Low seafood substitution rate in Qatar markets

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Background: DNA barcoding techniques have made it possible to authenticate various species used for food and medicinal purposes. In the identification of seafood species, studies are concentrated in North America, Europe and Asia Pacific. Elsewhere, including countries in the Middle East and North Africa, studies of this sort are scarce. For a growing country such as Qatar that relies on imports for the majority of its food supplies, the increasing seafood demand calls for its authentication in particular for it being an superior alternative to red meat favored traditionally by its population known to show high rates of cardiovascular disease. Results: This student-centered research focuses on fish fillets available at ten major supermarket chains in Doha, Qatar. A cocktail of eight primers attached with M13 tails established for fish species identification was used to authenticate various species used for food and medicinal purposes. In the study, two out of 50 analyzed samples were confirmed to be mislabeled, a rate of 4%. Significance: This study is the first of its kind conducted in countries in the Arabian Gulf countries and one of a handful of known studies of seafood authentication in the Middle East and Northern Africa. The relatively low rate of mislabeling in the samples perhaps is due to strict local food safety regulations, which may have indirectly led to high consistencies between the package labels and their contents.

Introduction
Market substitution of processed food, herbal medicine and fresh and frozen seafood have raised international awareness. Among the seafood substitution studies, most of them have been concentrated in North American, European, and Pacific Asian countries while less so in other regions. Using molecular and bioinformatics tools¹ this study focuses on fresh and frozen fish fillets sold in the large supermarket chains in Qatar (Figure 1) to maintain consumer confidence in seafood for it being a healthier protein choice for nationals who are known to show high rate of obesity, cardiovascular diseases and diabetes.

Methods
Samples of frozen and refrigerated fish were collected from various food retailers in Qatar. DNA was extracted using QiaGen DNeasy Blood & Tissue Kit from 25 mg of muscle tissues with a cocktail of eight primers attached with M13 tails for PCR. Sequences were compared with those available in GenBank and Barcode of Life Databases (BOLD). Among the 50 unique fish fillet packages analyzed, only two are determined to be mislabeled, a rate of 4%. Sequences similarity searches were conducted on Barcode of Life Database² and BLAST (National Center for Biotechnological Information).

Results

<table>
<thead>
<tr>
<th>Name on label (scientific name)</th>
<th>Common name (CO1 ID)</th>
<th>% BLAST match</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Snapper Fillet (Macolor niger)</td>
<td>Painted sweet lips (Diagramma pictum)</td>
<td>100</td>
</tr>
<tr>
<td>Pangasius hypophthalmus</td>
<td>Rohu (Labeo rohita)</td>
<td>100</td>
</tr>
</tbody>
</table>

Discussion
Inconsistences between the package labels and content in seafood are common. Hundreds of studies have been published and in some the mislabeling is 100%. As a contrast, the current study shows two out of 50 samples, constituting 4% of confirmed mismatch, a relatively low percentage compared to other studies. This may be attributed to unintended benefits of strict food and health safety regulations in the State of Qatar.

Although strict regulations for food safety may indirectly deter market substitution of authentic food product, there is a need for regulatory mechanism to routinely inspect packaged seafood using molecular tool such as DNA barcoding techniques. This may ensure seafood industry, processors and importers to adhere to food safety laws, minimize exploitation of endangered aquatic species and prevent intentional or unintentional market substitution.

References

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