Production of collagen/gelatin from fish skin in the Faroe Islands

Jonhard Eysturskarð, Ph.D.
Researcher at Seanergy and Norwegian University of Science and Technology, NTNU
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Contents

• History

• Company

• Raw material

• Collagen

• Production

• Application

• Marketing
Gelatin history

• 5000 years ago: the Egyptians used gelatin as glue

• 1803-1815 (Napoleonic Wars): the French used gelatin as a source of protein

• 1818: the first gelatin company was established

• 1833: a patent for the manufacture of hard gelatin capsules was granted

• 1845: the first patent for a gelatin dessert was granted

• 1897: the gelatin dessert JELLO was introduced

• 1930: a machine for the manufacture of soft gelatin capsules was invented

• 1930: the famous gummy bears were introduced

• 1950: marshmallows became extremely popular

• 2009: the total gelatin production was 326,000 tons
Seanergy was founded

- Fish gelatin has been extracted from fish skins since 1960 in Canada
- Only small commercial volumes are available (~2,000 tons)
- The Faroese gelatin history started in 2005
- The Faroese research centre and fishing industry were looking for partners
- Junca Gelatins confirmed their interest in 2006
- A production plant was established in the Faroe Islands in October 2008
Faroe Islands
Seanergy

- Located in Eiði, Faroe Islands
- Joint venture between Juncà Gelatins and Biotech Invest
Juncà Gelatines

- Located in Banyoles, Spain
- Founded in 1947
- Family business
- Mammalian gelatins and hydrolyzed collagen
- Has the know-how from 60 years of experience
Ownership

Sharecapital: 8 mill. DKK

Shareholders:

Junca Gelatines, Spain

Biotech Invest, Faroe Islands
• The Eik Fund
• Filleting factory
• Fishmeal factory
• Shipowners
• Service Company
• Staff
Raw material

- **Collagen** is the major component of fish skin and bone
- **Skin from** deep water fish such as *cod*, *haddock* and *saithe*
- Obtained from *local fish factories*
Collagen

- Composed of three \( \alpha \)-chains that are twisted around each other
- The \( \alpha \)-chain is about 1000 amino acids long
- Collagen is insoluble in water due to the covalent cross-linkages
- Collagen peptides/gelatins are obtained by the hydrolysis of collagen
Production

• Cutting

• Washing

• Pretreatment (acid/alkaline)

• Extraction (neutral/acid pH/enzym)

• Filtration/Centrifugation

• Concentration/Evaporation/Sterilization

• Drying
The final product

- A mixture of polypeptide chains with different molecular weights

- $\alpha$-chains, $\beta$-chains, $\gamma$-chains and components with higher and lower molecular weights
Commercial interest in gelatin

- 326,000 tons of mammalian versus ~2,000 tons of fish gelatin

- Gelatins from cold water fish species are known to have lower gel strength, as well as lower gelling and melting temperatures compared to mammalian gelatin due to a lower content of the imino acids

<table>
<thead>
<tr>
<th>Amino acid</th>
<th>Type A gelatin</th>
<th>Type B gelatin</th>
<th>Cold water fish gelatin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydroxyproline</td>
<td>91</td>
<td>93</td>
<td>60</td>
</tr>
<tr>
<td>Proline</td>
<td>132</td>
<td>124</td>
<td>96</td>
</tr>
</tbody>
</table>
Applications

- Health
- Food
- Tablets
- Cosmetics
Marketing situation in 2009

- Bottom line remained negative in 2009

- Small volumes were exported to Thailand, Japan, Taiwan, Malaysia, USA, Singapore, UK and Norway
• **Price** for fish collagen peptides/gelatin: **10-12 euro/kg**

• **Value of 80 tons** of collagen peptides/gelatin is **800,000 euro (~7 mill NOK)**

• **80 tons of collagen peptides/gelatin** can be produced from about **800 tons of fish skin (~27,000 tons of cod/saithe/haddock)**

• Production capacity: **3-5 tons/batch** (one batch/48h)
Positive aspect: Japan

- Our contacts are very positive on the introduction of our product
- Their main worry is the plant capacity and raw material availability
- Sales in the Japanese market can mean several hundred tons
Positive aspect: Thailand

• After **evaluation of the quality** of the product

• A **health distribution company** has **confirmed their interest** in becoming **exclusive agent** for our product in the **Thai market**

• **Similar approaches** are taking place in the **Taiwanese** and **Korean markets**
Positive aspects: EU

- In EU, the ongoing evaluation of products: Functional foods keeps collagen on the list as an health ingredient.

- After evaluation of the visco-elastic properties, a drug delivery company has confirmed their interest in using our product.
Thank you for your attention!