



Trash2Cash Delrapport nr. 2.6

Fish gelatine – a short market survey

Delprojekt 2: Hvidfisk – udnyttelse af affald

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Delprojekt 2: Hvidfisk – udnyttelse af affald

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Background

As a consequence of the increasing Danish interest in fish gelatin products, the project Trash2Cash, via Teknologisk Institut, decided to commission a market study, describing characteristics such as size, growth, prices, major actors, competition, attractiveness, and forecasts for coming years etc.

Core Competence AB has some earlier experience in the field, and has looked into recent developments, searched for information on the web, and performed a few interviews with leading gelatin producers.

Nomenclature

Collagen is the three dimensional biopolymer protein network, the connective tissue in mammals and fish. When collagen is hydrolyzed, by acid or by enzymes, gelatin is formed. It consists of a triple helix, three chains of polypeptides, associated with hydrogen bonds. Gelatin can be further hydrolyzed into a gelatin hydrolysate. In connection with the BSE, bovine spongi encephalopati, the term gelatin got a negative image in the mind of the consumer. Producers rebranded their products as "hydrolyzed collagen", "collagen hydrolysate", fish collagen hydrolysate etc. The nomenclature for collagen products is still confusing, and product specifications should be carefully studied in order to obtain the desired product.

Raw materials

The most common raw material for fish gelatin is fish skin, but substantial amounts are also made from fish scales. Fish bones are seldom used, since they do not contain very much collagen.

General properties

Fish living in warm water have a different composition of their collagen than fish swimming in cold water. Gelatin from warm water fish resembles the gelatin from bovine and porcine animals. It has gelling properties, with a gel strength measured with the Bloom number, good film forming properties and excellent water holding properties. Gelatin from cold water living fish, by contrast, does not gel for any practical purposes, and for a long time industrial applications were limited. This situation has now changed.

When gelatin from various sources are hydrolyzed, their properties and characteristics different from the start, the properties will converge and be more and more alike. A total hydrolysis will yield amino acids.

Market

The market for fish gelatin and fish collagen hydrolysates is small, around 2 000 to 3 000 tons per year, a very small part of the large gelatin market. Prices vary from 10 to 15 Euro per kg, depending on traceability, degree of hydrolysis, taste and purity.

The market is limited by the availability of products, a favorable situation for the suppliers.

Suppliers

The table below shows the most important suppliers of fish collagen based products with some comments.

Company	Country of production	Products
Norland Products Kenney & Ross, Nova Scotia, CAN. www.norlandproducts.com	USA, CAN	Gelatin and hydrolysates from cod skin. Cold water products. Large supplier with long experience and broad product range.
Seagarden www.seagarden.no	NOR	Fish collagen hydrolysates from cod skin, cold water
Rousselot www.rousselot.com	FRA	Products from warm water fish, mostly capsules and confectionary
Lapi gelatin www.lapigelatine.com	ITL	Gelatin from warm water fish
Weishardt Group www.weishardt.com	FRA	Gelatin from warm water fish. Hydrolyzed collagen, Naticol, for cosmetics and anti-arthritis formulations
Juncá Gelantines www.migueljunca.com	ESP	Fish gelatin from warm water fish
Nitta Gelatin Inc www.nitta-gelatin.co.jp	JAP	Hydrolyzed gelatin from fish scales. Maringen for cosmetics
Geltech Co Ltd www.geltech.co.kr	KOR	Gelatin from tilapia fish scales. Mostly capsule products
Jellice (JPPL) http://jellice.com.tw	TAI, JAP	Gelatin from fish scales. Important South East Asian producer

Copalis www.copalis.fr	FRA	Fish collagen and hydrolysates for cosmetics
YSK, Yaizu Suisan Kagaku Industry Co Ltd www.sphere.ne.jp/ysk/	JAP	Collagen and gelatin from warm water fish
20 to 25 smaller producers in China www.alibaba.com	CHI	Warm water fish, collagen, gelatin and hydrolysates

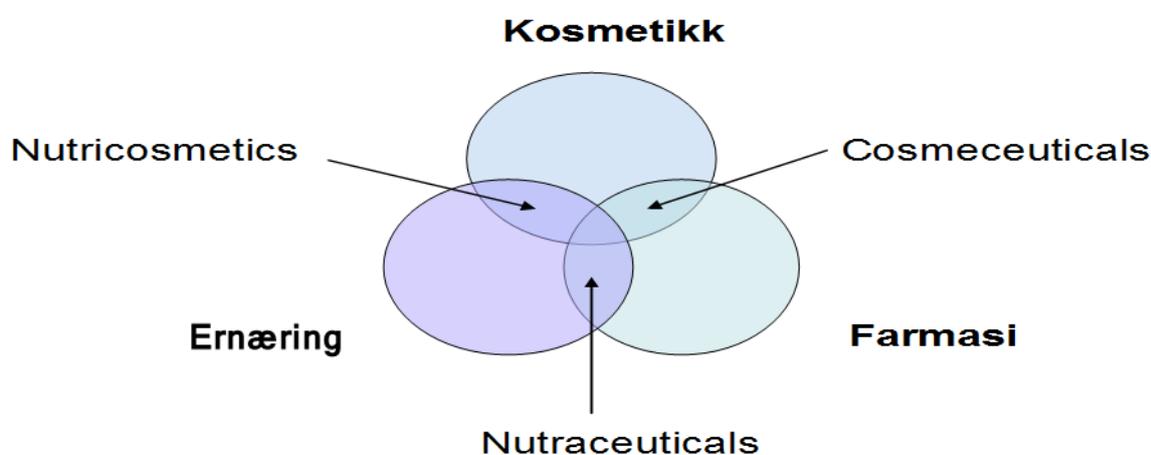
During the Health Ingredients Exhibition, Amsterdam, December 2014, the four gelatin producers Gelita, Weishardt, Copalis and Rousselot were interviewed. There was a great interest to collaborate with Danish and Norwegian companies if they could provide raw materials or preferably fish collagen based finished products. Their main interest were for applications such as skin care and “beauty from within”.

Applications

An important part of the warm water fish gelatin goes to the capsule industry and to additives for food. Here, it replaces bovine and porcine gelatin in uses where consumers want to have no discussions about BSE.

The traditional application for cold water fish gelatin is microencapsulation of heat sensitive vitamins and other nutrients. Norland pioneered this application, and was the sole supplier to Roche for many years.

For hydrolyzed products, collagen from both warm and cold water fish are used. A simplified picture of the fields of activity and the terms used is shown below.



Cosmeceuticals are cosmetics which will have a positive effect on our health. Mostly topical products for various types of skin care. The products are said to increase the

softness and elasticity of your skin, or reduce dark spots which may develop during ageing. A large segment is for anti-wrinkle, others for general moistening, and after shave. Products have also been used to treat acme, eczema, dermatitis and psoriasis.

All the big international cosmetic companies are active in this field. Requirements for fish collagen hydrolysates to be considered for use are: Traceability and sustainability issues all clear, high purity and general quality, neutral smell, good water solubility, mean molecular weight around 10 000 Dalton, depending on application and assurances of constant, long term supply.

Nutriocosmetics or “Beauty from within” are products on the borderline between cosmetics and nutrition. They are oral products, to be eaten or which you drink, formulated specifically for “beauty purposes”, pills, tablets, liquids, snacks or regular foods.

The market is driven by affluent, urban people with purchasing power and a wish to look young and attractive. An increased intake of hydrolyzed fish collagen is assumed to improve the moisture balance of the skin and reduce wrinkles. The target group is often mentioned as “women over 40”. Initial skepticism has turned into something a bit more positive as clinical studies show some support for the claims made by producers. Fish collagen hydrolysates are commonly used, especially in drinks. The most important market geographically is south East Asia. Requirements for a fish collagen product are: Neutral taste, good water solubility, mean molecular weight 2 000 to 7 000 Dalton. Other properties as for cosmeceuticals.

Some nutriocosmetics products are shown in the table below.

Company	Products	Comments
Biocell Technology LLC, USA www.biocelltechnology.com	Biocell Collagen II	Blend of collagen peptides, hyaluronic acid and chondroitin sulphate. As of today not fish collagen based.
Norland Products Inc. USA www.fintasticcollagen.com	SeaSource Collagen	Collagen hydrolysate from cod skin. 10 gram/day improves moisture balance of skin and reduces wrinkles. 300 gram, USD 38,95.
Rousselot FRA www.rousselot.com	Peptan	Collagen hydrolysate from fish pig or cow. Mainly antiwrinkle applications.

A very strong hydrolysis will yield peptides, a short string of amino acids. Some fish based peptides are bio active. The market for bio active fish based peptides is still in its infancy, and only small volumes are sold, if any. It is however, an active research field. In the table there are some examples of bio active peptides.

Company	Product	Function
Ocean Nutrition, CAN	Levenorm	Peptide from marine sources. ACE inhibitor, will reduce blood pressure. Supplement for prehypertension.
Gelita Group, GER	Fortigel	Will strengthen and regenerate cartilage in joints. Nutritional supplement. Not marine based.
Rousselot, FRA	Peptan	Hydrolysate from fish, pig or cow. Recommended for joint health and as an ingredient in food.

The coming years

Further growth of the fish gelatin market is determined by the availability of raw materials, mostly fish skin, and also by the number of enterprises willing to produce fish collagen hydrolysates. Production units will have an advantage if they are situated close to the raw material source. However, in order to make the business a success, a thorough know-how of the applications must be at hand. The situation today is that raw materials and application knowledge seldom are available in the same company. This makes it hard for new entrants into the business to make the decision to go ahead, provided they do not already have a collaboration with one of the established gelatin companies.

References

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