles about 45cm long, surrounded by the mouth which is provided with two large powerful Horney beaks. The shell is contained in the muscular mouth beneath the skin of the dorsal surface. When the animal die, the bodies decay and the shell are liberated, being eventually thrown up by the sea and are collected from the sea-shore. (Lal SS, 1911; Wallis TE, 1935)

The collection of bones carried out during the monsoon when cuttlefish drift a shore. (Anonymous, 1988)

Description

The kafe dariya shells are oblong-ovoid and lenticular about 10-25cm long, 4-8cm wide and 1.5-3cm in maximum thickness. They are biconvex or sometimes planoconvex, the greater convexity being on the outer side. The outer most layer is calcareous and white, about 0.1mm thick and bears rounded tuberculation's and rugae about 1mm wide and 0.5mm apart. Beneath this is a yellowish chitinous layer of which is about 45-100mm in thickness. This inner part is easily crushed by moderate pressure and retains the form of the indentation. The three outer layer project as a thin margin about 3mm wide, becoming wing like below where the inner layers tapper off rapidly to a rounded point or mucro. The shell is practically odorous and taste is earthy and slightly saline. (Kabiruddin H, 1935; Wallis TE, 1935)

Microscopic structure

The outer calcareous layer is compact and crystalline; the remaining chitinous layer stains deep yellow with trinitrophenol (picric acid). The remaining 50-100 parallel calcareous layer are about 7µ thick and are separated by spaces about 300-450 µ wide. Between the layers and at right angle to them are numerous short wavy membranes about 1µ thick which gives the appearance in a transverse section of the shell of numerous pillars, separated by intervals of 100µ. These delicate corrugated membranes marked by five transverse striations. (Wallis TE, 1935)

In the powder, fragments of three kinds are visible;

a) Delicate fragments showing transverse striation.
b) Flat more or less angular pieces of thin calcareous plates, showing numerous short wavy surface markings where the supporting membranes were attached.
c) Sharply angular pieces of chitinized layer, which are structureless, stony built and stain yellow with trinitrophenol (picric acid), it dissolves with the exception of chitinous fragments. (Wallis TE, 1935)

Special features

Animal has an ink sac (ink gland) over posterior-ventral surface. It ejects 'ink' by its 'ink-gland' in sea water when irritated. The 'ink' is secreted from a pear shaped ink-sac; the ink is called as 'sepia ink'. (Anonymous, 1988) The ink is black colored. (Maheshwari, YNM)

Economic importance

It is used for food in the Mediterranean countries and 'ink' has medicinal value. The collection of bone during monsoon is a minor industry, in some part of the Indian coast. (Anonymous, 1988)

Types of sepia

In Unani literature, many varieties of 'kafe dariya' or 'samundar jhag' have been mentioned.

Ibne Baitar has mentioned five varieties of kafe dariya while Boor Karima and Ghani have described six varieties.

Type one is called 'isfungy' (spongy) due to its resemblance in appearance to sponge, it smell fishy. The second variety is called 'zafari' (zafratul oyoon) which bears many pores (openings) and smell like algae, light weighted and whitish. The third one is somewhat bluish and lighter called 'doodi' and some people called it 'heelsoon' or 'seenoon' and in shirazi it is called 'kirm aboob' due to its resemblance to worm. The fourth variety is called 'soofi' or 'qayoon' which is wool like and bears numerous openings and cavities, yellowish-white and filled with muds. The fifth one is whitish, odorless, smooth at upper side and under surface (inferior side)(is rough. The sixth one is thick and it is one finger in broadness or more, odorless, salty in taste and it is composed of many layers and it is hard, below which a material composed of lime is found. It has black color skin at its back and bears some prominences, similar to its dorsal vertebrae

and these vertebrae seems to be the base of that black color thing. It is about 10 inches in length and it is called 'kastooori' in Hindi. (Ghani N, 1920; Karim N, 1980; Baitar I, 1985)

The fifth variety is better because it is more hot and powerful in actions. (Ghani N, 1920; Karim N, 1980; Baitar I, 1985) Galen (Jalinoos) has mentioned that the fourth variety is better from others due to its hotness in mizaj (temperament). (Ghani N, 1920) The pinkish colored variety was mentioned better by some other Unani physicians. (Ghani N, 1920; Karim N, 1980; Qaf I, YNM)

Temperament

a) Hot Dry (3o) (Hakim A, 1911; Ghani N; 1920, Karim N, 1980; Qaf I, YNM)
b) Hot Dry (2o) (Baitar I, 1985)
c) Hot Wet (1o) (Sina I, 1930)

Taste: It tastes salty. (Hakim A, 1911)

PHARMACOLOGICAL ACTIONS

Table 1. Pharmacological actions of cuttlefish bone

S.No	Actions	References
1.	Analgesic (*musakkin alam*)	Aziz A, 1994; Bashir A, YNM; Nadkarni, 1976
2.	Antacid (*dafe hurqatul meda*)	Wallis TE, 1935; Sina I, 1930; Nadkarni, 1976
3.	Anti-emetic (*dafe qae*)	Hakim A, 1911; Ghani N, 1920; Aziz A, 1994
4.	Anti-hemorrhagic (*habisud dam*)	Sina I, 1930
5.	Anti-inflammatory (*muhallil*)	Hakim A, 1911; Ghani N, 1920; Sina I, 1930; Aziz A, 1994
6.	Anti-scarring	Ghani N, 1920; Sina I, 1930
7.	Appetizer (*mushtahi*)	Ghani N, 1920
8.	Astringent (*qabiz*)	Nadkarni, 1976
9.	Concoctive (*munzij*)	Sina I, 1930
10.	Detergent (*jali*)	Hakim A, 1911; Ghani N, 1920; Karim N, 1980; Baitar I, 1985; Safiuddin A, 1999; Kabiruddin H, 1935; Aziz A, 1994
11.	Digestive (Hazim)	Hakim A, 1911; Ghani N, 1920
12.	Diuretic (*mudir baul*)	Hakim A, 1911; Karim N, 1980; Qaf I, YNM
13.	Eliminator (*munaqqui*)	Baitar I, 1985; Sina I, 1930
14.	Emmenagogue (*mudir haez*)	Hakim A, 1911; Ghani N, 1920, Karim N, 1980; Kabiruddin H, 1935; Qaf I, YNM
15.	Emollient/ relaxant (*murakhi*)	Sina I, 1930
16.	Hair remover (*halaiq*)	Hakim A, 1911; Ghani N, 1920; Karim N, 1980; Baitar I, 1985
17.	Laxative (*mulayyin*)	Ghani N, 1920; Sina I, 1930
18.	Purgative (*mus'hil*)	Sina I, 1930
19.	Siccative (*mujaffif*)	Sina I, 1930; Bashir A, YNM
20.	Stone crusher and remover (*mufttih wa mukhrije hasat*)	Hakim A, 1911; Ghani N, 1920; Karim N, 1980; Baitar I, 1985; Qaf I, YNM; Aziz A, 1994
21.	Weight reducer	Hakim A, 1911; Ghani N, 1920; Karim N, 1980
22.	Wound healer (*mudammil qurroh*)	Ghani N, 1920; Sina I, 1930

THERAPEUTIC USES

Table 2. Therapeutic uses of cuttlefish bone

S.No	Uses	References
1	Acne	Ghani N, 1920; Karim N, 1980; Baitar I, 1985; Kabiruddin H, 1935; Khan A, 1898; Chughtayee GM, Fasihuddin, 1995
2	Alopecia areata	Karim N, 1980; Baitar I, 1985; Qaf I, YNM
3	Aphthous ulcer	Sina I, 1930
4	As bait	Ghani N, 1920; Karim N, 1980; Anonymous, 1988
5	As tooth paste	Karim N, 1980; Safiuddin A, 1999; Kabiruddin H, 1935; Qaf I, YNM; Aziz A, 1994
6	Ascites	Hakim A, 1911; Ghani N, 1920; Baitar I, 1985; Sina I, 1930; Aziz A, 1994; Bashir A, YNM
7	Backache	Karim N, 1980
8	Boils	Ghani N, 1920
9	Calculous	Karim N, 1980; Baitar I, 1985; Qaf I, YNM
10	Chloasma/ black and white spots	Hakim A, 1911; Ghani N, 1920; Karim N, 1980; Baitar I, 1985; Safiuddin A, 1999; Kabiruddin H, 1935; Qaf I, YNM; Aziz A, 1994,
11	Conjunctivitis	Ghani N, 1920; Nadkarni, 1976
12	Corneal opacity	Hakim A, 1911; Safiuddin A, 1999; Kabiruddin H, 1935; Aziz A, 1994
13	Cough	Sina I, 1930
14	Dysuria	Karim N, 1980; Baitar I, 1985
15	Eczema	Bashir A, YNM
16	Exfoliation	Baitar I, 1985
17	Eye ache	Nadkarni, 1976
18	Gingivitis	Sina I, 1930
19	Gout	Aziz A, 1994
20	Headache	Karim N, 1980
21	hemoptysis	Sina I, 1930
22	Itching	Hakim A, 1911; Ghani N, 1920
23	Jaundice	Ghani N, 1920
24	Loosening of vaginal muscle	Ghani N, 1920
25	Lymphadenitis	Karim N, 1980; Qaf I, YNM
26	Naevi	Karim N, 1980
27	Otalgia	Ghani N, 1920; Nadkarni, 1976
28	Otorrhea	Ghani N, 1920; Nadkarni, 1976
29	Pain	Sina I, 1930
30	Pityriasis	Karim N, 1980; Baitar I, 1985; Safiuddin A, 1999; Kabiruddin H, 1935; Qaf I, YNM
31	Pleurisy	Sina I, 1930
32	Pneumonia	Sina I, 1930
33	Poisoning/ snake/ insect bite	Sina I, 1930
34	Prickly heat	Nadkarni, 1976
35	Renal colic	Baitar I, 1985
36	Scabies	Karim N, 1980; Baitar I, 1985
37	Skin diseases	Ghani N, 1920; Karim N, 1980; Safiuddin A, 1999; Kabiruddin H, 1935; Aziz A, 1994; Bashir A, YNM; Nadkarni, 1976

38	Skin marks and scars	Ghani N, 1920; Karim N, 1980; Baitar I, 1985; Safiuddin A, 1999; Kabiruddin H, 1935
39	Slimming	Karim N, 1980; Qaf I, YNM
40	Splenic pain	Karim N, 1980; Baitar I, 1985
41	Swelling/ inflammation	Karim N, 1980; Sina I, 1930
42	Tinea	Baitar I, 1985; Qaf I, YNM
43	Troublesome teething	Karim N, 1980; Baitar I, 1985
44	Urticaria	Qaf I, YNM; Aziz A, 1994
45	Vitiligo	Baitar I, 1985
46	Weight gain	Sina I, 1930
47	Wound/ ulcers	Ghani N, 1920; Karim N, 1980; Sina I, 1930

Principle uses

a) Useful in skin ailments (Hakim A, 1911; Safiuddin A, 1999)
b) Emmenagogue purpose (Kabiruddin H; 1935)
c) As eye tonic (Hakim A, 1911; Kabiruddin H; 1935)
d) Diuretic and stone remover (Hakim A, 1911; Kabiruddin H, 1935)

Contraindications

It should not be given to the patients suffering from respiratory tract diseases like cough and voice. (Hakim A, 1911; Ghani N, 1920) It is nearly a poison and harmful in the diseases of head hence it should be avoided well in taking internally. (Karim N, 1980; Kabiruddin H, 1935) It causes low appetite and harmful to stomach. (Karim N, 1980)

Correctives (Muslih)

For lungs and voice: Samaghe arabi (gum of Accacia arabica), kateera (gum of Cochlospermum religiosum) and roghane tukhme kaddu (oil of seed of Cucurbita moschata), (Hakim A, 1911; Ghani N, 1920; Kabiruddin H, 1935)

Substitutes (Badal)

a) Hajre Qaishoor (Karim N, 1980; Baitar I, 1985; Kabiruddin H, 1935)
b) Boorah Armani (sodium benzoate) (Hakim A, 1911)
c) Darmanah (Artemisia maritima) (Ghani N, 1920)
d) Other type of sepia (Hakim A, 1911)

Dose

750mg-1g (Ghani N, 1920)
1-2 (dang) (Karim N, 1980)
500mg-1g (Qaf I, YNM)

Compound formulations in Unani medicine

Musaffiye reham, samoom mujali, basaleeqoon kabir, safoofe bisbasa, kuhal roshneee etc. (Kabiruddin H, 1935; Anonymous, 1986)

CONCLUSION

Cuttlefish bone is a hard, brittle internal structure (an internal shell) found in all members of the family Sepiidae, commonly known as cuttlefish, a family within the cephalopods. The calcareous internal shell of sepia officinalis/ cuttlefish is known as 'cuttlefish bone/ kafe dariya' in Unani medicine. Cuttlefish bone is naturally found along the coasts of East and South Asia, Western Europe, and the Mediterranean, as well as all coasts of Africa and Australia. Most commonly cuttlebone debris is used as bird food.

In Unani medicine, the powder of the shell is widely used for the treatment of several diseases and in cosmetology. It has been used since centuries by Unani physician for the treatment of acne, alopecia areata, dental and periodontal diseases, ascites, backache, boils, calculous, chloasma, corneal opacity, dysuria, eczema, gingivitis, gout, headache, hemoptysis, itching, jaundice, loosening of vaginal muscle, naevi, otalgia, pain, pityriasis, pneumonia, poisoning, snake and insect bite, prickly heat, renal stone, scabies, skin marks and scars of various varieties, inflammation, tinea of different types, urticaria, vitiligo, weight gain, wound/ ulcers etc. Hence, animal and clinical studies should be conducted to substantiate the beneficial effect of cuttlefish bone/ kafe dariya in above mentioned diseases for the discovery of novel therapeutics of traditional side.

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CONFLICTS OF INTEREST

None declared

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