

NuProTex Nutritious Protein Textures

A Food Future project

March 2015

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Summary

Fish and vegetable protein sources are relatively underutilized for human consumption in comparison to meat, dairy and egg protein sources. Only part of the available fish proteins is used: fish is too small for human consumption and fish has a high proportion of by-products, up to 50% of fish weight is not used. This project aims to develop products and processes for creating healthy high valued consumer products based upon vegetable proteins and fish/crustacean proteins from by-products or from neglected fish. Three innovative processes are developed:

- 1) Iso-electric solubilization and precipitation of fish/crustacean proteins from by-products,
- 2) Networked vegetable/fish protein textures based upon low moisture extrusion processes
- 3) Fibrous vegetable/fish protein textures produced with high moisture extrusion processes.

Two innovative processes are applied:

- 1) Food products with water-oil-water emulsions with isolated fish proteins
- 2) Food products with sous-vide prepared fish fillets in semi industrial context.

Different consumer product prototypes will be developed like fish nuggets, fish flakes and fish crackers.

The Nuprotex project created successfully two new processes. Hanzehogeschool developed the process for fish protein isolation based upon iso electric solubilization and precipitation. With this process it was possible to recover about 15% weight of additional proteins from fish by-products. Please be aware that the yield of fish fillets from the fish is only about 30% of fish weight. So this is an important increase in food grade proteins! These Isolated Fish Proteins are successfully converted into several consumer prototype products like multiple emulsions for savory liquid products and fish cake/cracker applications. A sous-vide cooking process for fish fillets was developed with respect to microbial safety. It was shown that a microbial safe route could be developed, however further research is necessary to confirm these preliminary results.

DIL has developed successfully an high moisture extrusion process for isolated fish proteins, grinded fish by products and vegetable proteins. This semi-finished product is successfully applied by for developing deep fried fish nuggets and fish burgers. DIL produced fish pellets which are suitable for applications as fish feed as is demonstrated in actual trials. Further research must demonstrate the quality of the feed product in actual growth experiments with fish.

This project has clearly demonstrated that it is possible to produce with fish by-products added value consumer products. A possible increase of food-grade fish protein of about 15% on fresh weight base of processed fish is possible.