Gender Participation of Dried Boneless Siganids, Siganus puellus

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Rationale

Taboan Market in Cebu City, Philippines is the most famous source of dried siganids or boneless *danggit*, which served as gift presence for local and foreign tourists. The aerobic plate counts on fish and fishery products generally do not relate to food safety hazards, but sometimes can be useful in indicating quality, shelf life and post heat-processing contamination (http://seafood.ucdavis.edu/haccp/compendium/chapt09.htm). Siganid vendors involved in the distribution channels are important. CTU researchers utilized coconut water as pre-treatment to marinated mullet using low temperature preservation to enhance the overall quality (Macachor, 2015). Hence, this study determined the gender participation of vendors in the selected boneless *danggit* displayed at Taboan Market in Cebu City, Philippines.
Objectives

This study aimed to determine the safety of dried *danggit* based on microbial analyses and its gender participation of vendors in the distribution channels.
Framework

• The moisture content of fish needs to be reduced to 25% or less in order to prevent spoilage. The percentage will depend on the oiliness of the fish and whether it has been salted (http://www.fao.org/WAIRdocs/x5434e/x5434e0f.htm).

• A water activity of 0.85 or below will prevent the growth and toxin production of all pathogenic bacteria, including *Staphylococcus aureus*, and is critical for the safety of a shelf-stable dried product. (http://seafood.ucdavis.edu/haccp/compendium/chapt09.htm).

• Macachor *et al*, 2015 (UM 2-2014-000712) discloses the method of producing mullet *Mugil cephalus* chunks soaked in 50% coconut water enhances the sensory qualities of chunks mullet.
Materials and Methods

- Experimental method of research

  - Phase 1: Characterization of Commercial Samples
    - Physico-chemical properties (Aw and pH)
    - Microbial analyses
      - Aerobic Plate Count
      - Staphylococcus aureus
      - Mold Count
    - Phase 2: Coconut Water Treated Dried Danggit Samples
      - Aerobic Plate Count

- Descriptive method of research
  - Survey questionnaire
Materials and Methods

Figure 1
Map of Taboan, Cebu City, Philippines, the research site
Materials and Methods

Deboning

Brining

Loading for drying

Boneless Danggit

Dried Boneless Danggit

Fig. 2: Coconut Water Treated Boneless Danggit as Phase 2
Materials and Methods

- 50% Coconut Water
- 50% Iced Water
- 100% Coconut Water
- 100% Iced Water

Commercial Sample
The study characterized the physico-chemical properties of the commercialized dried seafoods that were identified by the vendors which are top 3 best sellers such as boneless danggit, dried squid and dried sardines or mangsi. The water activity were calculated based on the salt, fat and moisture content of the samples. Fig. 3 revealed that the salt content of the dried danggit contained 1.144% which is the highest among the three (3) samples.

Fig.3
Percent Salt Content of the Dried Seafoods
Results and Discussion

Phase 1 - Characterization of Commercial Samples

Fig. 4 showed that the percent fat content of the dried danggit, dried squid and dried sardines had 2.11%, 1.5% and 4.99%, respectively. This data insignificantly differs from the work published in https://www.fatsecret.com/calories-nutrition/generic/fish-dried with 1.34% to 5% as stated in http://www.myfitnesspal.com/nutrition-facts-calories/dried-fish fat.
Results and Discussion
Phase 1 - Characterization of Commercial Samples

Fig. 5 showed that the percent moisture content of the dried danggit, dried squid and dried sardines had 17.51, 20.68% and 41.68% respectively.

- The percent moisture content of dried sardines had the highest value since the product is in whole cut; while the dried siganids or danggit were in fillet form as well as dried squid. Hence the drying rate of the latter samples were faster that in the dried sardines.
Fig. 6 showed that the water activity of the dried danggit, dried squid and dried sardines which had 0.84, 0.9 and 0.99%, respectively.

- Hence, dried siganids is safe for human consumption considering the fact that a water activity of 0.85 or below will prevent the growth and toxin production of all pathogenic bacteria, including *Staphylococcus aureus*, and is critical for the safety of a shelf-stable dried product. (http://seafood.ucdavis.edu/haccp/compendium/chapt09. htm).
Results and Discussion
Phase 1 - Characterization of Commercial Samples

The pH of the dried siganids, dried squid and dried sardines were 6.3, 6.5 and 6.1 which belongs the low acid food products that conforms to the fact that the pH of the dried fish ranged from 6.2 to 6.6.

(http://shodhganga.inflibnet.ac.in/bitstream/10603/50877/15/15_chapter%207.pdf)

Fig. 7

The pH of the Dried Seafoods
Results and Discussion
Phase 1 - Characterization of Commercial Samples

The aerobic plate count of dried siganids, squid and sardines were $1 \times 10^4$ cfu/gram, $2.5 \times 10^4$ cfu/gram and $5 \times 10^4$ cfu/gram as reflected in Figure 8. Fish of good quality should have bacterial count less than $10^5$ per gram (Pal et al., 2016) with *Staphylococcus aureus* 30, 50 and 100 cfu/gram sample for dried siganids, squid and sardines, respectively.

The mold count in cfu/gram of dried siganids, squid and sardines ranged 23, 20 and 15 cfu/gram sample, respectively.

Aerobic plate count of Bacteria from selected dried products in $10^4$ cfu/g sample.
Results and Discussion
Phase 2 - Microbial Analyses of Coconut Water Treated Boneless Siganids Samples

Table 1. The Microbial Analyses of the Coconut Water Treated Boneless Siganids in cfu/g

<table>
<thead>
<tr>
<th>Parameter</th>
<th>100%</th>
<th>50%</th>
<th>0%</th>
<th>Com’l sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteria</td>
<td>$6.7 \times 10^3$</td>
<td>$3.3 \times 10^3$</td>
<td>$6.6 \times 10^3$</td>
<td>$2.5 \times 10^5$</td>
</tr>
<tr>
<td>Mold</td>
<td>$2.0 \times 10$</td>
<td>$&lt;1.0 \times 10$</td>
<td>$&lt;1.0 \times 10$</td>
<td>$2.8 \times 10^2$</td>
</tr>
</tbody>
</table>

The aerobic plate of bacteria of dried siganids with 50% coconut water had the most lowest bacterial count compared to the rest of the experimental and commercial samples. Hence, the best pre-treatment of coconut water was using 50% coconut water prior to drying process.
## Results and Discussion

### Table 2. Gender participation on distribution channels

<table>
<thead>
<tr>
<th>Distribution channels</th>
<th>Masculine (N=100)</th>
<th>Feminine (N=100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Market</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>Street vending</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td>Souvenir shops</td>
<td>22%</td>
<td>78%</td>
</tr>
<tr>
<td>E-market</td>
<td>20%</td>
<td>80%</td>
</tr>
</tbody>
</table>
Conclusion and Recommendation

The coconut water pre-treatment prior to drying process enhances the quality of the dried siganids, hence 50% coconut water added to 50% chilled brine solution is recommended.

Mostly involved in the distribution channels of boneless siganids are feminine.
References


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Thank you very much