Perspective
Volume 9:10, 2022

Journal of Environmental Analytical Chemistry

ISSN: 2380-2391 Open Access

Accretion of Insistent Biological Toxins in Organisms

Shanthi Kuppusamy*

Department of Analytical Chemistry, University of Latvia, Centra rajons, Latvia

Introduction

Organisms are subjected to a variety of stressors, including parasites and pollutants, which may interact with one another. In comparison to studies on parasite-metal interactions, research on the accumulation of organic compounds in host-parasite systems is limited and primarily focuses on intestinal endo parasites. The factors that influence the accumulation of persistent organic pollutants (POPs) in host-parasite systems were examined. Because the parasites have lower lipid contents, the wet/dry weight-based concentration of POPs in these parasites is usually lower than that in host tissues. However, the fractionation of pollutants into parasites and their hosts may vary depending on the parasites' developmental stages in their life cycle. Because of differences in development, developmental stages determine the trophic relationship and taxon of the parasite in host-parasite systems [1].

The relationship between parasitism and pollution is complicated. Both parasites and pollutants have been shown to harm the host's health. However, the combined effects of parasite infection and chemical exposure on the host, particularly for persistent organic pollutants, remain largely unknown. These chemicals are extremely toxic and persistent in the environment. According to the literature, the slow metabolism of these substances accounts for their bio magnification through food chains. POP bioaccumulation levels vary according to their octane-water partition coefficients. Compounds with logKOW of 4-5 or higher, for example, may be partitioned into the organic matter phase and thus accumulate in large amounts through food chains [2].

Because of the suggestion on the fractionation of organic compounds between parasites and their hosts, studies on the accumulation of organic pollutants in parasites are scarce in comparison to those on metals. The hypothesis is related to the well-known bioaccumulation pattern of organic chemicals, in which lipophilic substances are stored in lipids. Because most parasite taxa have lower lipid contents than the host, the accumulation level of lipophilic substances on the basis of dry or wet weight is expected to be lower in parasites than in host tissues. Furthermore, research on organic compounds focuses primarily on the effect of parasitism on accumulation in the host, while ignoring other interactions between parasites and pollutants [3].

Description

The presence of parasite infection and chemical exposure has a variety of effects on POP accumulation in the host. POPs can be accumulated by parasites, affecting the partition of these pollutants into the host. Despite having lower lipid contents than their hosts, parasites have higher weight-based concentrations of organic compounds than their hosts in some host-parasite systems. Chemical accumulation in the parasites may be a better indicator of contamination in these cases than accumulation in their hosts. Furthermore, the chemical fractionation of parasites and hosts varies according to the trophic relationships in the host-parasite system [4].

Because they assimilate the same food, the lipid-corrected concentrations of organic substances in intestinal end parasites are expected to be similar to the concentrations in their hosts. In general, chemical accumulation in organisms occurs as a result of a balance of influx and efflux. On the one hand, it has been proposed that the pattern of PCB accumulation in the endoparasites studied is primarily determined by passive uptake of free fatty acids via diffusion rather than direct (transport of short-chain fatty acids via ion channels or carrier molecules) or active (absorption of amino acids and monosaccharide's against a concentration gradient) uptake.

The host is also affected by their coexistence. Estimating pollutant concentrations in organisms is made possible by linking bioaccumulation to chemical properties such as hydrophobicity (represented by the octane-water partition coefficient KOW) and species traits. Furthermore, this relationship could be incorporated into models developed for estimating organic compound bioaccumulation in the host to gain a mechanistic understanding of the fractionation of these pollutants in host-parasite systems. The current study aimed to review the factors that influence POP accumulation in parasites, including chemical properties and biological traits, in order to facilitate the development of a mechanistic model simulating chemical accumulation in host-parasite systems [5].

Conclusion

However, deviations from these predictions have been reported, which have been attributed to the interference of parasite physiological and behavioural processes such as food selectivity. Furthermore, the trophic relationship in host-parasite systems is affected by the developmental stages of the parasites' life cycle due to differences in feeding strategies between stages. These factors interfere with the chemical fractionation of parasites and hosts, as evidenced by lower lipid-corrected concentrations of POPs in intestinal parasites than in hosts, which cannot be explained by fugacity based on lipid content. As a result, bioaccumulation models for organic compounds, which are typically based on chemical hydrophobicity and molecular size, as well as organism lipid content, may not be applicable to parasites.

Acknowledgement

None.

Conflict of Interest

There is no conflict of interest by author.

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***Address for Correspondence:** Shanthi Kuppusamy, Department of Analytical Chemistry, University of Latvia, Centra rajons, Latvia, E-mail: shanthikuppusamy@gmail.com*

Received: 01 October, 2022, Manuscript No: jreac-23-85057; **Editor Assigned:** 03 October, 2022, PreQC No: P-85057; **Reviewed:** 15 October, 2022, QC No: Q-85057; **Revised:** 20 October, 2022, Manuscript No: R-85057; **Published:** 27 October, 2022, DOI: 10.37421/2380-2391.2022.9.396

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How to cite this article: Kuppusamy, Shanthi. "Accretion of Insistent Biological Toxins in Organisms." J Environ Anal Chem 9 (2022): 396.