The Vietnamese Standard of Fish Sauce: National position base on science
Fish sauce is the mainstream sauce of Vietnamese cuisine

- Fish sauce is so prevalently used throughout Southeast Asia.
- Each culture has its own preferred strength of fish sauce and how to use it in its cuisine.
- For Vietnamese meals, fish sauce is brought more robustly flavored and fit with other cuisines.
Vietnam has a long coast, about 3260 km.

Fish sauce has been produced for hundreds of years, since the fourteenth century and along the coastal areas of the country.

Up to date, 300 manufacturers annually produce 50,000 liters and others small scale ones.

The total output is about 200 million liters.
Basic science for building codex standard of fish sauce

The research was undertaken by the Research Institute for Marine Fisheries

• Objectives:
  + Review on fish sauce production technologies in Vietnam
  + Description on fish sauce and processing procedures
  + Chemical properties of fish sauce
  + Microbiological contamination of fish sauce

• Activities:
  + Survey of fish sauce processing facilities in 15 provinces
  + Collect 900 samples for analyzing chemical properties and microbiological contamination
Chemistry Analytical Methodology

1. Determination of histamine content: HPLC (H/QT/19.64)
2. Determination of total nitrogen and protein content: TCVN 3705-90
3. Determination of nitrogen in amino acid content: TCVN 3708-1990
5. Fish and fishery products – Determination of acid content TCVN 3702-1990
6. Fish and fishery products - Determination of sodium chloride content
7. Method for the determination of Lead AAS (H/QT/19.55)
8. Method for the determination of pH (H/QT/19.70)
Microbiological analysis method

1. Enumeration of total aerobic bacteria: TCVN 5165-1990

2. Microbiology of food and animal feeding stuffs - Horizontal method for the detection and enumeration of coliforms - Most probable number technique TCVN 4882-2001

3. Microbiology of food and animal feeding stuffs - Horizontal method for the detection and enumeration of presumptive Escherichia coli - Most probable number technique : TCVN 6846-2001

4. Enumeration of Clostridium Perfringens: TCVN 4991-89 (ISO 7937 : 1985)
Review on fish sauce production in Vietnam

- 3 kinds of processing method of fish sauce
- 2900 fish sauce processing workshops/units, both in small and large scale
- 66 craft villages where the households are producing fish sauce
- In 2006, the annual output was 215,000 tons
- Domestic consumption: 99%
- Export: 1%
Diagram of the fish sauce production

- Reception of raw materials
  - Fish
  - Salt
- Mixing of fish and salt
- Fermentation
- First separation
  - First extract
  - Fish residue
- Brine preparation
  - Brine
- Succeeding extraction
- Separation
- Extract
- Blending
- Fish sauce
## Determination content of histamine

<table>
<thead>
<tr>
<th>Area</th>
<th>N^0 tested samples</th>
<th>The amount of histamine in tested samples (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>&lt; 100ppm</td>
</tr>
<tr>
<td>North of Vietnam</td>
<td>300</td>
<td>17.67</td>
</tr>
<tr>
<td>Central of Vietnam</td>
<td>300</td>
<td>21.33</td>
</tr>
<tr>
<td>South of Vietnam</td>
<td>300</td>
<td>23.67</td>
</tr>
</tbody>
</table>
### Determination content of pH, acetic acid, NaCl

<table>
<thead>
<tr>
<th>Area</th>
<th>N° tested samples</th>
<th>The average value of pH</th>
<th>The average value of acetic acid</th>
<th>The average value of NaCl</th>
</tr>
</thead>
<tbody>
<tr>
<td>North of Vietnam</td>
<td>300</td>
<td>5.7</td>
<td>12.9</td>
<td>270.01</td>
</tr>
<tr>
<td>Central of Vietnam</td>
<td>300</td>
<td>5.3</td>
<td>19.15</td>
<td>265.17</td>
</tr>
<tr>
<td>South of Vietnam</td>
<td>300</td>
<td>5.4</td>
<td>17.21</td>
<td>254.21</td>
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</table>
### Determination of total nitrogen content

<table>
<thead>
<tr>
<th>Area</th>
<th>No tested samples</th>
<th>The total amount of nitrogen in tested sample (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>10-15g/l</td>
</tr>
<tr>
<td>North of Vietnam</td>
<td>300</td>
<td>7.33</td>
</tr>
<tr>
<td>Central of Vietnam</td>
<td>300</td>
<td>6.00</td>
</tr>
<tr>
<td>South of Vietnam</td>
<td>300</td>
<td>7.33</td>
</tr>
</tbody>
</table>
Ratio of amino acids nitrogen to nitrogen in total

<table>
<thead>
<tr>
<th>Area</th>
<th>Nº tested samples</th>
<th>Ratio of amino acids nitrogen to nitrogen in total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>30-40</td>
</tr>
<tr>
<td>North of Vietnam</td>
<td>300</td>
<td>13.67</td>
</tr>
<tr>
<td>Centre of Vietnam</td>
<td>300</td>
<td>17.33</td>
</tr>
<tr>
<td>South of Vietnam</td>
<td>300</td>
<td>4.67</td>
</tr>
</tbody>
</table>
Total aerobic bacteria

<table>
<thead>
<tr>
<th></th>
<th>N⁰ tested samples</th>
<th>The total amount of aerobic bacteria in tested samples (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1-10 cfu/ml</td>
</tr>
<tr>
<td>North of Vietnam</td>
<td>300</td>
<td>32.67</td>
</tr>
<tr>
<td>Central of Vietnam</td>
<td>300</td>
<td>22.33</td>
</tr>
<tr>
<td>South of Vietnam</td>
<td>300</td>
<td>37.33</td>
</tr>
</tbody>
</table>
## Enumeration of coliforms and *E. coli, C. perfringens*

<table>
<thead>
<tr>
<th>Area</th>
<th>$N^0$ tested samples</th>
<th>The number tested samples of coliforms</th>
<th>The number tested samples of <em>E. coli</em></th>
<th>The number tested samples of <em>perfringens</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>North of Vietnam</td>
<td>300</td>
<td>98.00</td>
<td>2.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Central of Vietnam</td>
<td>300</td>
<td>82.33</td>
<td>17.67</td>
<td>100.00</td>
</tr>
<tr>
<td>South of Vietnam</td>
<td>300</td>
<td>97.00</td>
<td>3.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Proposals for building the standard draft of fish sauce

- **Fish sauce definition:** is a translucent brown liquid hydrolysate derived from fermentation of small fish and salt at a ratio of 3:1 in ambient temperature and color varies from traw yellow to amber.

- **Process definition:** The product is prepared by mixing fish with salt and is fermented in covered containers or tanks. The fermentation process takes not less than 6 months.

- **Basic ingredient:**

  + Raw fish
  + Salt
  + Water
Proposals for building the standard draft of fish sauce

• Quality criteria
  + Appearance: is a translucent not turbid
  + Odor and state: characteristic of product

• Level of chemical properties of fish sauce
  + Nitrogen in total: $\geq 10$ g/l
  + Ratio of nitrogen in amino acids to nitrogen in total (%)
    $\geq 40$
  + pH: $5 \leq \text{pH} \leq 6$
  + Histamine: $\leq 400$mg/l
  + NaCl: $\geq 200$ g/l

• The maximum limit microbiological contamination of fish sauce
Thank you very much!

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