

A synoptic review on the traditional uses of gastropods and bivalves (Mollusca) as food and medicines in India

Bulganin Mitra and Joyjit Ghosh*

Keywords: Indigenous Traditional Knowledge (ITK), India, tribes, animals, food, medicine.

Abstract:

Indigenous Traditional Knowledge (ITK) is deeply ingrained in numerous places worldwide. This knowledge system is essential for their overall well-being, promoting sustainable development, and monitoring their cultural vitality. In India, the literature on ITK, specifically about animals or fauna, is severely lacking and widely dispersed in contrast to the literature on flora. Traditional Knowledge is a multidisciplinary area of study that has attracted the interest of several experts, including zoologists, chemists, taxonomists, and others. This communication aims to compile all scientific works on the utilisation of Mollusca as food and medicine by indigenous communities in India. Present communication reports 38 species (identified & unidentified) under 14 families, 9 orders of 2 classes of molluscan currently used as food and medicines in India.

Introduction:

The relationship between humans and animals dates back to ancient times, displaying a long-standing history of interaction. Animals played a significant role in anthropogenic culture and religion and served as materials for food and medicine. During the shift from a 'hunter and gatherer' lifestyle to a more structured civilization, some animals played crucial roles in humans' cultural and societal advancement. Throughout history, animals have been revered as sacred beings, embodiments of divine or evil forces, maintained as friends, consumed as food, used for pleasure hunting, or employed as substitutes for human labour.

The emergence of animal husbandry and the utilisation of animals as a food source in India may be traced back to the Indus Valley Civilization, which flourished in the fourth millennium BC. Their primary sustenance consisted of cultivated grains, supplemented by a diverse array

Bulganin Mitra

Emeritus Professor, Department of Zoology, Ramakrishna Mission Vivekananda Centenary College, Rahara, West Bengal, India

E-mail:  bulganinmitra@gmail.com

Joyjit Ghosh*

Visiting faculty, Department of Zoology, Ramakrishna Mission Vivekananda Centenary College, Rahara, West Bengal, India

E-mail:  arkazoology@gmail.com; Orcid iD:  <https://orcid.org/0009-0003-8774-9929>

*Corresponding Author: arkazoology@gmail.com

of protein sources including fish, beef, hog, chicken, and mutton. Throughout history, animals from diverse phylogenetic backgrounds have played significant roles in our culture, religion, and food. The religious and cultural practises have been transmitted from one generation to another and are now integral to the indigenous traditional Knowledge among aboriginal, local, and tribal communities worldwide (Maity et al., 2010, 2013).

Throughout history, plants (Sarkar et al., 2022) and animals (Madhu & Jana, 2014), or their many components, have been utilised, and even in modern times, these resources remain crucial in global food supplies and healthcare. While plant and plant-derived materials have garnered significant scientific attention and are frequently utilised in traditional diets and medicine, it is vital to note that animal-derived products also play a crucial and indispensable role in nutrition.

Molluscs exhibit both ancient origins and a wide range of variation. This animal group constitutes the second most populous category of organisms, following insects, throughout the entirety of the animal kingdom (Mukhopadhyay et al., 2017). They exhibit a remarkable ability to adapt and can be found in all habitats except for those in the air. Originally inhabiting marine environments, these organisms have successfully colonised freshwater habitats and subsequently adapted to terrestrial environments. As a result, they currently exhibit a species diversity that is nearly equivalent to that of their marine counterparts (Ramakrishna & Dey, 2007). The group in the animal kingdom that is most distinctly characterised is the one that possesses at least two unique traits, namely the mantle and radula, which are not present in any other group. Molluscs are soft-bodied organisms with a bilaterally symmetrical and unsegmented body. They have a protective exterior coat called a shell and a broad, muscular fold of the body wall called a mantle (Mukhopadhyay et al., 2017).

This endeavour aims to consolidate nearly all the investigative studies conducted on molluscan species that are utilised by indigenous communities in India for food and medicinal purposes. Additionally, the scientific names of the animals utilised for food and medicinal purposes are verified and kept up to date, along with new classifications, followed by Mukhopadhyay et al. (2017).

Methodology:

This synoptic review collates and compiles the existing research on some traditionally used molluscs as food and medicines by the indigenous people in India.

Result:

A total of 38 species (identified & unidentified) are reported belonging to 14 families, 9 orders and 2 class. Out of these, 23 species are reported that are identified up to species level, and the rest are up to generic level.

Table 1. List of Bivalves & Gastropods used as food & medicines by the indigenous people of India

Local Name	Scientific Name	Used by tribes	Used for	Reference
Class Gastropoda				
Order: Architaenioglossa				
	<i>Filopaludina bengalensis</i> Lamarck, 1822	Tribe of Kosi River (Bihar)	Medicine	Prabhakar and Roy, 2009
	<i>Filopaludina bengalensis</i> Lamarck, 1822	Tribes of Northeast India	Food & medicine	Jadhav et al., 2023
		Birhors tribe (West Bengal)	Food & medicine	Chanda & Mukherjee, 2012
	<i>Angulyagra</i> sp.	Tribes of Northeast India	Food	Jadhav et al., 2020
	<i>Cipangopaludina lecythis</i> (Benson 1836)	Tribes of Northeast India	Food	Jadhav et al., 2020
	<i>Bellamya</i> spp.	Tribes of Singbhum	Medicine	Kumari and Mahata, 2014
	<i>Bellamya bengalensis</i> (Lamarck, 1822)	Tribes of Northeast India	Food	Jadav et al., 2020
	<i>Bellamya bengalensis</i> (Lamarck, 1822)	Birhors tribe (West Bengal)	Medicine	Chanda & Mukherjee, 2012
Family: Ampullariidae				
	<i>Pila globosa</i> (Swainson, 1822)	Tribes of Palakkad and Malappuram	Food	Padmanavan, 2007
	<i>Pila globosa</i> (Swainson, 1822)	Irular, Mudugar and Kurumbar	Medicine	Padmanabhan & Sujana, 2007
	<i>Pila globosa</i> (Swainson, 1822)	Naga tribe	Medicine	Jamir and Lal, 2005
Samu ladai	<i>Pila globosa</i> (Swainson, 1822)	Mech	Food	Sarkar et al., 2014
	<i>Pila globosa</i> (Swainson, 1822)	Tribes of Northeast India	Food	Jadhav et al., 2020, Jadhav et al., 2023
	<i>Pila</i> sp.	Karbi tribe (Assam)	Medicine	Hanse and Teron, 2012
	<i>Pila</i> sp.	Matya, Kolha, Gond, Munda, Kavar, Kolha, Kharia (Odisha)	Medicine	Azami and Sinha, 2012

	<i>Pila</i> sp.	Tribe of Kosi River (Bihar)	Medicine	Prabhakar & Roy, 2009
	<i>Pila</i> sp.	Saharia tribe (Rajasthan)	Medicine	Mahawar and Jaroli, 2007
	<i>Pila olea</i> (Reeve, 1856)	Tribes of Northeast India	Food & medicine	Jadhav et al., 2020, Jadhav et al., 2023
	<i>Pila theobaldi</i> (Hanley, 1876)	Tribes of Northeast India	Food	Jadhav et al., 2023
	<i>Pila scutata</i> (Mousson, 1848)	Tribes of Northeast India	Food	Jadhav et al., 2023
	<i>Pila virens</i> Lamarck, 1822	Tribes of Northeast India	Food	Jadhav et al., 2023
Family: Pachychilidae				
	<i>Brotia costula</i> (Rafinesque, 1833)	Tribes of Northeast India	Food	Jadhav et al., 2020
Family: Lymnaeidae				
	<i>Paludomus crassa</i> (Busch, 1842)	Adi (Arunachal Pradesh)	Food	Jadhav et al., 2023
Ghonga	<i>Paludomus conica</i> (Gray, 1833)	Adi (Arunachal Pradesh)	Medicine	Chinlapianga et al., 2013
	<i>Paludomus</i> sp.	Tribes of North east India	Food	Jadhav et al., 2020
Water snail	<i>Lymnaea</i> sp.	Tribe of Bhadrak	Medicine	Panda et al., 2013
	<i>Lymnaea</i> sp.	Biata Tribe (Assam)	Medicine	Betlu, 2013
Water snail	<i>Lymnaea</i> sp.	Zomi-Paite tribes (Mizoram)	Medicine	Chinlapianga et al., 2013
	<i>Lymnaea acuminata</i> Lamarck, 1822	Tribe of Theni (Tamilnadu)	Medicine	Chellappandian et al., 2014
JinaiKhong	<i>Lymnaea acuminata</i> Lamarck, 1822	Mech tribe (West Bengal)	Medicine	Sarkar et al., 2014
Order: Stylommatophora				
Family: Ariophantidae				
Khonjelekuwa	<i>Cryptozona bistrialis</i> (Beck, 1837)	Gibbon Wildlife Sanctuary, Assam	Medicine	Borah & Prasad, 2017
	<i>Cryptozona</i> sp.	Biata tribes (Assam)	Medicine	Betlu, 2013
Family: Helicidae				
Mollusks	<i>Helix aspersa</i> (Müller, 1774)	Mech tribe (West Bengal)	Food & medicine	Sarkar et al., 2014

Chupi	<i>Helix pomatia</i> Linnaeus, 1758	Karbi tribe (Assam)	Food & medicine	Hanse and Teron, 2012
Family: Achatinellidae				
Kapkong	<i>Pulmonata</i> spp.	Tangsa tribe (Arunachal Pradesh)	Medicine	Jugli et al., 2019
Class Bivalvia				
Order Unionoida				
Family Unionidae				
	<i>Lamellidens</i> sp.	Tribe of Kosi River	Medicine	Prabhakar and Roy, 2009
	<i>Lamellidens marginalis</i> (Lamarck, 1819)	Tribes of Northeast India	Food & medicine	Jadhav et al., 2020
	<i>Lamellidens corrianus</i> (Lea).	Tribes of Singbhum	Medicine	Kumari and Mahata, 2014
	<i>Anodonta anatine</i> Linnaeus, 1758	Tribes of Northeast India	Food	Jadhav <i>et al.</i> , 2023
Order: Ostreoida				
Family: Ostreidae				
Gugli	<i>Crassostrea madrasensis</i> (Preston, 1916)	Birhors tribe (West Bengal)	Food	Chanda & Mukherjee, 2012
Order: Mytiloida				
Family: Mytilidae				
Jhinuk	<i>Perna viridis</i> Linnaeus, 1758	Birhors tribe (West Bengal)	Medicine	Chanda & Mukherjee, 2012
		Birhors tribe (West Bengal)	Food	Chaudhury et al, 2016
	<i>Unio</i> sp.	Munda, Gond, Matya, Bhuiza (Odisha)	Medicine	Azami and Sinha , 2012
	<i>Unio</i> sp.	Tribe of Kosi River	Medicine	Prabhakar and Roy, 2009
Family: Viviparidae				
	<i>Cipangopaludina lecythis</i> (Benson, 1836)	Tribes of Northeast India	Food	Jadhav et al., 2020

Order: Veneroida				
Family: Mactridae				
Seepi	<i>Mactra</i> sp.	Bawaria, Mogya & Meena (Rajasthan)	Medicine	Mahawar and Jaroli, 2006
Seepi	<i>Mactra</i> sp.	Saharia tribe (Rajasthan)		Mahawar and Jaroli, 2007
Order: Unionida				
Family: Unionidae				
Ghonga	<i>Parreysia</i> (<i>Parreysia</i>) <i>sikkimensis</i> Lea, 1859	Adi tribe (Arunachal Pradesh), Zomi-Paite tribes (Mizoram)	Medicine	Chinlapianga et al., 2013
	<i>Parreysia</i> sp.	Tribes of Kosi River (Bihar)	Medicine	Prabhakar & Roy, 2009
Order: Littorinimorpha				
Family: Cypraeidae				
Shankh	<i>Cypraea</i> sp./ <i>Angulus</i> sp.	Tribes of Rajasthan	Medicine	Jain et al., 2007
Cowrie	<i>Cypraea</i> spp.	Tribes of Madhya Pradesh, Jharkhand, Odisha	Medicine	Joseph, 1988

Discussion:

The utilisation of animals for sustenance and medical applications is an essential component of traditional knowledge systems worldwide, particularly in India. This practise is becoming pertinent to discussions on animal relationships and phylogeny, conservation biology, bioprospecting, and patenting. India's abundant biodiversity and the country's wealth of traditional Knowledge, particularly in the field of medicine, contribute to its richness. However, it is crucial to safeguard and encourage the preservation of this information. India has faced numerous challenges in preserving its traditional wisdom.

According to reports, almost 50% of the world's contemporary medications and most food resources are derived from animals. India possesses a wealth of traditional Knowledge, encompassing areas such as food inventory and medicinal practises. Our ancient books extensively detailed the consumption of food and beverages obtained from living organisms and the wide range of medicinal and therapeutic uses of plants and animals. Indigenous people have made use of a wide range of faunal resources, spanning from earthworms to higher animals and from broad to very particular applications.

Hence, it is imperative to investigate and record this ancient traditional Knowledge as fundamental information for future generations. Given the aforementioned, it is necessary to extensively document molluscan species and further study their culinary and medicinal applications in India. Furthermore, further research in this domain may yield other gastropods or bivalves that can potentially serve as food and pharmaceutical resources in India in the future.

Acknowledgements:

Authors would like to express their special thanks to the revered Swami Kamalasthananda, Principal and Swami Vedanuragananda, Vice-Principal, Ramakrishna Mission Vivekananda Centenary College, Rahara, for their constant encouragement and support. We are thankful to Aritri Chatterjee, Research Scholar, Department of Zoology, Vidyasagar University for helping in doing the work.

References:

- Azami, H. K., & Sinha, G. (2012). The role of invertebrates as traditional drugs prevalent among the tribals of Orissa- Part-1. *Indian Journal of Science Research*, 3(1), 137-140.
- Betlu, S. (2013). Indigenous knowledge of zootherapeutic use among the Biata tribe of Dima Hasao district, Assam, Northeastern India. *Journal of Ethnobiology and Ethnomedicine*, 9, 1-15.
- Borah, M.P., & Prasad, S.B. (2017). Ethnozoological study of animals based medicine used by traditional healers and indigenous inhabitants in the adjoining areas of Gibbon Wildlife Sanctuary, Assam, India. *Journal of Ethnobiology and Ethnomedicine*, 13, 39-51.
- Chanda, S., & Mukherjee, A. (2012). Animal resources linked with the life of Birhor community settled in Ayodhya hills, Purulia District, West Bengal. *Indian Journal of Applied and Pure Biology*, 27(1), 31-36.
- Chaudhury, S., Rahaman, H., & Singh, H. (2016). Some ethnozoological uses of Birhor tribe of West Bengal, India. *J. Traditional and Folk Practices*, 2-4(1), 33 - 42
- Chinlapianga, M., Singh, R. K., & Shukla, A. C. (2013). Ethnozoological Diversity of Northeast India: Empirical Learning with Traditional Knowledge Holders of Mizoram and Arunachal Pradesh. *Indian Journal of Traditional Knowledge*, 12(1), 18-30.
- Hanse, R., & Teron, R. (2012). Ethnozoological Practices Among The Karbi Tribe In Karbi Anglong District Of Assam (India). *The Ecoscan*, 1, 117-120.
- Jadhav, A., Das, N. K., & Aravind, N.A. (2020). Edible Freshwater Molluscs From Northeast India. *Tentacle*, 28, 3-4.
- Jadhav, A., Das, N.K., Sil, M., & Aravind, A. (2023). *Indian Journal of Traditional Knowledge*, 22(2), 409-419.

- Jain, A., Katewa, S. S., Galav, P., & Nag, A. (2008). Some therapeutic uses of biodiversity among the tribals of Rajasthan. *Indian Journal of Traditional Knowledge*, 7(2), 256-262.
- Jamir, N.S., & Lal, P. (2005). Ethnozoological practices among Naga tribes. *Indian Journal of Traditional Knowledge*, 4(1), 100-104.
- Joseph, A.N.T. (1988). Ethnozoology in the Tribal Welfare of Madhya Pradesh and Orissa. *Rec. Zool. Surv. India*, 85(2), 319-348.
- Jugli, S., Chakravorty, J., & Meyer-Rochow, V.B. (2020). Zootherapeutic uses of animals and their parts: an important element of the traditional Knowledge of the Tangsa and Wancho of eastern Arunachal Pradesh, North-East India. *Environment, Development and Sustainability*, 22, 4699–4734.
- Kumari, S., and Mahata, M. C. (2014). Plants And Animals Of Ethnomedicinal Values Of Singhbhum Plateau, Jharkhand, India. Plants And Animals Of Ethnomedicinal Values Of Singhbhum Plateau, Jharkhand, India. *Proceedings Of The National Seminar On Traditional Knowledge And Social Practices*, pp.73-84.
- Madhu, N.R., & Jana, S.K. (2014). A review on zoo-ethno-medico-biological studies and human welfare. *International Journal of Current Research and Academic Review*, 2(12), 179-187.
- Mahawar, M.M., & Jaroli, D.P. (2006). Animals and their products utilized as medicines by the inhabitants surrounding the Ranthambhore National Park, India. *Journal of Ethnobiology and Ethnomedicine*, 2, 46.
- Maiti, A., Madhu, N.R., & Manna, C. K. (2010). Ethnomedicine used by the tribal people of the district Purulia, W. B., India in controlling fertility: and experimental study. *Pharmacologyonline*, 1, 783-802.
- Maiti, A., Madhu, N.R., & Manna, C. K. (2013). Natural products traditionally used by the tribal people of the Purulia district, West Bengal, India for the abortifacient purpose. *International Journal of Genuine Medicine*, Volume 3 / Issue 2 / e14, 1-4.
- Mukhopadhyay, A., Tripathy, B., & Ghosh, A. (2017). Mollusca. In: current status of freshwater faunal diversity in India. Ed. Kailash Chandra, K.C. Gopi, D.V. Rao, K. Valarmathi, J.R.B. Alfred, pp. : 501-525 (Published by Zoological Survey of India).
- Padmanabhan, P. (2007). Ethnozoological studies on the tribals of Palakkad and Malappuram districts of Kerala, South India. *Kerala Forest Research Institute (KFRI) Research Report No. 292*.
- Padmanabhan, P., & Sujana, K.A. (2008). Animal products in traditional medicine from Attappady hills of Western Ghats. *Indian Journal of Traditional Knowledge*, 7, 2008, 326-329.
- Panda, T., Mishra, N., Tripathy, B.K., Das, P.K., Mohanty, R.B. (2013). Ethno-Medico Biology of Bhadrak district, Odisha, India. *Journal of Forestry Research*, 24(1), 187-192.

- Prabhakar, A.K., & Roy, S.P. (2009). Ethno-medicinal uses of some shell fishes by people of Kosi River basin of North-Bihar, *Studies on Ethno-Medicine*, 3(1), 1-4.
- Prabhakar, A.K., & Roy, S.P. (2009). Ethno-medicinal uses of some shell fishes by people of Kosi River basin of North-Bihar, *Studies on Ethno-Medicine*, 3(1), 1-4.
- Ramakrishna, & Dey, A. (2007). *Handbook on Indian Freshwater Molluscs* 1-399. (Published by the Director, *Zool. Surv. India*, Kolkata)
- Sarkar, A., Biswa, R., & Das, A.P. (2014). Zootherapeutic uses of animals by *Mech* tribe living in Duars of West Bengal. *Indian Journal of Traditional Knowledge*, 13(3), 557-563.
- Sarkar, B., Biswas, P., Acharya, C.K., Ghorai, S.K., Nahar, N., Jana, S.K., Ghosh, S., Sarkar, D., Behera, B., & Madhu, N.R. (2021). Knowledge of Traditional Indian Medicinal Plants for the Management of COPD. *Chettinad Health City Medical Journal*, 10(4), 184 – 189. [https://doi.org/10.36503/chcmj10\(4\)-05](https://doi.org/10.36503/chcmj10(4)-05)

HOW TO CITE

Bulganin Mitra and Joyjit Ghosh (2023). A synoptic review on the traditional uses of gastropods and bivalves (Mollusca) as food and medicines in India. © International Academic Publishing House (IAPH), Mrs. Bhanumati Sarkar, Dr. (Professor) Surjyo Jyoti Biswas, Dr. Alok Chandra Samal & Dr. Akhil Pandey (eds.), *The Basic Handbook of Indian Ethnobotany and Traditional Medicine [Volume: 2]*, pp. 89-97. ISBN: 978-81-962683-5-0. <https://doi.org/10.52756/bhietm.2023.e02.007>

