

HUMAN NOROVIRUS DETECTION IN SHELLFISH COLECTED FROM ARRAIL DO CABO, RJ, BRAZIL

Sylvia Kahwage Sarmiento^{2*}, Caroline Rezende Guerra¹, Marize Pereira Miagostovich², Ricardo Coutinho¹, Tulio Machado Fumian².

*¹Laboratório de Genética Marinha, Instituto de Estudos do Mar Almirante Paulo Moreira (IEAPM), Marinha do Brasil. ²Laboratório de Virologia Comparada e Ambiental, Instituto Oswaldo Cruz (IOC), Fundação Oswaldo Cruz (FIOCRUZ). *syl_kahwage@yahoo.com.br*

Noroviruses are a major cause of acute gastroenteritis (AGE) worldwide. Specifically, norovirus are related with 18% of all AGE cases. The norovirus particle is stable in the external environment and highly infectious. Norovirus AGE outbreaks are frequently reported in closed and semi-closed settings and one of the main route of infection is the consumption of raw or undercooked bivalve shellfish cultivated in contaminated waters. The city of Arraial do Cabo, during the high summer season (December through March) there is a significant increase in tourists (n= 300.000) which could lead to inadequate treatment and wastewater disposal in coastal waters, affecting the marine environment and human health. As filter-feeding bivalve molluscan, oysters and mussels retain and bioaccumulate viral pathogens in the tissues, including noroviruses, that may be present in their growing waters in cases of sewage discharge without treatment. The objective of this study was to evaluate norovirus dissemination, during an ongoing monitoring, in bivalve shellfish harvested and collected from three different points of Arraial do Cabo coast. During the period of March 2018 through May 2019, oysters (*Crassostrea gigas*) and mussels (*Perna perna*) samples were collected at three different shellfish growing areas: Anjos and Forno beaches and Cabo Frio Island. Samples were collected monthly, however during the high season the samples were collected fortnightly. Viral concentration from the bivalve's digestive tissue was performed according to International Standard Operation method (ISO/TS 15216-1 -2017). PP7 bacteriophage was inoculated before concentration and was used as an internal control process. Viral nucleic acid was extracted from the shellfish homogenate using Viral NucleoMag kit (Biopur) and reverse transcription real-time quantitative PCR (RT-qPCR) was used to detect norovirus present in the sample, and to distinguish between genogroups I and II. So far, a total of 69 samples (n = 17 oyster and n = 52 mussels) were collected. Among the analyzed samples, 28 (40.6%) were positive for norovirus, and among the positive samples, 96.4% was detected as GII and GI was detected in only one sample (3.6%). Considering the type of shellfish tested, 23 mussel samples (among the 52 analyzed) and five oyster samples (among the 17 analysed samples) were positive. Among the 13 positive samples collected in 2019, ten samples (77%) were collected during the summer season when the city receives a great number of tourists. The majority of positive samples (n=12) were collected at Forno beach. This study highlights the potential risk of norovirus contamination in oysters and mussels and reflects the impact of tourism associated to poor sewage management in the marine environment of the Arraial do Cabo City. Our results highlight the importance of sanitary measurements avoiding viral risk infections from the consume of bivalves.