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

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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

<u>Shareholders</u>:

Junca Gelatines, Spain

Biotech Invest, Faroe Islands

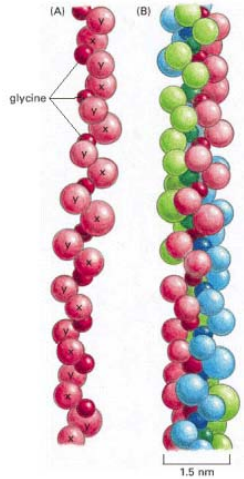
- The Eik Fund
- Filleting factory
- Fishmeal factory
- Shipowners
- Service Company
- Staff

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**

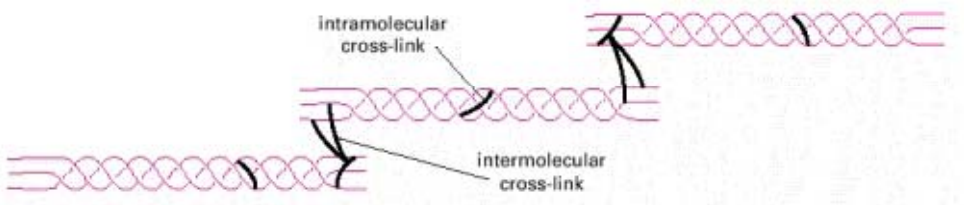
Collagen

- Composed of **three α-chains** that are **twisted around each other**



- The **α-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)

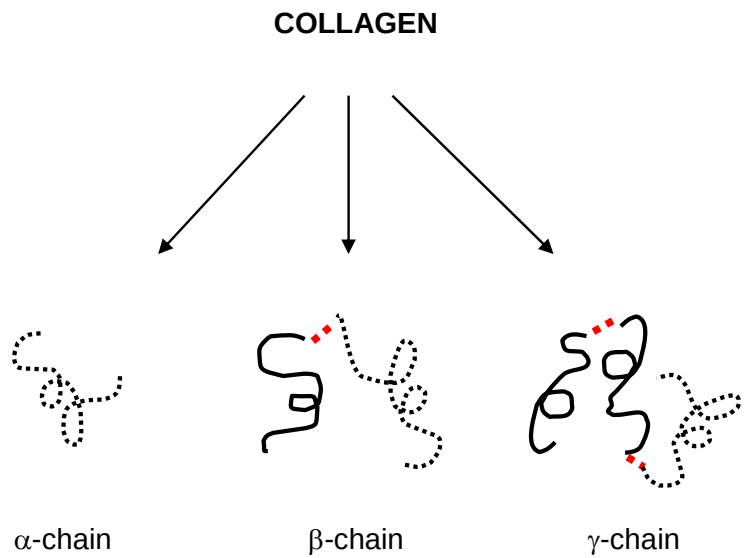
- Filtration/Centrifugation
- Concentration/Evaporation/Sterilization

- Drying

The final product

- A **mixture of polypeptide chains** with different molecular weights

- **α-chains**, **β-chains**, **γ-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**

Amino acid	Type A gelatin	Type B gelatin	Cold water fish gelatin
Hydroxyproline	91	93	60
Proline	132	124	96

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**

Bottom line

- **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!