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DAFIA

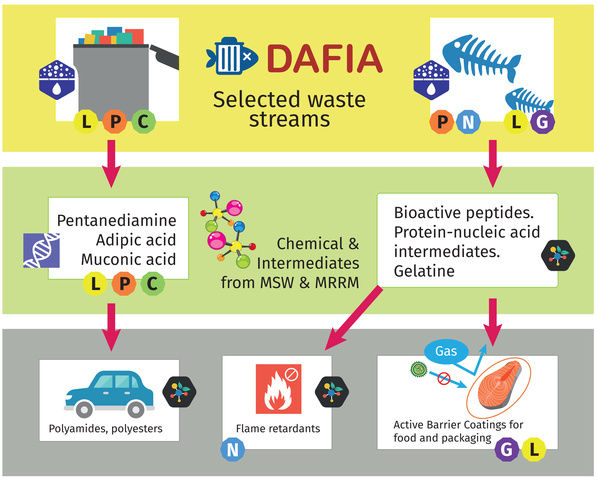
BIOMACROMOLECULES AND BIOPLASTICS FROM FISH REST RAW MATERIALS FOR HIGH ADDED VALUE APPLICATIONS

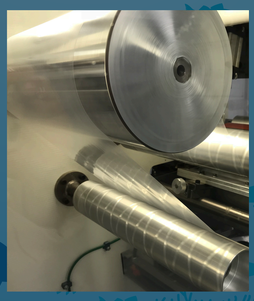
More than 1.3 million tonnes of marine rest raw material (MRRM) are generated in Europe each year. It will be a challenge for the industry to develop methods to turn fish skin, currently considered as undesirable raw materials for hydrolysis and human consumption, into profitable products.

One of the main objectives of the DAFIA project is to explore the conversion routes of marine rest raw-materials (MRRM) from the fish processing industries, to obtain high added value products, i.e. edible and barrier coatings as well as flame retardants.

Gelatine, nucleic acids, proteins, polypeptides, bones are the main products otained from MRRM with very interesting and innovative uses applied in this project.

Thus, DAFIA consortium has developed fish gelatine-based coatings, optionally including based bioactive peptides, for application on fish fillet (edible coating) and fish packaging in which the gelatine acts as an oxygen barrier coating.



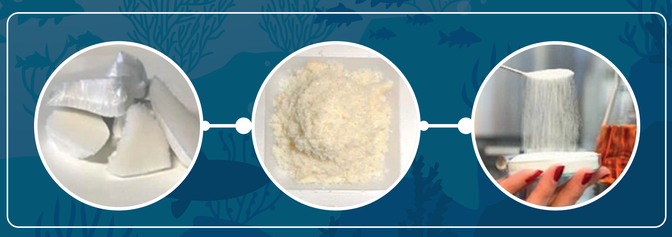


AIMPLAS is involved in the production of this bio-based packaging including bio-actives compounds in cooperation with IRIS, responsible of the edible coating solutions, and SINTEF, in a cooperation with other project partners, is developing technological solutions for extraction of nucleic acids from MRRM and seeking for improvement of gelatine extraction technologies. Evaluation of protein-rich residues after extraction of gelatine and nucleic acids is also contemplated.

Improved textural characteristics of cold water fish gelatine would substitute mammalian gelatine in food industry for the production of coatings.

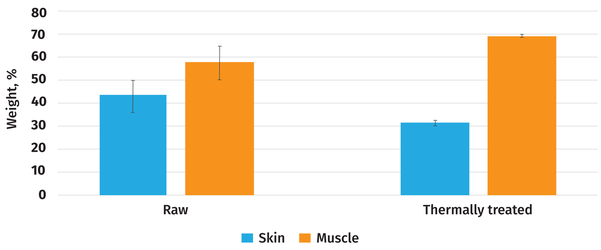
Rest raw material from fatty fish like herring, mackerel and salmon are rich in lipids and proteins. Lipids and non-collagen proteins usually complicates the extraction of gelatine. Therefore, initial fractionation of lipids and non-collagen proteins from raw material before extraction of gelatine has been studied.

Yield of extracted gelatine has been used to evaluate efficiency of different extraction technologies and the quality of gelatine has been tested by chemical and amino acid composition while it is compared with commercial gelatines.



The results have shown that up till 84 % of gelatine (based on dry material) can be extracted from salmon skins by using selected technologies and edible and barrier coatings can be produced with them. **Extracted and dried gelatines are white and odourless powder**.

Yield, %	Technology I	Technology II	Technology III	Technology IV
g dry gelatine from 100g skin	7.2 ±0.3	4.1±0.0	11.3±0.5	15.1±0.1
% of dry material	14.7±0.6	10.3±0.1	26.5±1.1	38.7±0.4
% of N	24.1±1.8	14.5±2.3	48.2±2.1	68.1±1.0
% hydroxyproline	*	*	74.2±2.2	83.8±6.8



◄ *Fractionation of the skin into muscle and de-muscled skin was performed by two technologies. One is based in mechanical removal of the raw muscle from the skin, while the other included mild heating of the skin in order to ease the removal of muscle from skin, followed by oil separation. The yield of the muscle and skin is given in this figure. The higher amount of muscle is removed from the thermally treated skin, giving less, but more clean skins intended for following gelatine extraction.*

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