AGRI MAGAZINE
(International E-Magazine for Agricultural Articles)
Volume: 03, Issue: 04 (April, 2026)
Available online at http://www.agrimagazine.in
©Agri Magazine, ISSN: 3048-8656

Practices of Entomotherapy in the State of Arunachal Pradesh

*Neelam Benn, Gida Attar and Ngangom Uma Devi
College of Agriculture (CAU-Imphal) Kyrdemkulai, Meghalaya, India
*Corresponding Author's email: bennneelam4@gmail.com

Traditional healing still shapes everyday life in parts of Arunachal Pradesh, where distance, terrain, and culture influence how people care for their health. This article explores entomotherapy, the practice of using insects and insect-based substances as medicine, as understood by indigenous communities across the state. Drawing from ethnographic observations and documented sources, it describes how specific insects are prepared and used to manage common ailments such as wounds, stomach troubles, and fatigue. More importantly, it reflects on the knowledge systems behind these remedies-how they are learned, shared, and adapted over time. As modern healthcare slowly expands into remote areas, such traditions are beginning to fade, making documentation both urgent and meaningful. Rather than treating these practices as curiosities, the discussion presents them as practical, experience-based healthcare strategies and as valuable leads for future scientific and pharmacological inquiry. It ultimately shows why listening to local wisdom still matters today worldwide.

Keywords: Traditional healing, entomophagy, traditional medicine

Introduction

Insects are among the most diverse and abundant organisms on Earth. They belong to the class Insecta under the phylum Arthropoda and are characterized by a three-part body structure consisting of the head, thorax, and abdomen, along with three pairs of legs and a pair of antennae. Many insects also possess wings, and their bodies are protected by a hard outer covering known as an exoskeleton. Due to their remarkable adaptability, insects inhabit nearly every ecosystem on the planet—from dense forests and grasslands to freshwater bodies and agricultural landscapes. Beyond their ecological roles in pollination, decomposition, and food webs, insects have also played an important role in human societies as sources of food, medicine, and other useful products.

Across the world, insects have long been incorporated into traditional diets and healing practices. The consumption of insects, known as entomophagy, has been documented in many cultures across Africa, Asia, Latin America, and Oceania. In addition to their role as food, insects have also been used for therapeutic purposes, a practice referred to as entomotherapy. Various insect species and insect-derived products such as honey, propolis, and bee venom have historically been used to treat ailments ranging from digestive disorders to skin conditions and inflammatory diseases. In recent years, global scientific interest in edible insects has increased significantly. Researchers now recognize insects as a sustainable source of high-quality protein, vitamins, minerals, and beneficial bioactive compounds. A 2025 review by van Huis et al. notes that "*edible insects are gaining traction worldwide for research and development owing to their nutritional value and diverse health-enhancing properties, including immunomodulatory, antioxidant, and antimicrobial effects*." Similarly, research has identified numerous bioactive compounds in insects that may contribute to anti-inflammatory and antimicrobial activities. A global review by Ramos-Elorduy et al. (2023)

reported that *more than 2,100 insect species worldwide have documented therapeutic uses, highlighting their long-standing role in traditional health systems.*

In India, the practice of consuming insects and using them for medicinal purposes is particularly common among indigenous communities, especially in the northeastern region of the country. The diverse ecosystems of this region support a wide variety of edible insects such as grasshoppers, crickets, ants, termites, beetles, and silkworm larvae. Many ethnic communities in states such as Assam, Nagaland, Manipur, and Arunachal Pradesh traditionally collect and consume insects as part of their daily diets rather than merely during times of food scarcity. According to Mishra (2024), "*insects have been traditionally used as medicine and therapeutic agents across diverse cultural groups, and ethnomedical knowledge of insect use is often conserved by healers as a part of intergenerational cultural heritage."* These practices reflect a close relationship between local communities and their surrounding natural environment, where insects serve both nutritional and medicinal purposes.

Among these regions, Arunachal Pradesh stands out for its extraordinary biological and cultural diversity. Located in the Eastern Himalayan region of India, the state features a wide range of landscapes, from low-lying valleys to high mountain ecosystems. This ecological diversity supports a rich variety of insect species found in forests, rivers, wetlands, and agricultural fields. At the same time, Arunachal Pradesh is home to 26 major tribes and more than a hundred sub-tribes, each possessing unique traditions, languages, and ecological knowledge. Within these communities, insects are not viewed as unusual or exotic foods; rather, they are familiar and respected components of traditional diets and health practices.

In Arunachal Pradesh, the practice of eating insects or using them for medicinal purposes is deeply rooted in everyday life. Long before global scientific interest in edible insects emerged, tribal communities in the region relied on forests, rivers, and surrounding landscapes not only for survival but also for nourishment and healing. Knowledge about edible and medicinal insects such as when to collect them, how to prepare them, and what health benefits they provide has traditionally been passed down orally from one generation to the next. Certain insects are consumed mainly for their nutritional value and taste, while others are believed to help treat ailments such as stomach problems, wounds, or general weakness.

The term entomotherapy may sound technical, but it simply refers to the use of insects or insect-derived products as remedies for health conditions. In many tribal societies of Arunachal Pradesh, such practices are closely linked with local beliefs, seasonal cycles, and careful observation of the natural environment. However, rapid social and environmental changes including modernization, deforestation, and shifting lifestyles are gradually affecting traditional knowledge systems. As younger generations become less connected with the natural environments where such practices originated, valuable ethnobiological knowledge risks being lost.

Documenting the traditional use of insects in food and medicine is therefore important not only for preserving cultural heritage but also for understanding the potential nutritional and therapeutic value of these organisms. By studying entomophagy and entomotherapy in Arunachal Pradesh, researchers can gain insights into how indigenous knowledge systems interact with biodiversity and may contribute to sustainable food resources and future medical discoveries.

Materials and methods

Fieldwork was conducted in selected tribal regions of Arunachal Pradesh, India, an area recognized for its exceptional biological diversity and strong indigenous knowledge traditions. Surveys covered districts inhabited mainly by Nyishi, Galo, Adi, and Apatani communities across habitats ranging from river valleys and agricultural lands to forested hills and mid-elevation zones. Between 2015 and 2017, villages were selected through random sampling within each tribal area to reduce bias. Ten villages each were surveyed in Nyishi and Galo regions, eighteen in Adi areas, and five in Apatani areas. Smaller villages typically

had 12-20 households, while Adi settlements often contained 80-200. Priority was given to interviewing elder households, widely regarded as knowledge holders. Where village headmen or elders recommended particularly knowledgeable individuals in neighboring settlements, these referrals were followed. For each tribe, 20 informants aged approximately 45-70 years participated, with efforts made to include both men and women. Semi-structured interviews were conducted using clear, simple questions, as many participants were more comfortable in local languages than in Hindi or English. Museum specimens or photographs were shown to assist identification and avoid confusion between similar species. Participants were asked about local names, uses, seasonal availability, edible or medicinal life stages, harvesting methods, preparation techniques, and perceived therapeutic value. Frequently cited edible or medicinal insects included grasshoppers such as *Oxya hyla*, crickets like *Brachytrupes orientalis*, silkworm larvae (*Bombyx mori*), red weaver ants (*Oecophylla smaragdina*), honey bees (*Apis cerana indica*), giant water bugs (*Lethocerus indicus*), and certain beetles such as *Holotrichia parallela*. Open discussion was encouraged so informants could elaborate on personal experience and traditional beliefs.

To confirm reported species, insects were collected with local assistance from habitats mentioned during interviews-ponds, streams, agricultural fields, soil, shrubs, trees, grasslands, and dwellings. Specimens were preserved following standard entomological techniques and identified using established taxonomic keys. When identification could not be completed in the field, samples were sent to specialists at the Zoological Survey of India in Kolkata for verification. Observations on livelihood systems and ecological settings were recorded alongside biological data to understand how insect use fits within daily life. Adi communities, for example, combine hunting, gathering, wet rice cultivation, and shifting agriculture, while Apatani settlements centered around Ziro are known for permanent irrigated rice-fish farming. Climate, vegetation type, altitude, and seasonal cycles were also noted, since these factors strongly influence insect availability and use. Information gathered during interviews was cross-checked through repeated questioning, comparison among informants, and specimen confirmation. Only uses verified by multiple respondents or supported by collected specimens were included in the final analysis, ensuring reliability while respecting oral knowledge traditions.

Results and discussion

Field surveys across tribal regions of Arunachal Pradesh revealed a rich diversity of insects used for both dietary and therapeutic purposes. Informants identified numerous species belonging mainly to the orders Orthoptera, Coleoptera, Hymenoptera, Hemiptera, Lepidoptera, and Odonata. The wide taxonomic range reflects both ecological richness and detailed local knowledge.

Although all surveyed tribes practiced entomophagy and entomotherapy, preferences differed noticeably among communities. Some groups favored orthopterans for their taste and availability, while others preferred aquatic insects or larvae. Such variation appears to stem from a combination of ecological access, inherited culinary traditions, and clan-specific knowledge systems. Insects were rarely described as famine foods; instead participants emphasized flavor, nutritional value, and perceived health benefits as reasons for consumption. Preparation methods were generally simple yet deliberate. Roasting, frying, boiling, or sun-drying were the most frequently reported techniques, often performed immediately after collection to preserve freshness.

Certain species were eaten only during specific life stages-for example, larvae rather than adults indicating detailed understanding of seasonal life cycles. Medicinal uses were equally specific: ants were sometimes used in remedies for coughs, honey for wound care, and particular beetle larvae for fatigue or weakness. Such practices demonstrate that insect use is embedded in practical experience rather than abstract belief.

Ecological Knowledge and HarvestingPractices

Collectors showed strong awareness of insect habitats and seasonal rhythms. Aquatic species were gathered from ponds and slow streams, soil-dwelling larvae from cultivated fields, and

arboreal insects from shrubs or tree trunks. Harvesting methods were usually low-impact, involving handpicking, simple traps, or digging tools fashioned from local materials. These approaches suggest a sustainable relationship with the environment, shaped by generations of observation and adaptation.

Local ecological knowledge also extended to conservation-like practices. Several informants explained that certain insects should not be collected during breeding periods or should be harvested only in small quantities to ensure future availability. Although not framed in scientific terms, such practices effectively support population persistence and biodiversity maintenance.

Therapeutic Applications

Twelve insect species were consistently reported as having medicinal value. Honey from *Apis cerana indica* was commonly administered for cough, throat irritation, and wound healing. The acidic secretion of weaver ants (*Oecophylla smaragdina*) was diluted and used as a traditional remedy for digestive problems and as a topical antiseptic. Oil extracted from beetle larvae such as *Oryctes rhinoceros* was applied to relieve joint pain and muscle stiffness. Dragonfly nymphs were sometimes prescribed in soups for individuals recovering from illness, believed to restore vitality. Certain remedies extended to veterinary care: crushed termites (*Odontotermes obesus*) were mixed with fodder to treat digestive disorders in livestock, while powdered wasp nests were occasionally used in folk treatments for skin infections. These practices illustrate a close empirical relationship between observation, experimentation, and intergenerational transmission of knowledge.

Weaver ants (*Oecophylla smaragdina*)

Beetle larvae (*Oryctes rhinoceros*)

Dragonfly nymphs

Termites (*Odontotermes obesus*)

Trends and Emerging Concerns

Despite the richness of these traditions, respondents noted a gradual decline in insect use. Habitat disturbance, pesticide exposure, changing diets, and increased reliance on market foods were cited as major factors reducing both insect availability and cultural transmission. Younger generations were often less familiar with insect identification and preparation methods, indicating a risk of knowledge erosion. Overall, the findings confirm that entomophagy and entomotherapy form an integrated biocultural system rather than isolated practices. Insects function simultaneously as food resources, medicinal agents, and ecological indicators. Documenting these traditions not only preserves indigenous knowledge but also highlights their potential relevance for sustainable nutrition, biodiversity conservation, and future pharmacological research.

Conclusion

The study shows that entomotherapy in Arunachal Pradesh is a deeply rooted tradition supported by detailed ecological knowledge and cultural practices. Indigenous communities continue to use a wide range of insects species for both nutrition and healing demonstrating a sophisticated understanding of local biodiversity.

References

1. Bodenheimer FS. In: Insects as Human Food. Junk W, editor. The Hague; 1951.
2. DeFoliart GR. The Human Use of Insects as a Food Resource: a Bibliographic Account in Progress. 2002. http://www.food-insects.com E-Book.
3. Nonaka K. Ethnoentomology - Insect Eating and Human-Insect Relationship.

4. Mitsuhashi J. Sekai konchu shoko taizen. Tokyo, Yasaka Shobo; 2008.
1. Tokyo, University of Tokyo Press; 2005.
5. Van Huis A. Insects as food in Sub-Saharan Africa. Vol. 23. Insect Sci Applic;2003. pp. 163–185.
6. Ramos-Elorduy J. In: Biodiversidad, taxonomia y biogeografia de artropodos de Mexico: hacia una sintesis de su conocimiento. Llorente JB, Morrone J, Yanez OO, Vargas IF, editor. Vol. 4. Mexico City, National University Press; 2004. La etnoentomologia en la alimentacion, la medicina y el reciclaje; pp. 329–413.
7. Antonio TMF. Insects as remedies for illness in Zaire. Food Insects Newsletter. 1994;73(3):4–5.
8. Fosaranti JO. The place of insects in the traditional medicine of South WesternNigeria. Food Insects Newsletter. 1997;10(2):1–5.
9. Zimian D, Yonghua Z, Xiwu G. Medicinal insects in China. Ecol Food Nutr.1997;36(2-4):209–220. doi: 10.1080/03670244.1997.9991516.
10. Green SV. The bushman as an entomologist. Antenna. 1998;22(1):4–8.
11. Namba T, Ma YH, Inagaki K. Insect derived crude drugs in the Chinese Song Dinesty. J Ethnopharmacol. 1988;24(2-3):247–285. doi: 10.1016/0378- 8741(88)90157-2.
12. Maya EMA. Hnahuunu EL-Dexthi-San Juanico". Hidalgo; 2000. Ethnoentomologia de la comunidad.
13. Oudhia P. Traditional medicinal knowledge about common insects and mites in India. Ecol Environ Conserv. 2002;8(4):339–340.
14. Padamanbhan P, Sujana KA. Animal products in traditional medicine from Allapady hills of Western Ghats. Ind J Tradit Knowledge. 2008;7(2):326–329.
15. Lokeshwari RK, Shantibala T. A review on the fascinating world of insect resources - reason for thoughts. Vol. 70. Psyche; 2010. pp. 1–11. article ID 207570.
16. Pemberton RW. Insect and other arthropods used as drugs in Korean traditionalmedicine. J Ethnopharmacol. 1999;65:207–216. doi: 10.1016/S0378- 8741(98)00209-8.
17. Yamakawa M. Insect antibacterial proteins: regulatory mechanisms of their synthesis and a possibility as new antibiotics. J Sericult Sci Japan. 1998;67:163– 182.
18. Reim H. Die Insektennahrung der australischen Ureinwohner. Berlin, Akademie Verlag; 1962.
19. Meyer-Rochow VB. Can insects help to ease the problem of world foodshortage? Search. 1975;6:261–262.
20. Meyer-Rochow VB, Changkija S. Uses of insects as human food in Papua New Guinea, Australia, and North-East India: cross-cultural considerations and cautious conclusions. Ecol Food Nutr. 1997;36:159–187. doi: 10.1080/03670244.1997.9991513.
21. Meyer-Rochow VB. In: Ecological implications of minilivestock: Rodents, frogs,
2. snails, and insects for sustainable development. Paoletti MP, editor. Enfield, USA, Science Publ; 2004. Traditional food insects and spider in several ethnic group of North East India, Papua New Guinea, Australia and New Zealand; pp. 385–409.
22. Singh OT, Nabam S, Chakravorty J. Edible insects of Nishi tribe of Arunachal Pradesh. Hexapoda. 2007;14:56–60.
23. Kato D, Gopi GV. Ethnozoology of Galo tribe with special reference to edible insects in Arunachal Pradesh. Ind J Tradit Knowledge. 2009;8(1):81–83.
24. Myer N, Muttermeier RA, Muttermeier CA, da Fonseca GAB, Kent J. Biodiversity hot spots for conservation priorities. Nature. 2000;403:853–858. doi: 10.1038/35002501.
25. Anonymous. Tourism policy. Directorate of Tourism. Itanagar, Govt. of Arunachal Pradesh; 2003.