ORIGINAL RESEARCH PAPER

Volume-7 | Issue-8 | August-2018 | PRINT ISSN No 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

INSECTS AND THEIR VENOMS IN TRADITIONAL USE OF MEDICINE-A REVIEW

Entomology

Sinjini Bose Vidyasagar College, Saltlake, Kolkata-700 091, India

Soumit Dutta* Vidyasagar College, Saltlake, Kolkata-700 091, India,*Corresponding author

ABSTRACT

Insects and their products have long been in used as traditional medicines in different parts of the globes. Different insects of several orders are used in making medicines or used to treat certain diseases. In Latin America, the common houseflies were used to treat skin infections. In Africa crickets were used to treat foot infections. Use of insects to treat diseases was most prevalent in ancient Asia. Lesser examples were found in case that of Europe.

KEYWORDS

Insect, Venom, Disease, Medicine.

INTRODUCTION

Insects make up the largest and most diverse group of organisms on earth, making up 80-90% of the world's biodiversity (Dossey, 2010), considering the sheer numbers of insect species approximately 4,000,000 on earth in total (May et al., 2000). The field of chemical ecology itself has been by far almost completely focused on insects with the first pheromone Bombykol having been discovered from silk moth, *Bombyx mori* (Butenandt et al., 1961). For a variety of reasons, globally ubiquitous insects and their chemical defense systems produce a valuable source of novel chemistry that certainly merits further investigation as a source of new medicinal compounds (Dossey, 2010).This review aims to focus and amalgamates the most intriguing examples of medicinal insects use by cultures worldwide and provides an overview of insects chemical defense system and also insect derived substances with medicinally relevant biological properties.

ETHNOENTOMOLOGY-Various cultures around the world particularly in tropics have long histories of using insects for a wide variety of functions including productions of materials such as silk for art, in rituals for food and as medicines to alleviate disease and suffering. (Costa-Neto, 2005; Bulmer, 1965).

- **LATIN AMERICA-** Use of insects in medicines has been well documented for native places in Latin America (Costa-Neto, 2005; Costa-Neto , 2002; Conconi, 1988; Ratcliffe, 2006) .In the recent and comprehensive review (Costa -Neto, 2005) notes the medicinal use of insects has been reported atleast in 13 Brazilian states since colonial times in over 16 different reports. Such an example is the common housefly (vernacular name 'mosca' ; *Musca domestica* in Tanquinho, Brazil to treat furuncles or boils (a skin infection caused by microbial parasites such as *Staphylococcus aureus* .These flies are being prepared by crushing them and applying paste directly onto the infected area (Costa-Neto, 2002). Other medicinal insects are the ants from the genus *Paraponera* (local name 'formigao'). The stings of the ants are used in the treatment of rheumatism and backaches for ages. The honey from at least 5 genera of bees *Apis, Melipona, Partamona, Plebia, Tetragonisca* is used in several local areas in Bahia, to treat ailments such as cold, flu, tuberculosis, and sore throats as well as for treating burns.

- **AFRICA-** Medicinal insect use as well as common use of insects as foods has been well studied in Africa (Costa-Neto, 2005; Nonaka, 1996; Antonio, 1994; Srivastava, 2009; Mbata, 1992) .Medicinal insects like bagworm (Family –Psychidae) whose body juices are applied to treat stomatitis. If this treatment is effective, it could therefore be due to some anti-inflammatory or anti-microbial agents in the bagworms (Nonaka, 1996). In southern-western Nigeria, the gut contents of mole crickets *Gryllotalpa africana)* are smeared on the feet to treat foot infections (Costa-Neto , 2005; Fasoranti, 1997).Six species of cockroaches (order-Blattaria) are used to treat boils (caused by infected hair follicles) and other wounds.

- **ASIA -** Asian medicine continues to use various exotic ingredients such as insects even in today's time. Probably the most historical example of an insect used in both European and Chinese medicine is that of 'Spanish fly'. This medicine originally came from the blister beetle (*Lytta vesicatoria,* Family–Meloidae). The haemolymph of these insects is known to contain a potent blistering agent (vesicant), cantharidin . When disturbed many blister beetles exude droplets of this blistering agent out of the pores in their legs so that it runs off on the attacker. Blister beetles have been also used by the Chinese for removing warts and cancer treatment (Moed et al., 2001 and Rauh et al., 2007) and by the Greeks for enhancing sexual libido (Moed et al., 2001). Though later it has been proved the use of Spanish fly for enhancing the sexual libido is just a misconception, because it causes irritation of urinary tract, providing a false notion of sexual stimulation. Cockroaches (order-Blattaria) such as *Eupolyphaga sinesis and Opisthoplatia orientalis* are mass produced in China and used for treatment of traumatic and vulnerary medicines and some useful health products (Zhang et al., 2008). One very intriguing example is Chinese people living in Malaysia use stick insects (order – Phasmatodea) for the medicinal use of their faeces (or frass). This frass is dried and mixed with herbs to treat various severe diseases asthma, upset stomach and muscle pain (Costa-Neto, 2005; Boyle, 1992). Other Asian cultures have incorporated insects into traditional medicines. For example- the Mamusi people of Papua New Guinea reportedly use the actinidine containing defensive spray of the stick insect, *Megacrania nigrosulfurea* as a ultimate treatment for ulcers (Prescott et al., 2009). Centipedes are also used for the treatment of joint ailments, lumps, tumors or neoplasms. Traditional use of insects as medicines has also been practiced in India, for example oil from 'red velvet mite' (*Trombidium grandissimum)* is used to treat at least 10 different diseases including malaria, urogenital disease and paralysis (Costa-Neto, 2005). The pod-borers or gram caterpillar (*Helicoverpa armigera)* also known as cotton ballworm in United states is widely distributed in India, U.S.A. and other countries (Oudhia, 2005) .The powder of these moths along with some herbs are used to treat fever, general weakness and nervous breakdown. As a final example from the report by Oudhia (2005), lightning beetles also known as fireflies; (Order Coleoptera; Family Lampyridae) are crushed fresh and applied to wounds to stop bleeding.

- **EUROPE**-In Europe, fewer examples of medicinal insects have been described than from other regions of the world (Ratcliffe, 2006 and Berenbaum, 1995). However aforementioned use of cantharidin for a number of medicinal purposes as described as early as 50-100 AD, and became popular in France as an aphrodisiac in late 1700s (Moed et al., 2001 and Berenbaum, 1995). Ratcliffe (2006) cites the application of oil obtained from the 'May beetle', *Melolontha vulcaris*to treat scratches and other wounds, as well as for rheumatism. The adult beetles of that species were also soaked in wine and used to treat anemia (Costa-Neto, 2005; Ratcliffe, 2006 and Berenbaum, 1995). In Eastern Europe, propolis from bees is used as antiseptic and anti-inflammatory agents for wound (Costa-Neto, 2005).

SUMMARY AND CONCLUSION

Insects make up the largest and most diverse group of organisms on the planet. Likewise the extent of chemical diversity which they process and make effective use of is also one of the most impressive in the living world. With the advancement in technologies to inspect, analyze and assay ever small amounts of materials, it is foremost important that formerly overlooked taxa and natural matrices are capitalized upon. Clearly among these are insects which possess one of the most productive and unexplored reservoirs of potentially useful substances.

The whole motive and reason of the present review is to emphasis on the usage of insect's natural products as budding and potential source of medicines that is useful and valuable for curing the disease as well as providing immunity against significant disease of our daily life. This overview concisely outlines the recent progress in developing insect naturalproducts as efficient new drugs. This is an exciting field of fresh and promising research topic due to huge importance to man in numerous grounds including -ethnobiology , medicine , pharmaceutical cure

ACKNOWLEDGEMENT

Gratitude is expressed to Dr. Indrani Sarkar, Head of the Department of Zoology, Vidyasagar College, Kolkata for her cooperation. Sincere thanks are also expressed to Dr. L.K. Ghosh for his help and guidance.

References

1. Antonio, T.M.F. (1994). Insects as remedies for illness in Zaire. The food insects newsletter, 7(3): 3-4
2. Berenbaum, M.R. (1995). The chemistry of defense: Theory and practice in Chemical Ecology: The chemistry of Biotic interaction. Proc. Natl. Acad. sci., U.S.A, 92(1):1-16.
3. Boyle,R.H.(1992) . The joy of cooking insects. Audubon., 94(5): 100-103.
4. Bulmer,R.(1965). Ethnology and General: Navaho Indian Ethnoentomolog. Am. Antropol. 67(6): 1564-1566.
5. Butenandt, A., Beckmann, R. and Hecker,E. (1961). [On the sex attractant of silkmoths.I. The biological test and the isolation of pure sex attractant bombykol] . Hoppe seylers z physiol. Chem., 324:71-83.
6. Conconi, J.R.E and Jose, M.P.(1988) . The utilisation of insects in the empirical medicine of ancient Mexicans. J. Ethnology.,8:195-202.
7. Costa-Neto, E.M. (2002). The use of insects in folk medicine in the state of Bahia , North -Eastern Brazil, with notes on insects reported elsewhere in Brazilian folk medicine. Hum.Ecol., 30(2) :245-263.
8. Costa-Neto,E.M .(2005). Animal based medicine: biological prospection and sustainable use of zootherapeutic resources. An.Acad.Bras.cienc., 77(1): 33-43
9. Dossey ,A.T. (2010) . Insects and their chemical weaponry: New potential for drug discovery.
10. Nat.Prod.Rep., 27:1737-1757.
11. Fasoranti , J.O.(1997) .The place of insects in traditional medicine of South-western Nigeria.
12. The food insects newsletter, 10(2): 1-5.
13. May, R. (2000). The dimension of life on earth in nature and human society: The quest for sustainable world. National Academy Press, 2000pp, 30-45.
14. Mbata, Keith,J., (1991). Traditional uses of arthropods in Zambia: II. Medicinal and miscellaneous uses. The food insects newsletter., 12(2): 1-7.
15. Moed,L. , Schwayder,T.A. and Chang, M.W. (2001).Cantharidin revisited: a blistering defence of an ancient medicine.Arch.Dermatol.,137(10) : 1357-1360.
16. Nonaka,K.(1996).Ethnoentomology of the Central Kalahari San. African study Monographs., 22:29-46.
17. Oudhia, P. (2005). Traditional knowledge about medicinal insects and mites in Chattisgarh, India: An overview conference paper at promotion and development of Botanicals with International coordination:Exploringquality, safety, efficacy and regulations.
18. Prescott,T., Bramham, J., Zompro,O. and MacIver, S.K.(2009). Actinidine and glucose from defensive secretions of the stick insect Megacrania nigrosulfurea. Biochemistry. Syst. Ecol., 37(6): 759-760.
19. Ratcliffe,B.C. (2006). Scarab beetles in human culture. Coleopts Bull., 60(5):85-101.
20. Rauh,R., Kahl,S., Bochzelt,H., Bauer,R., Karina,B. and Efferth, T.(2007). Molecular biology of cantharidin in cancer cells. Chin.Med., 2:8.
21. Srivastava, S.K., Babu, N. and Pandey, H. (2009). Indian J. Tradit. Knowledge., 8(4):485-494
22. Zhang, C.X., Tang, X.D. and Cheng, J.A.(2008).The utilisation and industrialisation of insect resources in China. Entomol. Res., 38: S38- S47.