# INSECTS: Nature's Tiny Healers and their Therapeutic Uses

**Parineeta Rabha[1]*and Mahesh Pathak[2]**

[1]*M. Sc. Scholar, Department of Entomology, CPGS-AS, CAU (I), Umiam, Meghalaya (793103), India*
[2]*Professor, Department of Entomology, CPGS-AS, CAU (I), Umiam, Meghalaya*

**Corresponding Author**
Parineeta Rabha
Email: parineetarabha87@gmail.com

**OPEN ACCESS**

**Keywords**

Insects, Medicine, Bee venom, Cantharidine, Maggot therapy

*How to cite this article:*

Rabha, P. and Pathak, M. 2024. INSECTS: Nature's Tiny Healers and their Therapeutic Uses. *Vigyan Varta* 5(8): 33-36.

**ABSTRACT**

Entomotherapy is the use of insects and their products for medicinal purposes. Since ancient times, humans have been utilizing insects and their products as a source of medicine for curing ailments due to their antirheumatic, anticancer, immunological, diuretic, analgesic, antibacterial, and anesthetic properties. Insects have long been used in traditional medicine for their useful natural products such as propolis, pollen, bee wax, and royal jelly. The intriguing ways that insects and their products are transforming healthcare are examined in this article.

## INTRODUCTION

Insects are one of the most diverse and successful groups of organisms on the entire globe. They belong to the phylum Arthropoda (the Animal Kingdom's largest phylum). A wide range of high and low molecular compounds are produced by insects, primarily as defense measures (Kaur *et al.*, 2023). Insects have shown to be a significant source of modern pharmaceuticals due to their antirheumatic, anticancer, immunological, diuretic, analgesic, antibacterial, and anesthetic properties (Kaur *et al.*, 2023). Entomotherapy is the use of insects and their products for medicinal purposes. Products derived from insects, such as silkworm silk and bee venom, are finding a growing market for medicinal uses. Traditional medicine has been employing bee venom therapy, i.e., the medicinal application of honeybee venom, to treat conditions like skin disorders, malignant

tumors, back discomfort, rheumatism, and arthritis (Kaur *et al.*, 2023).

Insects have long been used in traditional medicine for their useful natural products such as propolis, pollen, bee wax, and royal jelly. The use of honey and the products of bees are mentioned in the ancient Indian Sanskrit Veda as treatments for various diseases. Another example of an insect that is mentioned in Ayurveda is the Jatropha leaf miner. Topical application of the larvae of this insect was believed to reduce fever, induce lactation and facilitate digestion. In Africa, grasshoppers are collected, sun-dried, powdered and applied to the forehead in the form of a paste to relieve intense headaches (Kaur *et al.*, 2023). During World War II, military surgeons observed that wounds infested with maggots of blowflies healed more quickly than wounds that weren't treated for several days. Ants mixed with coffee or juice were consumed in certain parts of Brazil to treat eye-related diseases. *Palembus dermestoides*, a tenebrionid beetle, was used in Brazil to treat sexual impotency, TB, arthritis, and asthma. Amazonian Indians used ants to detect diabetes in their patients, as the urine of individuals with high blood sugar levels attracts ants (Kaur *et al.*, 2023).

Currently, around a thousand insects have been found to possess therapeutic qualities in various nations throughout the world. The following list includes notable insect-based compounds with medicinal properties that are being developed.

1. **Apitherapy:** Apitherapy is the practice of employing honeybee products for therapeutic purposes. Beeswax, which is used in body lotions and pill coatings for facilitating ingestion, is high in vitamin A and aids in cell formation (Choudhary *et al.*, 2022). Mellitin, the main peptide found in bee venom, is used to treat inflammation in multiple sclerosis and rheumatoid arthritis patients (Choudhary *et al.*, 2022). Moreover, bee venom has anticancer properties where melittin targets leukemia cells and cancer cells of the kidney, lung, liver, prostate, bladder, and breast to make them cancer-free. Honey can be heated and consumed to treat coughs, colds, lung diseases, laryngitis, throat infections, and tuberculosis. It can also be used on the skin to treat burns, rashes, and severe scarring (Choudhary *et al.*, 2022). Bee bread, also known as bee pollen, is consumed as a general health booster and is claimed to aid in the treatment of ulcers, skin conditions, and both internal and external illnesses. It is rich in vitamins (A, B1, B2, B6, C, and E), calcium, iron, potassium, sodium, and amino acids (Choudhary *et al.*, 2022). Propolis, which is rich in antibacterial, anesthetic, and anti-inflammatory qualities, is consumed by menopausal women due to its high hormone concentration (Choudhary *et al.*, 2022). In addition to its usage in treating anemia, gastrointestinal ulcers, arteriosclerosis, hypo- and hypertension, and inhibition of sexual libido, royal jelly also aids in bone marrow development, cell regeneration, and endocrine system balance (Choudhary *et al.*, 2022).

2. **Maggot Therapy or Maggot Debridement Therapy (MDT):** The deliberate application of live, sterile blowfly larvae (maggots) to soft tissue to heal wounds is known as "maggot therapy." The three important functions of maggot therapy are to disinfect the wound by eliminating bacteria, promote wound healing, and clean wounds by dissolving dead (necrotic) diseased tissue (Choudhary *et al.*, 2022). The therapy utilizes aseptically grown, specially graded clinical maggots of greenbottle fly larvae (*Lucilia sericata*) or *Phormia regina* (Kaur *et al.*, 2023). MDT not only speeds up

wound healing but also lowers the need for surgical intervention, providing a less invasive and more affordable alternative for patients.

3. **Silk:** Silk has high tensile strength, self-assembling proteins and a manipulatable structure and composition (Ratcliffe *et al.*, 2014). It also degrades slowly and is biocompatible with human tissue. Silkworm silk was approved by the FDA for use in biomaterial devices (Kaur *et al.*, 2023). Scaffolds of silk are used for healing damaged cartilage, bones, and skin as they promote tissue growth and restoration. Silk's versatility makes it possible to modify it into a variety of forms, including sponges, films, and gels, facilitating its use in medical fields.

4. **Cantharidine:** The green blister beetle of the order Coleoptera and family Meloidae secretes a chemical called cantharidine as a defense against other species. Cantharidine has been used to treat warts in clinical trials; the blistering skin patches return to normal condition without leaving a scar in the patient (Kaur *et al.*, 2023). The two species most often utilized are *Lytta vesicatoria* (Europe) and *Mylabris pustulata* (India). The FDA approved this technique in 2004 as a treatment for warts, skin issues, ovarian cancer cells, urinary tract infections, and kidney infections (Choudhary *et al.*, 2022).

**Commercial Products**

Several insect-based products have been produced by companies for the treatment of a number of diseases and are commercially available on the market. Nowadays, many companies are developing honeybee products to cure a wide range of conditions, including burns, diabetic foot ulcers, minor cuts or wounds, mild abrasions, lacerations, and dry eyes. Many FDA-approved Manuka honey formulations are also available in the form of gels, wound dressings, eye drops, etc. on the market. Royal jelly can be purchased commercially in the form of a pill and acts as an antibacterial and antifungal agent. Cantharone Plus, derived from blister beetles and developed by the Canadian company Dormer Laboratories, is also available to treat warts (Kaur *et al.*, 2023).

**Constraints**

Products created from insects have not yet achieved market success and recognition, despite their great potential. In addition, entomotherapy's research and operations lack both personnel and facilities (Choudhary *et al.*, 2022). The development of insect products as potential medicines in modern times has progressed slowly due to a lack of knowledge and challenges regarding the identification of species, drug toxicity, cost of development, and large-scale production.

## CONCLUSION

Often disregarded and undervalued, these tiny creatures are turning out to be incredible assets to modern medicine. Insects due to their vast abundance can possess inexhaustible resources for pharmaceutical research. Overexploitation, however, may cause insects and their resources to disappear. Thus, insect diversity must be conserved and preserved to supply materials for pharmaceutical research in the future.

"Remember! The next time you see a crawling beetle or a buzzing bee, they might have the secret to the advancement of a disease."

## REFERENCES

Choudhary, P., Sharma, A.K., Mishra, Y.K., and Nayak, S. (2022). Entomotherapy medicinal significance of insects: A review. *The Pharma Innovation Journal*, SP-11(4): 25-29.

Kaur, G., Sarao, P.S., and Chhabra, N. (2023). Therapeutic use of insects and insect products. *Indian Journal of Entomology*, 85(3): 798-807.

Ratcliffe, N., Azambuja, P., and Mello, C.B. (2014). Recent Advances in Developing Insect Natural Products as Potential Modern Day Medicines. *Hindawi*, Volume 2014, Article ID 904958.