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THE PRESENCE OF *ESCHERICHIA COLI* AND COLIFORM BACTERIA IN SELECTED SEAFOOD OBTAINED FROM FOOD MARKET

Escherichia coli is not part of the natural microflora of aquatic products, however, it has been isolated from these organisms, and their presence indicates faecal contamination. The aim of this work was to evaluate the contamination of selected products of aquatic origin with Escherichia coli and coliform bacteria. The presence of Escherichia coli was found in 7,9% of the analysed products. Coliform bacteria in the amount of > 0,1 g, 1g, 0,01 g of product were present respectively in 81,6%, 10,5% and 7,9% of samples.

Keywords: *Escherichia coli, coliform, seafood, shrimps.*

INTRODUCTION

Foodborne illnesses caused by *Escherichia coli* are one of the most important diseases of the gastrointestinal tract, posing public health risk. *E. coli* is often nonpathogenic, although different strains can cause diseases of the gastrointestinal tract, urinary tract, or central nervous system [1, 2]. *Escherichia coli* bacteria do not belong to the natural microflora of aquatic products, however, they have been isolated from stomachs as well as the guts of these organisms. The presence of *E. coli* in water or in products such as shrimps indicates faecal contamination of the environment from which they were obtained [1, 3].

Microbiological contamination of the aquatic environment causes the increase for public health risk, especially when the polluted water is used as a source of fish and shellfish breeding [4].

Often cited as a potential causes of the *E. coli* pollution are: the quality of ice used for protective purposes, and also food processing plants [2].

The Commission Regulation (EC) recommends to use *Escherichia coli* as an indicator, when assessing the degree of contamination with coliform bacteria of areas where seafood is obtained from [5].

The aim of the work was to evaluate the contamination of selected products of aquatic origin towards the presence of *Escherichia coli* and coliform bacteria.

1. RESEARCH MATERIAL AND METHODS

Research material were whole fresh shrimps purchased in trade networks (n = 5), frozen peeled shrimps (n = 5) and partially peeled shrimps (n = 5), small blanched shrimps (n = 5) and medium blanched shrimps (n = 5), a mixed seafood consisting of i.a. cocktail shrimps, mussels, squids and octopuses (n = 7), as well as peeled mussels in brine (n = 6). These products were purchased with or without packaged units.

The research was conducted on 38 samples. All purchased products were analysed on the day of purchase. In the analysed products the number of *Escherichia coli* on selective Coli ID agar (developed by bioMerieux) was marked and coliform bacteria index on the brilliant green bile broth (developed by Graso) with Durham tube medium. The microbiological analyses were performed with the application of dilution method in accordance with the relevant methodological standards.

2. RESULTS AND DISCUSSION

After all the 38 samples were checked, *Escherichia coli* was found in 7,9% of the analysed products. Completely free of these microorganisms were all types of shrimps and peeled mussels in brine. The presence of these bacteria was detected in only three samples originating from a mixed seafood. The number of *Escherichia coli* bacteria found in these products fitted between 1×10^{1}-2×10^{2} cfu/g (on average <10 cfu/g).

The presence of coliform bacteria was found in analyzed seafood, however, their index was different (Fig. 1). Coliform bacteria in the amount of > 0,1 g, 0,1g, 0,01 g of product were present respectively in 81,6%, 10,5% and 7,9% of samples (Fig. 1), and their presence can serve as the evidence for lack of hygiene and inadequate treatment of the products during the technological process [6].

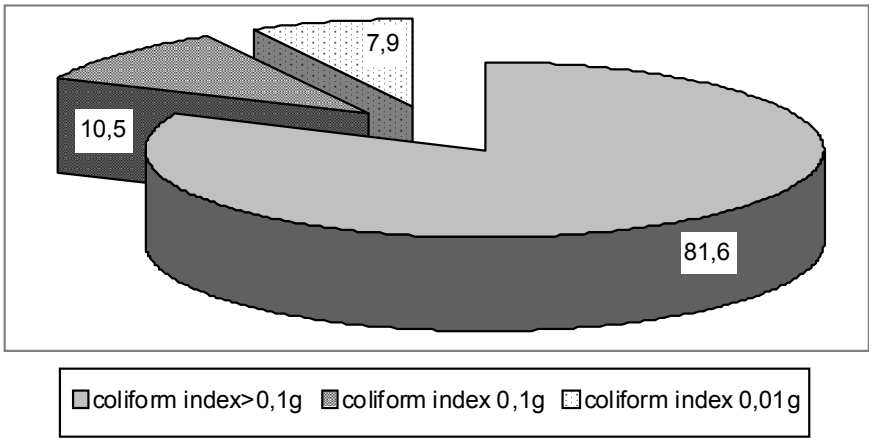

Fig. 1. Percentage of all samples with stated coliform index

The highest coliform index of 0,01 g was observed only for the mixed seafood. This level of contamination was found in approximately 14% of samples (Fig. 2). Coliform bacteria present in quantity of 0,1 g of the product was found in 43% and 60% of the samples extracted respectively from the mix of seafood and raw shrimps (Fig. 2). Other products were characterised by index at the level of > 0,1 g.

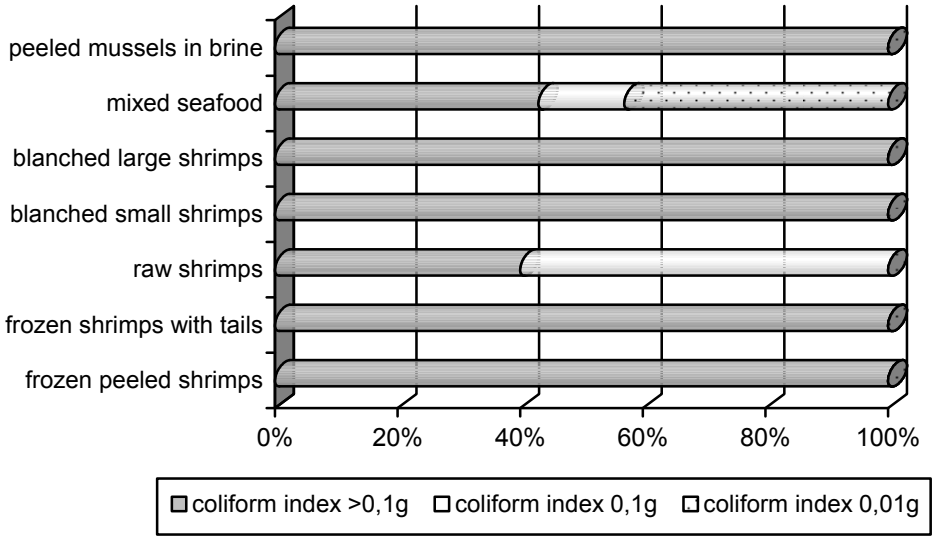

Fig. 2. The level of contamination of the tested products with coliform bacteria

Kumar et al. [3] have found the presence of *Escherichia coli* in 39,6% of shrimps obtained from different sources. A higher percentage of samples contaminated with these bacteria was observed for mussels and oysters, respectively 78% and 100% [3]. Lekshmy et al. [4] while examining i.a. sediment, water and shrimps in different collection seasons found the presence of *E. coli* in 3,5% of tested shrimps. In author's own studies, the presence of *Escherichia coli* was found in 42,8% of samples coming from a mixed seafood including i.a. mussels and shrimps. Coliform bacteria in the amount of 0,1 g and 0, 01 g of product was observed in 18,4% of tested seafood. Kumar et al. [3] have found the presence of coliform in 82,4% of analysed products.

The prevalence of *Escherichia coli* in a variety of seafood can be the result of faecal contamination and improper usage. Contamination can also be the result of water quality, fishing method and storage, or survivability in cooling temperatures [7, 8].

CONCLUSIONS

1. The presence of *Escherichia coli* was found in 7,9% of the analysed products.
2. The largest percentage of samples (about 43%), in which *E. coli* was found came from a mixed seafood.
3. Coliform bacteria in amount of 0,1g, 0,01g of product were present respectively in 10,5% and 7,9% of tested samples.
4. In order to ensure that the seafood is not a vehicle for *Escherichia coli*, there must be continuous monitoring of all stages of the processing of sea products, mainly in terms of compliance with good hygiene practices.

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