INVESTIGATION OF STAPHYLOCOCCUS AUREUS IN SMOKED TROUTS

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Abstract

The well-known food-borne pathogen, Staphylococcus aureus, rarely has been implicated in cases originating from consumption of smoked seafoods. This bacterium may be contributed through human handling of the raw seafood and products. The aim of the presented work was the risk assessment of distribution and prevalence of Staphylococcus aureus in smoked fish. There were totally analyzed 50 samples of fish. Staphylococcus aureus was detected in %4 of analyzed samples. The Food and Drug Administration (FDA) [1] established that effective doses of staphylococci enterotoxins can be achieved when populations of Staphylococcus aureus are greater than 10^2 organisms per gram of contaminated food. This limit was not exceeded in any of the studied samples.

Keywords: Diseases, Fishes, Aegean Sea

Introduction

Safety of fish products and their quality assurance is one of the main problems of food industry today. S. aureus is one of the major bacterial agents causing foodborne diseases in humans worldwide [2]. These bacteria are salt-tolerant and therefore can contaminate all cured preparations such as cold smoked fish, caviar and fish-based preserves [3]. Fish contains large amount of proteins and their breakdown into amino acids support the growth of Staph aureus. Even though fish are smoked, the heat supplied might not kill all the pathogens. Smoked fish could be stored satisfactorily for three weeks at 5°C and less than one week at 10°C. The need for proper refrigeration cannot be over-emphasized. The finished product should not be distributed until it has been properly cooled to 4.2°C or below. Furthermore, because of perishable nature of smoked fish, it is imperative that finished product be maintained in a refrigerated condition at 4.2°C or below until consumed. Most food poisoning outbreaks related to smoked fish have been related to abusive storage temperature conditions. The isolated S. aureus were due to the contamination of fish during capture and subsequent unhygienic handling and processing [4]. Isolated Staphylococcus aureus in fishery products and fish processing factory workers. Small numbers of this bacterium in fishery products is not a serious problem but food poisoning may occur if the product is handled carelessly during processing, resulting in high multiplication. Therefore, consumption of such products may cause a risk of Staphylococcus aureus intoxication in consumers. The purpose of the present work was to study the incidence of Staphylococcus aureus in fishery products and fish processing factory workers.

Material and Methods

The samples (25 g) were weighed into sterile stomacher bags, diluted with 225 mL buffered peptone water (BPW) (Oxoid, Unipath, Hampshire, UK) and homogenized in a Stomacher (Classic) about 10 min. The samples were further diluted with buffered peptone water (BPW), and 0.1 mL portion of various dilution levels were spread on the surfaces of Baird-Parker agar (BP) (Oxoid) supplemented with tellurite and egg yolk emulsion (Oxoid) and incubated at 37°C for 32-48h. Convex, black, shiny colonies with narrow white margin surrounded by clear zone were regarded as S. aureus. These colonies were confirmed by conducting gram staining, coagulase test, catalase test and anaerobic utilization of glucose and mannitol [5].

Results and Discussion

In this study, random samples of fifty smoked fish were taken at regular intervals. This samples were divided into decimal groups and total numbers of Staphylococcus aureus were determined. After enumeration on the groups were defined respectively 1.0×10^0 cfu/g, 2.7×10^0, 1.2×10^1, 1.7×10^1, 3.0×10^1, and 3.0×10^2 cfu/g. Isolated Staphylococcus aureus in fishery products and fish processing factory workers. Small numbers of this bacterium in fishery products is not a serious problem but food poisoning may occur if the product is handled carelessly during processing, resulting in high multiplication. Therefore, consumption of such products may cause a risk of Staphylococcus aureus intoxication in consumers. As the Staphylococcus aureus is an indicator of hygiene and sanitary conditions, the presence of this organism indicates the unhygienic condition during processing, storage etc. The contamination of the product could be due to a food poisoning. It is recommended to use sanitary gloves for handling processing foods to reduce the problem of Staphylococcus aureus contamination.

References


Tab. 1. The total numbers of Staphylococcus aureus in sample groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. aureus</td>
<td>1.0×10^0</td>
<td>2.7×10^0</td>
<td>1.2×10^1</td>
<td>1.7×10^1</td>
<td>3.0×10^1</td>
<td>&lt;10^2 cfu/g</td>
</tr>
</tbody>
</table>

Tab. 2. A characteristics of Staphylococcus aureus in seafood [6]

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Estimated minimal infectious dose</th>
<th>Symptoms</th>
<th>Associated seafood</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. aureus</td>
<td>1×10^2 (cfu/g)</td>
<td>Vomiting, diarrhea</td>
<td>Contamination from infected persons</td>
<td>Frequency of intoxications</td>
</tr>
</tbody>
</table>

According to these data we assume that the isolated Staphylococcus aureus were due to the contamination of fish during sampling and subsequent unhygienic handling and processing [5].