Imprimir Resumo

Congresso Brasileiro de Microbiologia 2023 **Resumo: 1113-1**

1113-1 BRAZILIAN OYSTERS CONTAMINATED WITH HAZARDOUS HEAVY METALS AND ANTIBIOTIC-RESISTANT SUPERBUGS: ARE YOU SAFE TO EAT THEM?

Autores:

Felipe Vásquez-ponce (ICB-USP - INSTITUTO DE CIÊNCIAS BIOMEDICAS, USP) ; Johana Becerra (ICB-USP - INSTITUTO DE CIÊNCIAS BIOMEDICAS, USP) ; Fábio Sellera (FMVZ-USP - FACULDADE DE MEDICINA VETERINÁRIA E ZOOTECNIA, USP) ; Fernanda Esposito (FCF-USP - FACULDADE DE CIÊNCIAS FARMACÊUTICAS, USP) ; Patricio Montecinos (IGC-USP - INSTITUTO DE GEOCIÊNCIAS, USP) ; Aline Pereira (IQ-USP - INSTITUTO DE QUÍMICA, USP) ; Cassiana Seimi Nomura (IQ-USP - INSTITUTO DE QUÍMICA, USP) ; Edison Barbieri (IP-APTA - INSTITUTO DE PESCA, APTA-SAA, GOVERNO DO ESTADO DE SAO PAULO) ; Nilton Lincopan (ICB-USP - INSTITUTO DE CIÊNCIAS BIOMEDICAS, USP)

Resumo:

Antimicrobial Resistance (AMR) is currently one of the primary threats to public health. Aquaculture is considered a hotspot for resistance genes, mainly due to the therapeutic and/or prophylactic use of antimicrobials in fish farming, as well as the use of non-antibiotic chemical agents. Bivalve mollusks can serve as biomarkers of environmental contamination, as the microbiological quality of these mollusks reflects the quality of their habitats. This study identified clinically relevant antibiotic-resistant bacterial species in oysters from marine farms, markets, and surrounding waters in the states of São Paulo and Santa Catarina, by using MALDI-TOF, antibiotic susceptibility testing and whole genome sequencing (WGS). Main identified bacteria included Escherichia coli, Klebsiella pneumoniae, Pseudomonas spp., Acinetobacter baumannii, Morganella morganii, Citrobacter freundii, Serratia spp., Enterobacter bugandensis, Proteus spp., Aeromonas spp., Raoutella spp., and Providencia spp. WGS data revealed the presence of the international clone of K. pneumoniae ST307, K. quasipneumoniae ST526, Morganella morganii, and Citrobacter freundii, with a broad chromosomal and plasmidial resistome. Antibiotic resistance genes including blaCTX-M15, blaTEM-1, blaOXA-1, blaSHV-like (beta-lactam resistance), aph(3")-Ib, aph(6)-Id, aac(6')-lb-cr (fluoroquinolone and aminoglycoside resistance), aadA13 (aminoglycosides resistance), tetA and tetB (tetracycline resistance), catA2 (chloramphenicol resistance), fosA6 (fosfomycin resistance), dfra14 and dfrA1 (trimethoprim resistance), and sul1 and sul2 (sulfonamides resistance) were found. Interestingly, these bacterial species also carried genes that confer resistance to arsenic (arsABCDH). Analysis of heavy metals in oyster tissue, using Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-OES) revealed the presence of various elements, including arsenic (As), chromium (Cr), cadmium (Cd), and silver (Ag), with As and Ag being the elements with the highest concentrations (> 4 mg/Kg) in the analyzed oyster samples, exceeding legal limit values (> 1 mg/Kg). This investigation reports unprecedented and epidemiologically significant results regarding the detection of critically priority resistant pathogens in oysters intended for human consumption, which also contain high concentrations of arsenic and silver. These findings support the use of oysters as bioindicators of environmental contamination, highlighting an additional potential risk to human health related to the presence of hazardous heavy metals and antibiotic-resistant bacteria.

Palavras-chave:

antimicrobial resistance, arsenic, heavy metals, high-risk clones, oysters

Agência de fomento:

Agencia Nacional de Investigación y Desarrollo de Chile (ANID)