Environment and Ecology 39 (4) : 723—728, October—December 2021
ISSN 0970-0420

Associations of Isotopes ^{13}C, ^{15}N, ^{34}S on the Mercury Levels of Different Marine Finfish and Invertebrate Species

Debajyoti Chakrabarty, Rabindra Nath Das, Gaurab Bhattacharyya

Received 4 June 2021, Accepted 4 September 2021, Published on 4 October 2021

ABSTRACT

It is well known that the stable isotopes of carbon (δ13C), sulfur (δ34S) and nitrogen (δ15N) have several effects on biochemical parameters of different marine finfish and invertebrate species. The current article examines the roles δ13C, δ34S and δ15N on the mercury levels (Hg) of different marine finfish and invertebrate species based on a real data set of 16 marine finfish species as well as invertebrates of 56 different sample units. It is derived herein that the mean Hg level is negatively associated with δ13C (p=0.0059), positively associated with δ15N (p=0.0019) and it is positively associated with their joint interaction effect δ13C* δ15N (p=0.0021). In addition, mean Hg is negatively partially associated with δ34S (p=0.1493). Mean Hg level is negatively associated with species Type 2 (=Free Swimming) (p=0.0023) and species Type 3 (Invertebrate species) (p=0.0556). The variance of Hg level is positively associated with δ13C (p=0.0419) and the species Type 3 (p=0.0063). Stable δ13C and δ34S can reduce the Hg level, while δ15N and δ13C* δ15N can increase Hg level. Free swimming fish species and Invertebrate species have lower Hg levels than bottom dowelling finfish species.

Keywords Carbon isotope, Invertebrates, Joint mean variance modeling, Marine finfish species, Mercury level.

INTRODUCTION

Heavy metal mercury (Hg) is a global health concern (Mergler *et al.* 2007,WHO 2007). More than 6000 tons of Hg is released into the environment annually and its concentration is continuously increasing in many regions over the world (WHO 2010, Zhu *et al.* 2012). Most amount of Hg is released from the coal-fired power plants and there are several such point sources in many countries such as China, India (Zhu *et al*. 2012, Campbell *et al.* 2005). Hg is disseminated throughout the globe via natural and anthropogenic processes and the mercury toxicity has resulted in concerns for our food chain (Zhu *et al*. 2012, BISI *et al*. 2012).

Human beings are primarily exposed to Hg (as methylmercury) by fish consumption (Mergler *et al*.

Debajyoti Chakrabarty[1]*
[1]Department of Zoology, Government General Degree College, Singur, Hoogly 712409, WB, India

Rabindra Nath Das[2], Gaurab Bhattacharyya[2]
[2]Department of Statistics, The University of Burdwan, Burdwan, West Bengal, India
Email: drdc64@gmail.com
*Corresponding author