

The 13th European Nutrition Conference, FENS 2019, was held at the Dublin Convention Centre, 15–18 October 2019

Lipophilic Marine Biotoxins in Mussels from Bulgarian coast and Dietary Intake of Different Population Groups

Zlatina Peteva¹, Stanislava Georgieva¹, Bernd Krock², Aneliya Gerasimova¹, Mona Stancheva¹ and Albena Merdzhanova¹

¹Medical University-Varna, Varna, Bulgaria and

²Alfred-Wegener-Institute, Helmholtz Zentrum für Polar- und Meeresforschung, Bremerhaven, Germany

Abstract

Introduction

Lipophilic phycotoxins, produced by toxic phytoplankton species, accumulate in digestive glands of mussels. If contaminated mussels containing marine biotoxins over regulatory levels are consumed, it is assumed that this could result in e.g. gastrointestinal disorders.

Objectives

The aim of the study was to report contamination level of lipophilic marine biotoxins and to assess the potential health risk based on dietary intake for regular consumers and recreational harvesters from Bulgaria.

Method/Design

Wild and cultivated mussels were sampled in spring seasons of 2017 and 2018 from the North Black Sea coast. Positive phycotoxins concentrations determined via LC-MS/MS in extracts from digestive glands of the mussels were converted in phycotoxin levels for whole mussel meat (mm) by applying a factor of 5 proposed by EFSA. Dietary intakes were calculated by multiplying the mean positive phycotoxin levels (mg /kg mm) by the food consumption data for an average body weight (bw) of the investigated population group.

Results and discussion

In total 20 farmed and 15 wild mussel samples were investigated. Yessotoxins and pectenotoxin-2 were detected. The mean YTX levels in cultivated mussels were measured about two times higher in spring 2018 (1.64 mg/kg) than in 2017 (0.70 mg/kg). The mean YTX level in wild mussels was found much lower - 0.46 mg/kg (spring 2017). In this regard, estimation of mean dietary YTX intake show that exposure of both population groups by consumption of cultivated mussels from spring 2018 is highest. Nevertheless, the regulatory threshold – acute reference dose of 25 µg/kg bw, is much above the highest calculated dietary intake (0.006 µg/kg female consumers). The mean PTX2 level in wild mussel samples from spring 2017 (0.71 mg/kg) was found about six times higher than in farmed mussels.

The calculation of mean dietary PTX2 intake indicate that most exposed are females if wild mussels from spring 2017 were consumed. Still, the calculated value – 0.003 µg/kg bw were much lower than the ARfD - 0.8 µg/kg bw. All wild mussel samples from spring 2018 were negative. Lowest exposure to detected toxins were established for recreational harvesters.

Conclusion

This study showed in general low contamination level with YTX and PTX2 of investigated mussel samples. Thereon, the estimated dietary intake of selected population groups is also much lower than the regulatory thresholds.

Acknowledgements

This work was supported by Science Fund of Medical University Varna, Project Incoming number 16012/2016

Conflict of Interest

There is no conflict of interest