

Compliance of brown mussel (*Perna perna*) production areas in the South of Brazil with the bacteriological criteria of the shellfish hygiene systems in the European Union and United States of America: assessing the impacts on consumer safety

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ABSTRACT

Levels of faecal indicator organisms (FIOs) monitored in surface water and brown mussels collected at 28 production areas in Brazil from August 2012 to October 2013 were used to assess compliance with the bacteriological standards of the shellfish hygiene classification systems used in the European Union (EU) and USA. This classification determines the level of post-harvesting purification needed to reduce the risk of illness in consumers. The results indicate that 36% of production areas would be class A under the EU system and 75% would be 'Approved' under the US system. Mathematical models showed that a 90th percentile of FIO levels in water of 43 MPN (most probable number) 100 mL^{-1} (standard for 'Approved' areas under the US system) would correspond to an 80th percentile of FIO levels in mussels of 572 MPN 100 g^{-1} . This concentration is more than double that in the class A standard in the EU system. These results have important implications for public health since no post-harvesting purification is required for any of these classification categories. Areas compliant with the US 'Restricted' and EU class B standards, however, provide similar levels of consumer safety.

Key words | faecal indicator organisms, hygiene, legislation, *Perna perna*, trade

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INTRODUCTION

Filter-feeding bivalve molluscan shellfish accumulate microorganisms, including human pathogenic bacteria and viruses, when grown in sewage-polluted waters and can present a significant health risk when consumed raw or lightly cooked. To protect human health, shellfish safety authorities commonly monitor faecal indicator organisms (FIOs) in shellfish production areas (SPAs) in order to classify them. This classification determines whether the area can be used for production and, if so, the level of post-harvest treatment (depuration, relaying, heat treatment) that needs to be applied to harvested shellfish prior to sale for human consumption (WHO & FAO 2012).

In general, there are two approaches to monitoring the microbiological quality of SPAs depending on the type of sample. The approach used in the European Union (EU) and countries with trade agreements with the EU is to monitor *Escherichia coli* in shellfish flesh while the approach used in the USA and countries with a memorandum of understanding with the USA is to monitor total coliforms or faecal coliforms in surface waters (Table 1). The EU Scientific Veterinary Committee Working Group on Faecal Coliforms in Shellfish studied the equivalence between these two systems (EU Working Group 1996, 2010) and concluded that class A in the EU system is more