ENVIRONMENTAL GEOCHEMISTRY OF PERSISTENT TOXIC SUBSTANCES, FISH CONTAMINATION AND HEALTH EFFECTS, WITH EMPHASIS ON SOUTH CHINA: A MULTI-DISCIPLINARY APPROACH

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ABSTRACT

Most of the fish consumed in Hong Kong are farmed fish, including freshwater and marine fish, which are highly susceptible to various chemicals discharged from industrial sites nearby. It is recognized that emissions from coal-power plants are major sources of Hg in the environment worldwide. The situation is serious in the Pearl River Delta, South China, with a high demand of electricity, to support rapid development of various industries. In addition, the area has become the world's manufacturer for electrical/electric equipment, textiles, footwear, furniture, etc., emitting a wide range of toxic chemicals into the environment. In addition, the use of trash fish (small fish, without commercial value), and to certain extent, commercial feed pellets containing a high proportion of fish meal (very often made =from trash fish), for feeding carnivorous fish (such as grouper), resulted in higher concentrations of environmental contaminants, notably mercury in the cultured fish. In fact, "chemical food contaminants" is one of the 3 key global food safety concerns. Food safety is any action and policy which ensure food is safe, in the entire food chain, i.e. from production to consumption (WHO, 2013). This article attempts to review environmental health issues related to persistent toxic substances (PTS), with a focus on Hg; from biogeochemistry, ecology, epidemiology, to policy and management, citing examples related to South China. Reduction of anthropogenic Hg emissions pays an important role for minimizing biotic exposure to MeHg and associated human health risks. The use of food wastes for producing safe and quality fish would be an attractive alternative, for replacing trash fish and fish meal used in commercial feed pellets. Furthermore, there seems to be an urgent need of establishing a regional list of toxic chemicals for more efficient control, focusing on PTS commonly found in local food items.

Key Words: Emerging chemicals of concern; Fish contamination and human health; Mercury; Pearl River Delta; Persistent toxic substances