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Nutritional and Pharmaceutical Uses of Insects

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INTRODUCTION

Insects are the most diverse group of organisms with one million species that account for 80% of the world's species. Insects and the substances extracted from them have been used as medicinal resources by human cultures all over the world. Besides medicine, these organisms have also played mystical and magical roles in the treatment of several illness in a range of cultures. So briefly, preventative or therapeutic use of insects and insect-derived products is referred to as Entomotherapy. It has its origins in traditional medicine and the use of insects for medical purposes was recorded in *Naturalis historiae* In the Roman empire. For example, the signature hair on hairy ants, for example, meant that they had powers to cure baldness. Likewise, stick insects were used for weight loss and crickets for throat and ear ailments (Meyer-Rochow). Now that science has already proven the existence of immunological, analgesics, antibacterial, diuretic, anesthetic, and other properties in the bodies of insects. Thus, insects seem to constitute an almost inexhaustible sources for pharmacological research.

Preventative or therapeutic uses

Among various insect's silkworms and honeybees are well-known sources of food and have been used for the treatment of a large number of human disorders. Honey, royal jelly, propolis, bee pollen, bee wax, and bee venom from honeybees have been used since ancient times and are potentially beneficial to humans due to their biomedical properties. Honeybee products are also regarded as a potential source of natural antioxidants due to their heterogenous phenolic, polyphenol content and flavonoid constituents that varies based on floral sources as well as the processing, handling, and storage of the product.

Insects from the Orders Coleoptera, Hymemoptera, Orthoptera, and Hemiptera were more employed in the treatment of disorders of the skin, digestive, respiratory, reproductive, circulatory, nervous, neuromuscular, and immunological systems as well as other diseases. In China, the medical use of crude drugs derived from insects was reported in the "herbal" *Jingshi Zhenglei Daguang Bencao* (A.D.1108). Many insects have been recorded in traditional medicine to exhibit anti-cancer activities. These uses include use of *Bombyx mori* and *Apis mellifera* for lung cancer, *Tabanus mandarinus* (Chinese horse fly) and *Gryllotalpa unispina* (giant mole cricket) for liver cancer, *Cyclopelta parva* (dadap bug) for esophageal cancer, *Hueckys sanguea* (red lady bug) for skin cancer, *Blatta orientalis* (oriental cockroach) for renal cancer, and *Cryptotympana japonensis* (black cicada) for thyroid cancer.

Cryptotympana japonensis

Hueckys sanguea

Members of Coleoptera (e.g., the Palm beetle (*Pachymerus nucleorum*), scarab (*Strategus aloeus*), scarab (*Megasona acaeon*), and Blister beetle (*Lytta versicatoria*)) have been used for treatment of earaches, as aphrodisiacs, and to treat urinary disorders (Posey, 1986). In Hemiptera (e.g., *Hyechys sanguinea*) have been used to treat migraine and ear infections (Kritsky, 1987). Orthoptera (e.g., the grasshopper (*Tropidacris* sp.), crickets (*Brachytrupes* sp.), and mole cricket (*Gryllus assimilis*)) have been used to treat skin diseases, defective mental development, and urine retention. Moreover, in order hymenoptera, wasps, stingless bees, and honey bees have been used as traditional medicine. One of the most well-known insects in this group are bees, which have also been used extensively in folk medicine. In Nepal, bee pollen has been used as a tonic for the elderly. Propolis, a plant resin collected by honey bees, is also used as an antiseptic and anti-inflammatory agent in the treatment of wounds and burns. Royal jelly, a bee larval food provided by young nurse bees, is used to treat asthma, anorexia, gastrointestinal ulcers, arteriosclerosis, anemia, hypotension or hypertension, anorexia, gastrointestinal ulcers, and postmenopausal symptoms (Cherniack, 2010 & Conconi & Jose, 1988). Moreover, the venom of honeybees has been used to ameliorate the symptoms of inflammatory and autoimmune disorders, including multiple sclerosis (MS), arthritis, rheumatism, chronic pain, neurological diseases, asthma, and dermatological conditions (Kampmeier & Irwin, 2009). Bee venom was used in ancient Greece for the anti-arthritic properties of apitoxin, which enhances blood flow to ischemic regions. The application of bee stings in treatment of human disease is known as "apipuncture".

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Apipuncture technique

The order Orthoptera has also been traditionally used for treatment of human disorders, for example, in Africa, powder of dried grasshoppers has been used to alleviate the pain of severe headaches (Srivastava, et al, 2009). The mole cricket, *Gryllotalpa africana*, has been used in Korean traditional medicine for retention of urine, urolithiasis, edema, lymphangitis and furuncles (Pemberton, 1999). In Latin America, the house cricket, *Acheta domesticus*, was used for the treatment of scabies, asthma, eczema, lithiasis, earache, oliguresis, rheumatism, urine retention, urinary incontinence and ophthalmological problems. Some insects of the order Hemiptera, are known to have medicinal values. For example, the stinkbug (*Encosternum delegorguei*) in Zimbabwe and South Africa decrease hypertension and have been used to cure asthma and heart diseases (Makore et al., 2015). The edible Chinese stinkbug, *Aspongopus chinensis*, has also been employed to relieve pain, and to treat nephropathy and kidney disease in China. Besides the orders described above, the silkworm (*B. mori* L., 1758) which is a member of Lepidoptera, has been used in Chinese traditional medicine for at least three thousand years (Yonghua & Xiwu, 1997) and the larvae of certain flies have been employed for centuries as beneficial agents to heal infected wounds.

CONCLUSION

Due to the large diversity of insects, they may be an alternative food source and preventive medicine for humans. Pharmacological and chemical analyses of insects and their products as well as medicinal properties warrant further investigation in multicellular organisms to reaffirm that the same effects are achievable in humans. Insect-derived compounds may be used as alternative medicine in the 21st century. Quality control for commercial processes, reductions in pesticides, and barcoding for taxonomy are also needed for food safety and to maintain the benefits of edible insects and insect-derived products as an alternative diet and in preventive medicine.

REFERENCES

Posey, D. A. (1986). Topics and issues in ethnoentomology with some suggestions for the development of hypothesis-generation and testing in ethnobiology. *J Ethnobiol 6*, 99-120.

Kritsky, G. (1987). Take two cicadas and call me in the morning. *Bulletin of the ESA 33*, 139-141.

Conconi, R. E. J., & Jose, M. P. (1988). The utilization of insects in the empirical medicine of ancient Mexicans. *J Ethnobiol 8*, 195-202.

Kampmeier, G. E., & Irwin, M. E. (2009). Chapter 59 - Commercialization of insects and their products. In: Encyclopedia of Insects (Second Edition). Eds: Resh, V. H. R. T. Cardé, Academic Press, San Diego.

Cherniack, E. P. (2010). Bugs as drugs, part 1: Insects. The "new" alternative medicine for the 21st century. *Rev Altern Med 15*, 124-135.

Srivastava, S., Babu, N., & Pandey, H. (2009). Traditional insect bioprospecting–As human food and medicine. *Indian J tradit. knowl 8*, 485-494.

Pemberton, R. W. (1999). Insects and other arthropods used as drugs in Korean traditional medicine. *J Ethnopharmacol 65*, 207-216.

Makore, T. A., Garamumhango, P., Chirikure, T., & Chikambi, S. D. (2015). Determination of nutritional composition of encosternum delegorguei caught in Nerumedzo Community of Bikita, Zimbabwe. *Int. J Biol 7*, 13–19.

Yonghua, Z., & Xiwu, G. (1997). Medicinal insects in China AU - Zimian, Ding. *Ecol Food Nutr 36*, 209-220.