

THE SURVEY OF SOME BACTERIAL CONTAMINATION IN FROZEN SEMI-COOKED READY TO EAT SEA FOOD PRODUCTS IN ALBORZ PROVINCE- IRAN

MASHAK ZOHREH^{1*}, TAHERI MIRGHAED ALI², SAADATI AMIRREZA³

¹*Department of Food Hygiene, Faculty of Veterinary Medicine, Islamic Azad University, Karaj Branch, Karaj –Alborz, Iran, *Email:mashak@kiaiu.ac.ir

²Department of animal health, Faculty of Veterinary Medicine, University of Tehran, Iran ³Shahid Beheshti University of Medical Science, Tehran, Iran

ISPITIVANJE NEKIH BAKTERIJSKIH KONTAMINACIJA SMRZNUTIH GOTOVIH POLUKUVANIH MORSKIH PREHRAMBENIH PROIZVODA U PROVINCIJI ALBORZ U IRANU

Apstrakt

Socijalne i ekonomske promene i način života u Iranu uzrokovali su i promene u ishrani. Tako su potrošači sve više skloni konzumiranju svih vrsta gotove hrane (engl. ready-to-eat, RTE), kao što su morski proizvodi. Kontaminacija ovih hraniva psihrofilnim i patogenim bakterijama je opasna i smatra se da ozbiljno ugrožava zdravlje ljudi. Šesdeset devet smrznutih polukuvanih RTE morskih prehrambenih proizvoda trinaest različitih proizvođača (po tri uzorka od svakog tipa proizvoda) kupljeni su između januara i marta 2012. iz supermarket i lanca hipermarketa u provinciji Alborz, a zatim prebačeni do laboratorije za higijenu hrane Islamskog Univerziteta Azad u Karaju. Izvršena je identifikacija i izolacija *L. monocytogenes*, kao i utvrđivanje broja *Staphylococcus aureus* i psihrofilnih aerobnih bakterija. Srednja vrednost \pm SD (Log_{10} CFU/g), minimalni i maksimalni broj aerobnih psihrofilnih bakterija i *Staphylococcus aureus* u svim smrznutim polukuvanim RTE morskim proizvodima iznosili su, redom: $3,79 \pm 1,66$; $3,59 \pm 0,23$; $0/0,6/11$ i $0/0,6/86$ (Log_{10} CFU/g). Takođe, 26,1% uzoraka bili su kontaminirani sa *L. monocytogenes*. Izgleda da su RTE morski prehrambeni proizvodi bili izloženi patogenim bakterijama i uzročnicima kvara hrane. Oni predstavljaju pretnju za ljudsko zdravlje. Prema tome, čišćenje, sanitacija opreme i osoblja, odgovarajuća temperatura za vreme i posle prerade i transporta, kao i odgovarajuće skladištenje može da smanji kontaminaciju i brojnost mikroorganizama koji su uzrok kvara namirnica.

Ključne reči: zamrznuti kuvani gotovi morski prehrambeni proizvodi, *Staphylococcus aureus*, *Listeria monocytogenes*, aerobne psihrofilne bakterije, Iran

Keywords: Frozen cooked ready to eat sea food products, *Staphylococcus aureus*, *Listeria monocytogenes*, *Aerobic psychrophilic bacteria*, Iran

INTRODUCTION

The increasing growth of world population has changed the production pattern and technology in food industry. RTE food products have been considered more by customers, because they are prepared and consumed very quickly. RTE Sea foods have an important role in human health due to high protein levels, unsaturated fatty acids, easy digestion and general health benefits. However, improper manipulation of sea foods can cause cross-contamination during and after processing. Also, abuse time-temperature during processing, machine transportation and markets freezers may be an important factor for growth of bacterial spoilage and pathogens such as *psychrophilic bacteria*, and *Staphylococcus aureus* and *Listeria monocytogenes*. *L. monocytogenes* is a pathogenic bacterium with widespread presence in nature, affecting a wide range of animals and humans (9, 13). In the vast majority of human cases, listeriosis is the result of consumption of contaminated food, with a high fatality rate. *S. aureus* is a Gram-positive microorganism and salt-tolerant. It is estimated that 50% of the human population are long-term carriers of *S. aureus*, which can survive as part of the normal skin flora, and nasal passages (5). So, the handling of sea products during the manufacturing process involves a risk of contamination and causing food borne human intoxication (4). In research of Vitas et al. psychrophilic growth occurs 7 to 10 days of incubation with maximum bacterial number of 10^6 cfu/g. Improper usage of time-temperature during production and storage at refrigeration or freezing is the most important factor in the growth of psychrophilic bacteria (10). So, we surveyed the contamination of frozen semi-cooked RTE sea food products in Iran with *L.monocytogenes*, *S.aureus* and *psychrophilic bacteria*.

MATERIALS AND METHODS

Sample collection: 69 frozen semi-cooked sea food samples including fried shrimp, shrimp burger, fish finger, baked trout fish, fish batter, fish strudel, roast skate fish, fish sausage, pasta fish, ball fish, fried fish fillets, Pot roast vegetables fish, fish burger, minced potatoes fish and smoked salmon, from thirteen different factories in Alborz province were purchased randomly between January-March 2012. All samples were transported to the laboratory of food hygiene, beside cool box and kept in -18°C .

Bacterial analysis: The modified Canadian version of the U.S. FDA Listeria isolation protocol was used. Briefly, 25 g/225 ml was homogenized in LEB containing KSCN and nalidixic acid ($30^{\circ}\text{C}/24\text{-}48\text{h}$) and loopful from LEB was then streaked onto Listeria selective agar containing nalidixic acid and PALCAM LSA with supplement. Suspected colonies were confirmed by Gram staining, motility test (hanging drop), catalase and β -hemolysis tests and sugar fermentation tests for rhamnose, xylose and mannitol (8). For enumeration of *psychrophilic aerobic bacteria* were used surface method with 10 fold serial dilution in King agar media ($1\text{-}4^{\circ}\text{C}/_{1\text{-}7\text{ days}}$). For isolation of *S. aureus* including enrichment of a 1-g sample in 10ml cooked meat medium ($37^{\circ}\text{C}/_{24\text{h}}$) streaking a loopful of the enrichment culture on Baird-Parker agar ($37^{\circ}\text{C}/_{24\text{h}}$) with using surface plate technique and subsequent confirmatory coagulase test of jet-black colonies (8).

For statistical analysis: The SPSS 16 for Windows software was used, and $p < 0.001$ was considered statistically significant.

RESULTS

Mean \pm SD (Log_{10} cfu/g) of *Aerobic psychrophilic bacteria* and *S. aureus* in sixty-nine frozen semi-cooked RTE sea food samples were 3.79 ± 1.66 and 3.59 ± 0.23 respectively. 75% of counted *psychrophilic bacteria* and 70% of counted *Staphylococcus aureus* were $> 2/9 \times 10^3$ and $> 10^3 \times 8/1 \text{Log}_{10} \text{CFU/g}$. Min and max of them were (0/0.6/11) and (0/0.6/86) $\text{Log}_{10} \text{CFU/g}$, respectively. Also, in nine samples *L. monocytogenes* identified (fig. 1,2,3)

DISCUSSION AND CONCLUSIONS

In Iran, consumption of RTE foods is increasing due to the economic, social and cultural changes. RTE foods include convenient, ready, instant and fast foods. Health quality of these kinds of food due to the way of production, processing, transportation; storage and improper use of time-temperature have been constantly facing the risk of contamination with pathogenic and spoiling microorganisms. *L. monocytogenes* be able to survive and even multiply in numerous food and may be lead to outbreaks of listeriosis. So, the pathogen has become of much concern to the food processing industry, public health professionals and regulators. According to Basti et al. (2006) some types of salt smoked fish may be considered as risk of *L. monocytogenes* and *S. aureus* infection and intoxication for Iranian consumers (1). Also in different researches, it has reported *L. monocytogenes* contamination in RTE salmon and RTE seafood (3.31.28)%, respectively (2,5,7). In our research, it was 27%. It seems that raw materials, environment, the factory design and sanitation procedures during and post by cross-contamination are to be source of *L. monocytogenes* contamination for RTE semi-cooked sea food products (7,10).

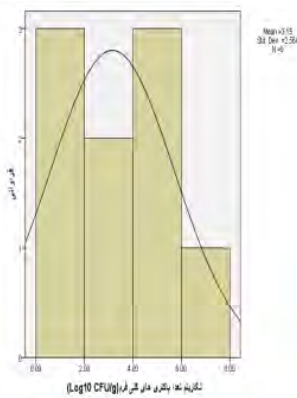


Figure 1. *Aerobic psychrophilic bacteria* contamination in sea food samples (Log_{10} cfu/g)



Figure 2. *Staphylococcus aureus* contamination in sea food samples (Log_{10} cfu/g)

VasutR. G.; Robecchi, M. D. (2009). Food Contamination with *Psychrophilic bacteria*. LUCRĂRI TIINŢIFICE MEDICINĂ VETERINARĂ VOL. XLII (2), 325-330.

Vitas, A.I., Aguado, V., and Garcia-Jalon, I. (2004). Occurrence of *Listeria monocytogenes* in fresh and processed foods in Navarra (Spain). Int. J. FoodMicrobiol. 90. 349-356.