

## Zootherapy: A study from the Northwestern region of the Kingdom of Saudi Arabia and the Hashemite Kingdom of Jordan

Abdulhadi Aloufi<sup>1</sup> & Ehab Eid<sup>2\*</sup>

<sup>1</sup>University of Tabuk, Faculty of Science, Biology Department, KSA, Tabuk,; <sup>2\*</sup>The Royal Marine Conservation Society of Jordan, P O Box 831051, Abdel Aziz El Thaalbi Street, Shmeissani 11183, Amman, Jordan

E-mails: eha\_jo@yahoo.com; dr.aloufi@gmail.com

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This paper provides an overview of the traditional uses of animal species and their derivatives in traditional folk medicine from Tabuk area located at the North western region of the Kingdom of Saudi Arabia and the Hashemite Kingdom of Jordan. Potential implications for conservation of species used are also discussed, as several species used in folk medicine are threatened for extinction. We conducted interviews with local communities, hunters and druggist to collect information on various species of animals or their derivatives used and the remedies prepared from them. Results showed that at least 22 taxonomic orders of animals (13 vertebrates and 9 invertebrates) are used for medicinal purposes. In addition, 28 categories of raw materials that formed the basis of traditional medicine were also prescribed for treating locally diagnosed ailments. This survey is important as it defines species of animals used in folk medicine, from a region which is insufficiently studied. Although the extent of traditional folk medicine is still in debate, but their conservation management should be addressed, as an indiscriminate use of these animal species may contribute in decrease of their populations, especially in case of carnivores.

**Keywords:** Zootherapy, Animals, Folk medicine, Saudi Arabia, Jordan

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Zootherapy is defined as “the healing of human illnesses using therapeutics that are obtained from animals or ultimately derived from them”<sup>1</sup>. Humans have been using animals and their derivatives for medicinal purposes since early times<sup>2-8</sup>. In addition, human cultures which present a structured medical system will utilize animals as medicines<sup>9</sup>. Although the use of animals for medicinal purposes is considered as superstition by some, in recent years the pharmaceutical companies are exploring various traditional medicines as sources of drugs for modern medicine<sup>4</sup>. Furthermore, a study also showed that 11.1% and 8.7% out of 252 essential chemicals that have been selected by the World Health Organization were originated from plants and animals, respectively<sup>9</sup>. A variety of wildlife species are used in traditional medicine worldwide. For example, twenty three animal species have been recorded in Sudanese traditional medicine, five hundred species of insects, mites, and spiders have been recorded as having medicinal value in India, while twenty three species

from three ecological zones in Nigeria are used for medical purposes<sup>10,11</sup>. The cattle milk, bee honey, lizard blood, ox organs, swallow’s liver, bat limbs, ambergris from the sperm whale, and the glands of the musk deer were used in ancient Egypt for medicinal purposes<sup>12,13,14</sup>. Also, the canids are believed to be the most reported group of carnivores as being used in traditional medical system worldwide<sup>16,17</sup>. Demands on the wild sources of traditional medicinal products are increasing as human populations grow and demand for natural remedies is also increasing<sup>18</sup>. This increasing demand, has led to exploitation of wild species, of which several species already are threatened with extinction<sup>19</sup>. Very little is published or understood regarding the species of animals used for folk medicine and their significance in the Arabian Peninsula. Therefore, this study aims to highlight the use of animal species in traditional medicine, identify those species, and discuss the implications of their consumption from the northwestern region of the Kingdom of Saudi Arabia (KSA) and the Hashemite Kingdom of Jordan.

\*Corresponding author

## Methodology

A field study was carried out in KSA and Jordan (Fig. 1) over the period of January to October 2013 to examine the diversity of animal species used in traditional medicine. The information was collected using semi-structured which was designed basically to understand which animal's and\ or their derivatives are used in traditional medicine, prescriptions and remedies. Personal interviews were done with local communities and hunters in urbanized and rural areas with no specific preferences such as but not limited to age structure, education work nature or experiences. Druggists were interviewed in Saudi Arabia only as this issue is considered sensitive in Jordan due to enforcement issues. The interviews took place in the form of group discussions or individual meetings in Jordan and Saudi Arabia and focused basically on collecting information related to which species of animals are used in folk medicine, their parts or derivatives used, and their prescriptions for remedies.

## Results

Twenty two taxonomic orders of animals (13 vertebrates and 9 invertebrates) were recorded as being used for medicinal purposes (Table 1). It was difficult to quantify the exact number of species because some entire groups of animals are collected for medicinal purposes including snakes (venomous and non- venomous), hedgehog, lizards and bats species. The most widely used group of animals was mammals (N= 12, 57%) while the least used group was reptiles (N = 5, 17%).

All the zootherapeutic animal body parts or their products were assigned to one of 28 categories of raw materials that formed the basis of medicine and were prescribed for treating locally diagnosed ailments. The 28 categories include blood, canine, brain, chicks, egg shells, eye, faeces, fat, flesh, gallbladder, bile from gallbladder, head, honey, liver, milk, muscle, neck, nest, pharynx, sexual organ, shell, skin, spines, spider web, stomach, tail, tongue, and blood extracted from lung. The birds and reptiles are used equally in Jordan and Saudi Arabia, although different species are used. Jordanians use mammalian species more than Saudis, while Saudis use more invertebrates. In addition, animals subjected to traditional healing can be used for 51 remedies, and the most widely used animal parts in remedies is the flesh (N=26), followed by blood (n = 9) and liver (n = 7).



Fig. 1—Location of Jordan and Tabuk area in the Kingdom of Saudi Arabia

## Discussion

This is the first study of its kind to examine the traditional folk medicines uses of vertebrate and invertebrate species in Jordan and Saudi Arabia. This study revealed that interviewed communities believe that about 28 types of common human ailments can be cured by using some of the aforementioned animal parts. Our study also showed that a given species of animal often has various parts or derivatives, i.e., used for various medical purposes. For example, 9 parts of the Arabian Wolf, *Canis lupus* are used including flesh, blood, blood extracted from lung, canines, eye, fat, bile from gallbladder, liver, and pharynx (Fig. 2). Others have noted that wolves are captured because their gall bladder is used to treat cataracts, which our study corroborates<sup>20</sup>. The Arabian wolf is a threatened species in Jordan and Saudi Arabia due to persecution and hunting by humans. Although this study does not quantify the potential negative population impact of collecting wolves for medicinal purposes, but it suggests that their mortality occur because of human consumption. For example, Arabian wolves were persecuted after an alleged wolf attack on humans in the southern Ghor, Jordan, and killed animals were used for folk medicines (Eid, Pers. Comm.). The Arabian wolves are classified as vulnerable species<sup>20</sup>. Animals and their products can be put to very different uses in Saudi Arabia and Jordan. For example, the flesh of Rock Hyrax is used for treating joints and muscle pain by the Saudis, but people from Jordan use the same material for general tonic, neurological treatment, and diabetes mellitus. In addition, the flesh of the Desert Monitor is used by

Table 1—The vertebrate and invertebrate species of animals used for medical purposes in Jordan and Kingdom of Saudi Arabia

Scientific name	Common name	Location	Parts used	Prescription	Remedy
<b>Mammals</b>					
<b>Insectivora</b>					
NA	Hedgehog	KSA	Flesh	Flesh is cooked and the yielded Soup is used as a drink.	Treatment of bronchial asthma for children's less than six months old.
			Skin and spines	Skin and the spines are burned and the yielded Ash mixed with oil and used as ointment.	Strengthen the growth of hair.
		JO	Flesh	Flesh is cooked and eaten.	Treatment of nocturnal enuresis.
<b>Chiroptera</b>					
NA	Bat	JO	Blood	The body is scrubbed with blood.	Stop hair growth for new born girls.
<b>Rodentia</b>					
<i>Jaculus jaculus</i>	Lesser Egyptian Jerboa	KSA	Blood	The body is scrubbed with blood.	Treatment of vitiligo.
			brain	Brain is cooked and eaten.	Treatment of vitiligo.
		JO	Flesh	Flesh is cooked and eaten.	Treatment of vitiligo.
<i>Hystrix indica</i>	Indian Crested Porcupine	KSA	Flesh	Flesh is cooked and eaten.	Treatment of high temperature, general weakness, and muscle fatigue.
		JO	Flesh	Flesh is cooked and eaten.	Treatment of general weakness and used as a sexual tonic.
			Blood	Body is scrubbed with blood.	Treatment of angina pectoris, hair fall and infertility.
			Liver	Liver is cooked and eaten.	Treatment of infertility.
<i>Psammomphus obesus</i>	Fat Sand Rat	JO	Flesh	Flesh is cooked and eaten.	Treatment of muscle fatigue.
<b>Carnivora</b>					
<i>Canis lupus</i>	Wolf	KSA	Liver	Liver is cooked and eaten.	Treatment of low backache, general weakness, muscle fatigue and colonic gases.
			Blood extracted from the lungs	Blood is placed on eyelids.	Increase visual acuity.
			Blood	Used as ointment.	Treatment of panic.
			Bile from Gallbladder	Bile is scrubbed on body.	Treatment of trachoma.
			Flesh	Flesh is cooked and eaten.	Treatment of low backache.
			FAT	Used as ointment.	Treatment of joints and muscle pain.
			Eye	Dried, crushed and placed on eyelids.	Increase visual acuity.
		JO	Blood	Used as ointment.	Treatment of rheumatic pain.
			Flesh	Flesh is cooked and eaten.	Treatment of exhaustion & joints and muscle pain.
			Canine Pharynx	Crushed and eaten.	Treatment of infertility.
				Dried and placed on the patient neck.	Treatment of pulmonary diseases especially whooping cough.

(Contd.)

Table 1—The vertebrate and invertebrate species of animals used for medical purposes in Jordan and Kingdom of Saudi Arabia (*Contd.*)

Scientific name	Common name	Location	Parts used	Prescription	Remedy
<b>Mammals</b>					
<i>Vulpes vulpes</i>	Red Fox	KSA	Flesh	Boiled and eaten with its soap.	Treatment of diabetes mellitus and jaundice.
		JO	Flesh	Only right half of the fox body is grilled. Cooking and the yielded Soup is eaten.	Treatment of diabetes mellitus, jaundice, neurological failure, cardiac arrhythmia and joints and muscle pain. Treatment of high temperature.
			Skin	Grilled and eaten.	Treatment of itching.
			Tail	Rubbing the tail with the human skin.	Treatment of alopecia areata.
			Neck	Cooked and eaten.	Treatment of angina pectoris.
			Blood	Blood is scrubbed on body.	Treatment of angina pectoris.
<i>Caracal caracal</i>	Caracal	JO	Liver	Cooked and eaten.	Treatment of diabetes mellitus and liver cirrhosis.
<i>Hyaena hyaena</i>	Striped Hyaena	KSA	Flesh	Cooked and eaten with its soap.	Treatment of rickets in children, exhaustion. In addition, it is used in the treatment of joint and muscle pains and muscle fatigue and used as a sexual tonic.
		JO	Flesh	Cooked and eaten.	Treatment of neurological failure and infertility.
<i>Meles meles</i>	Badger	JO	Flesh	Cooked and eaten. Cooking and the yielded Soup used as ointment.	Used as a sexual tonic and joints and muscle pain. Treatment of rheumatic pain and neurological failure.
<b>Lagomorpha</b>					
<i>Lepus capensis</i>	Cape Hare	KSA	Stomach	Cooked and eaten.	Treatment of nasal congestion.
		JO	Flesh	Cooked and eaten.	Treatment of bronchial asthma.
<b>Hyracoidae</b>					
<i>Procavia capensis</i>	Rock Hyrax	KSA	Faeces	Faeces mixed with honey and fenugreek.	Treatment of expectorant treatment for sever cough.
		JO	Flesh	Cooked and eaten. Cooking and the yielded Soup used as ointment.	Treatment of neurological failure, diabetes mellitus and used as a sexual tonic. Treatment of joints and muscle pain.
<b>Artiodactyla</b>					
<i>Gazelle subgutturosa marica</i>	Arabian Gazelle	KSA	Flesh	Cooked and eaten.	Used as a sexual tonic.
			Faeces	Dissolved in water and the paste created is scrubbed on body.	Strengthen the growth of hair.
		JO	Flesh	Cooked and eaten.	Used as a sexual tonic.
<b>Perissodactyla</b>					
<i>Equus sp.</i>	Donkey	KSA	Milk	Milk is drink.	Treatment of pulmonary diseases especially whooping cough.

*(Contd.)*

Table 1—The vertebrate and invertebrate species of animals used for medical purposes in Jordan and Kingdom of Saudi Arabia (Contd.)

Scientific name	Common name	Location	Parts used	Prescription	Remedy
<b>Reptiles</b>					
<b>Squamata</b>					
<i>Scincus sp.</i>	Skink Lizard	KSA	Skin	Lick the skin or use piece of flesh under tongue.	Treatment of disarticulation and delayed speech in children.
			Flesh	Cooked and eaten.	Used as a sexual tonic.
<i>Chamaeleo chamaeleon</i>	Common Chameleon	JO	Flesh	Cooked and eaten.	Used as anesthetize.
<i>Uromastix aegyptia</i>	Egyptian Spiny-tailed Lizard	KSA	Flesh	Cooked and eaten.	Used as a sexual tonic.
				Cooked and the yielded Soup is drink.	Treatment of high temperature.
			Blood	Blood is dissolved in water and drink.	Treatment of bronchial asthma, pulmonary diseases especially whooping cough and high temperature.
		JO	Flesh	Cooked and eaten.	Treatment of infertility, neurological failure and used as a sexual tonic.
<i>Varanus griseus</i>	Desert Monitor	KSA	Flesh	Cooked and the yielded fat fried with olive oil and used as ointment.	Treatment of joints and muscle pain.
			FAT	Used as ointment on penis.	Strengthen erections.
		JO	Flesh	Cooked and eaten.	Used as a sexual tonic and enhance immunity against snake poisoning.
NA	Snake	JO	Flesh	Cooked and eaten.	Used as a sexual tonic.
			Skin	Placed on eyelids.	Increase visual acuity.
NA	Gecko	KSA	Body	Fried with oil and eaten.	Treatment of vitiligo.
<b>Gekkonidae</b>					
<i>Testudo graeca</i>	Greek Tortoise	KSA	Sexual organ	Cooked and eaten.	Used as a sexual tonic.
		JO	Flesh	Cooked and eaten.	Used as a sexual tonic.
<b>Birds</b>					
<b>Columbiformes</b>					
<i>Streptopelia decaocto</i>	Collared Dove	KSA	Chicks	Cooked and eaten.	Used as a sexual tonic.
<i>Columba sp.</i>	Pigeons	JO	Egg shell	Water is poured in the egg shell and drink.	Treatment of delayed speech in children.
<b>Accipitriformes</b>					
<i>Gypaetus barbatus</i>	Bearded Vulture	KSA	Flesh	Cooked and the yielded Soup is drink.	Treatment of paralysis.
				Cooked and the yielded fat is used as ointment.	Treatment of paralysis.

(Contd.)

Table 1—The vertebrate and invertebrate species of animals used for medical purposes in Jordan and Kingdom of Saudi Arabia (*Contd.*)

Scientific name	Common name	Location	Parts used	Prescription	Remedy
<b>Birds</b>					
<i>Torgos tracheliotus</i>	Nubian Vulture	KSA	Flesh	Cooked and the yielded. Soup is eaten.	Treatment of paralysis.
<i>Aquila sp.</i>	Eagle	JO	Flesh	Cooked and eaten.	Treatment of neurological failure.
<b>Passeriformes</b>					
<i>Corvus rhipidurus</i>	Fan-tailed Raven	KSA	Gallbladder	The bile is mixed with water and drink. Dried, crushed and mixed with eyeliner and placed on eyelids.	Treatment of bronchial asthma. Increase visual acuity.
<i>Garrulus glandarius</i>	Eurasian Jay	JO	Tongue	Cooked and eaten.	Treatment of delayed speech in children.
<i>Passer domesticus</i>	House Sparrow	JO	Flesh	Cooked and eaten.	Treatment of delayed dentition in children.
<b>Invertebrates</b>					
<b>Araneae</b>					
NA	Spider	KSA	Spider web	Placed on bleeding wounds.	Stop bleeding and rapid wound healing.
<b>Hymenoptera</b>					
NA	Bees	KSA	Nest	Collected, dissolved in water and eaten.	Treatment of gastroenteritis, and enhance immunity against snake poisoning.
<i>Apis mellifera</i>	Honey Bee	KSA JO	Honey	Eaten directly.	Used as a sexual tonic.
<b>Scorpiones</b>					
NA	Scorpion	KSA	Body	Bowled in vinegar and then fried and eaten.	Treatment of skin diseases such as vitiligo and used for children's as anti-poisoning in the adult stage.
<b>Orthoptera</b>					
<i>Locust sp.</i>	Locust	KSA	Body of young locust	Fried with herbs and eaten.	Treatment of headache and hemiplegia.
<b>Veneroida</b>					
<i>Tridacna sp.</i>	Giant Clam	KSA	Flesh	Cooked and used either for drink or rinse. Cooked and the yielded Soup is eaten.	Treatment of piles. Used as laxative and increase visual acuity.
		JO	Muscle	Cooked and eaten.	Used as a sexual tonic.
			Shell	Dried, crushed and eaten.	Treatment of skin ulcers and stop bleeding and rapid wound healing.
<b>Octopoda</b>					
<i>Octopus sp.</i>	Octopus	JO	Flesh	Cooked and eaten.	Used as a sexual tonic.

*(Contd.)*

Table 1—The vertebrate and invertebrate species of animals used for medical purposes in Jordan and Kingdom of Saudi Arabia (*Contd.*)

Scientific name	Common name	Location	Parts used	Prescription	Remedy
<b>Invertebrates</b>					
<b>Sepiida</b>					
<i>Sepia sp.</i>	Cuttlefish	KSA	Flesh	Dried, crushed and then mixed with ghee or oil and cress seeds added with a bit of pepper and eaten.	Treatment of joints and muscle pain as well as runny nose.
<b>Aspidochirotida</b>					
<i>Stichopus horrens</i>	Stichopus	KSA	Body	Cooked and eaten.	Used as a sexual tonic.
<b>Pterioida</b>					
<i>Pinctada radiata</i>	Pinctada	KSA	Flesh	Cooked and eaten.	Treatment of ear pain.



Fig. 2—Pictures of a dead wolf used for medical purposes

Jordanians for general tonic and to enhance immunity against snake poisoning, while it is used for treatment of muscle and joint stiffness by Saudis. Furthermore, the flesh of the snakes is cooked and eaten by Saudis for general tonic purposes, while the skin of the snake is used to increase visual acuity by Jordanians.

The Skink Lizards were found in large quantities in trade in Saudi Arabian markets. Based on the survey results, the flesh is either cooked for the treatment of general tonic, and licked or placed under the tongue for the treatment of disarticulation and improvement of speech in children (Fig. 3). Such lizards are not red listed in Saudi Arabia<sup>18</sup>, but their quantity in trade for medical purposes is alarming.

The use of flesh is common in both Jordan and Saudi Arabia, and it is usually taken in cooked or grilled form. Body parts of most animal species are either cooked, crushed into powder, or boiled and then eaten. Despite generalities in the preparation and

prescription methods, distinct methods of the Zootherapeutic resources were present (Table 1). The flesh of different animal species, like hedgehog and hyaena for example, is always cooked and the yielded soap is eaten to cure bronchial asthma for children less than 6 months old. Hedgehog and hyaena are also used for the treatment of rickets in children, exhaustion, joints and muscle pain, muscle fatigue in adults, as well as a general tonic. The gall bladders and their bile contents are another important raw material for Saudi Arabian practicing traditional medicine. Such parts, collected from Wolf and Fan-tailed Raven are used for the treatment of trachoma, respiratory system illnesses such as bronchial asthma, as well as increased visual acuity. The selection of species is a very complex issue in communities in Jordan and Saudi Arabia due to several reasons, including: 1) species availability, 2) differences in accessibility and motivation to go and obtain such



Fig. 3—Skink lizards sold in the market at Tabuk region

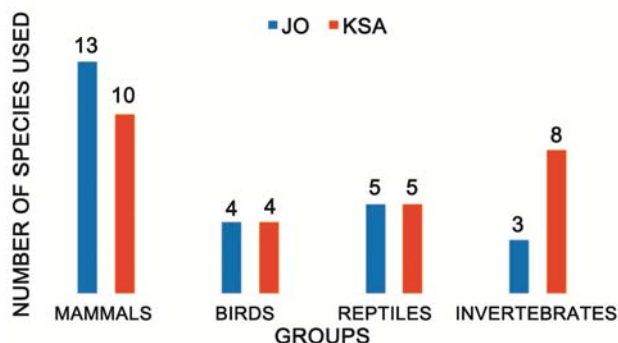


Fig. 4—Number of species used for medical purposes according to their groups. JO = Jordan. KSA = Kingdom of Saudi Arabia.

species/product(s), 3) law implementation and enforcement, 4) environmental factors such as climatic and geographic differences, and 5) traditions and the differences in the widespread disease spectrum (Fig. 4).

Although the hunting, slaughtering, and trading of wild animals is prohibited in Jordan and Saudi Arabia by law, animals and their derivatives continue to be used for nutrition and medicine in a clandestine way. Humans may kill animals for the use of their products or because they represent a threat to humans and their domestic animals. Despite the demanding use of animals for medicinal purposes, there is a general lack of detailed information concerning the magnitude of this practice and its impact on the species involved from the Arabian region. However, this survey is important as it defines various species of animals used for folk medicine, and establish the base for further research on the impact of using animals for folk medicine and their status. It is suggested that those species of animals which are directly involved in

traditional medicines should be among the highest priorities for conservation<sup>21</sup>.

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