Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 11 [11] October 2022 :219-222

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD

REVIEW ARTICLE **OPEN ACCESS**

Present Status of Entomophagy in India

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ABSTRACT

Eating insects is a very widespread behaviour in many cultures all over the world. In India, insects are used in a variety of ways by tribal people, including as food, medicine, and ornament. For tribal people, edible insects are a healthy, renewable food supply that has positive effects on the environment, the economy, and nutrition. Insects are a more affordable source of protein than meat and fish because of their high protein content and ease of digestion. They also contain certain minerals, vitamins, lipids, and carbohydrates. Varied ethnic groups choose food insects based on their cultural practices, culinary preferences, accessibility, and various phases of development. Indian tribal people frequently eat insects in many different regions. Coleopteran species are consumed the most out of these edible insect species, accounting for roughly 34% of total consumption, followed by Orthopteran (24%) and Hemipteran (17%), Hymanoptera (10) and Odonata (8%), Lepidoptera (4%), Isoptera (2%), and Ephimeroptera (1%). Insect consumption has been important in terms of nutrition as well as biological control, which is significantly superior to the use of pesticides and other approaches in terms of costs and environmental implications.

Key Words: *Entomophagy, Insects, Food, Tribals, Nutrition, Biological Control.*

Received 22.10.2022 Revised 25.10.2022 Accepted 10.11.2022

INTRODUCTION

Eating insects is a practice known as entomophagy. Many nations throughout the world consider insects to be true food sources for people. Numerous tribes in India have been doing this for ages. However, as Mistuhashi has demonstrated, such ancient behaviours are uncommon, and the available evidence, particularly with relation to India, is fragmented and limited. In the near future, entomophagy needs to be revalidated and pushed because food scarcity in India is getting worse by the hour [1].

More than 65 percent of people in India live in rural areas where there is a concern with food security [2]. The overall amount of food that India would need to produce by 2030 is estimated to be roughly 355 million tonns, however the amount of food that is available will be insufficient in future. The suffering has been made worse by inefficient food distribution and expensive food. Additionally, he examined the current state of entomophagy globally and advocated for its revival in areas where there is a severe food crisis.

Edible insects are a sustainable natural food supply with health, economic, and ecological advantages for people all over the world. Insects are the ideal food because of their high protein content, digestibility, and combination of minerals, vitamins, lipids, and carbohydrates. In contrast to fish and meat, insects are really the most affordable source of protein. Entomophagy is currently, however, a less widespread practice. As food scarcity in India worsens on a daily basis, entomophagy needs to be revalidated and pushed in the near future.

Between 8°4' and 37°6' north latitude and 68°7' and 97°25' east longitude, India is located north of the equator. It is the seventh-largest country in the world, with a total area of 3,166,414 square kilometres (1,222,559 square miles) and a population of approximately 1210.2 million people, including 645 different tribes. More than 65 percent of the population also lives in rural areas. Its distinct geoclimatic characteristics support a wide variety of living things. India is a tropical country, hence there are more different kinds of insects there. 589 families and 51450 species of insects have been recorded from India [3]. Alfred et al. identified 59353 species of insects from India, divided them into 619 groups, as part of another estimate [4]. As a result, using insects as a bioresource could be possible in India.

The fundamental issue in this scenario is that although locals have a wealth of ethno-entomological knowledge that has been passed down orally from generation to generation, those outside the

communities in issue are hardly ever aware of this reservoir of information.. However, despite being still accessible, it is increasingly in jeopardy of disappearing.

There are still many problems, as much of the region in question is not only difficult to reach, but special permits are required by the Indian administration to enter the tribal areas, mainly in north-eastern India, where most cases of entomophagy have been reported.

Local informants are reluctant to speak out when they realize they are being recorded, preferring to remain silent. Thus, there is always a risk that information obtained from local informants (tribes of remote areas often do not speak Hindi or English requiring a translator) is somewhat incomplete; however, this difficulty should be seen as a minor setback in the context of the enormous threats to the traditional uses of insects in these societies.

WHY INSECTS:

Insects are the most successful class of animals in the animal kingdom, making up more than half of all species that exist today. There are a million insect species in existence. Every year, more than 7000 new species are described. Significant contributors to their success include their capacity for rapid escape from predators, their capacity for rapid reproduction, and their ability to adapt to and live in a variety of habitats [5].

Insects have an impact on humans both positively and negatively. They could spread diseases to people as vectors and decimate our crops as pests. Insects aren't always pests or disease carriers, though. Most are safe, and many are even helpful. Even though the insect legions cause both misery and benefits for man, Vines and Rees concluded that the suffering surpasses the benefits [6]. Numerous insects are consumed as food in many poor nations [7].

Grasshoppers, locusts, crickets, beetles, termites, ants, and caterpillars are some of the insects that are frequently eaten in Nigeria [8]. Insects represent a category of traditional food in many cultures around the world. There are over 1,000 insect species that are eaten as food around the world. Van Huis [9] has noted that there are 250 highly nutritious edible insect species in sub-Saharan Africa; Ramos et al. [10] reported similar information and registered approximately 535 edible species in Mexico; Mitsuhashi [1] came up with a figure of at least 1,900 identified edible insect species worldwide.

Recent reports indicate that the number has reached 2000 [11]. In traditional societies, insects are frequently used in other contexts, such as raw material providers (for dyes, poisons, and traditional medicines), decorative accents, amusement, and even objects of admiration [12].

ETHNO-ENTOMOPHAGY IN INDIA

Termites are consumed by native tribes in Mysore and the Karnataka region [13]. In Arunachal Pradesh, 81 insects are consumed by the Nyishi and Galo tribes[14]. Indian locust *Schistocerca gregaria* for use as both food and fertiliser and found that it was high in crude protein and fat [15]. A nutritional examination of the Muria tribes in Madhya Pradesh was carried out by Roy and Rao [16]. The two writers discovered that intake of chin kara, or insect larvae, as well as specific ant species was documented in conjunction with several other food items. According to Rajan [17], the winged termites, also known as "Eesal," are eaten as food by the tribe known as the "Irumbars" in the North Arcot region of Tamilnadu and by tribes in Karnataka. He has also mentioned that in some Karnataka communities, weak kids are given uncooked queen termites to eat. In a situation similar to this, termites are consumed in Odisha, either by themselves or with rice [18]. Wilsanand [19] and Yesodharan et al. [20] reported eating at least five different species of insects (bees, ants, and termites) in Kerela. The Negrito people of the Indian Andaman Islands eat insects as a food source [21].

The Hindu reported on July 3, 2022 that researchers are currently in the final stages of their findings to prepare a presentation for the GI registry of kai chutney made from weaver ants, scientifically known as *Oecophylla smaragdina*. It is abundant year round in Odisha's Mayurbhanj district [22]. The GI label, when used under the food category, would support the development of a standardized hygiene strategy in the manufacture of kai chutney for general consumption. Labeling helps businesses in the local area, and it also helps to increase the value and reputation of regional products.

Table: - Some popular insect foods in India and their recipes.	
Nagaland	❖ Silkworm pupae are eaten by some Naga tribes after they are fully developed, while others prefer them when they are still in the prepupal stage.
Arunachal Pradesh	❖ Nyishi and Galo tribes consume a lot of insects. The most favourable life stages for insects are the caterpillars and pupae of the mulberry silkworm and non-mulberry silkworms.
Meghalaya	❖ Termites are used as a source of proteins and carbohydrates.
Assam, Mizoram, Manipur and Tripura	❖ The cinnamon bugs are fried in oil and eaten.
Tamil Nadu and karnataka	❖ Winged termites are cleaned, roasted and eaten.
Odisha	❖ Termites are eaten either alone or with rice.
Madhya Pradesh	❖ The Muria tribe in the Bastar district of southeastern Madhya Pradesh relish ***Chind Kira*** and ***Gurmuri Kira –*** insect larvaes collected from young date palms and leafy trees.
Chhattisgarh	❖ As a side dish, people like to eat de-oiled silkworm pupae meal and red ant chutney.
West Bengal	❖ Dead ants and their eggs are stored by some tribes in the Purulia District to dry in the sun before being ground up for use later. On special occasions, the sour-tasting powder is used to prepare vegetable and meat curry.

DISADVANTAGES OF ENTOMOPHAGY

The current use of pesticides is one issue with eating insects. Due to the fact that insects consume pesticides and herbicides from plants, these can bioaccumulate inside of them. When insects consume sprayed plants, this occurs. This implies that natural insects would not be edible in regions where chemical spraying of any kind is taking place.

Another concern with eating insects is the possibility of people having allergic reactions to them. People with allergies to nuts or shellfish should avoid eating insects because they are known to provoke reactions.

CONCLUSION

A report on the practice of entomophagy and its prospects for the future was released by the U.N. Food and Agriculture Organization in 2013. More than 1900 kinds of insects are utilised as food worldwide, and eating insects is regarded to be a component of the traditional diets of at least 2 billion people [23].

Entomophagy may be advised, especially during natural disasters and at the beginning of the crop season, taking into account the current state of food security and future food requirements. In their natural environments, insects can be hand-collected using simple methods like light traps. Rural populations have discovered that indoor rearing in homes is feasible because host plants are easily accessible, eliminating the need for collecting from remote locations. Insects and their products may be exported through cooperative societies if the necessary infrastructure is in place. In well-managed fields, control measures against insects may not be necessary because the population of destructive stages is drastically decreased when insects are removed from crop fields. Therefore, community activities may enhance local residents' standard of living.

ACKNOWLEDGEMENT

Author is thankful to the Principal, Suri Vidyasagar College and all the teaching staffs of the Department of Zoology, for providing support and encouragement during the study.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest for this study.

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CITATION OF THIS ARTICLE

Chandrik Malakar. Present Status of Entomophagy in India. Bull. Env.Pharmacol. Life Sci., Vol 11 [11] October 2022 :219-222