



Review

Multi-class of endocrine disrupting compounds in aquaculture ecosystems and health impacts in exposed biota



Nur Afifah Hanun Ismail, Sze Yee Wee, Ahmad Zaharin Aris*

Department of Environmental Sciences, Faculty of Environmental Studies, Universiti Putra Malaysia (UPM), 43400 Serdang, Selangor, Malaysia

HIGHLIGHTS

- Aquaculture is important in regulating food production and wild fish burden.
- EDCs are introduced into aquatic ecosystem via natural and anthropogenic sources.
- Primary sources of EDCs are from industrial waste and sewage treatment plants.
- EDCs demonstrate endocrine disruption in fish.
- Human are exposed to EDCs via fish consumption.

ARTICLE INFO

Article history:

Received 20 June 2017

Received in revised form

24 August 2017

Accepted 29 August 2017

Handling Editor: Klaus Kümmerer

Keywords:

Aquaculture

Aquatic ecosystem

Emerging pollutant

Endocrine disrupting compounds

Health risk

Waste water treatment plants

ABSTRACT

Fishes are a major protein food source for humans, with a high economic value in the aquaculture industry. Because endocrine disrupting compounds (EDCs) have been introduced into aquatic ecosystems, the exposure of humans and animals that depend on aquatic foods, especially fishes, should be seriously considered. EDCs are emerging pollutants causing global concern because they can disrupt the endocrine system in aquatic organisms, mammals, and humans. These pollutants have been released into the environment through many sources, e.g., wastewater treatment plants, terrestrial run-off (industrial activities, pharmaceuticals, and household waste), and precipitation. The use of pharmaceuticals, pesticides, and fertilizers for maintaining and increasing fish health and growth also contributes to EDC pollution in the water body. Human and animal exposure to EDCs occurs via ingestion of contaminated matrices, especially aquatic foodstuffs. This paper aims to review human EDC exposure via fish consumption. In respect to the trace concentration of EDCs in fish, types of instrument and clean-up method are of great concerns.

© 2017 Elsevier Ltd. All rights reserved.

Contents

1. Introduction	376
2. World review of aquaculture	376
2.1. Types of culture practices	377
2.2. Emerging pollutants in fish culture	377
2.3. Origin, sources of EDCs in aquatic ecosystems	379
2.4. Sample extraction and instrument analysis	380
2.5. EDC effects on aquatic fish	381
2.6. Human health impacts	382
2.7. Human health risk assessment	384
Conclusion	385

* Corresponding author.

E-mail address: zaharin@upm.edu.my (A.Z. Aris).