

# **Evaluation and Optimization of Lipid Recovery from Fatty Fish and Very Lean Fish Protein Isolates using Chloroform-methanol Extraction**

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Recovery of the lipid fraction of muscle tissues is one of the most usual tasks performed routinely by food scientists. Within the fish research field, by far the most common methodology used for this purpose is chloroform-methanol extractions according to any of the numerous varieties originating from the Bligh and Dyer method. Unfortunately the Bligh and Dyer method has often been heavily misunderstood, and it has been forgotten that it must be carefully adjusted to the specific matrix of interest. In our lab, special focus is currently given on lipid extractions from both fatty materials and very lean materials such as fish protein isolates. No publications have been found that deal with an optimized extraction method for the very lean materials although numerous labs world-wide have started to produce them. This study was performed to fill this gap, and had two aims. Firstly, to qualitatively evaluate our routine lipid extraction method (Bligh and Dyer as modified by Lee et al.) when applied to a fatty tissue (herring mince) and a fish protein isolate. As a second aim, the possibility to further improve lipid recovery and lipid quality using the very lean protein isolates was investigated by means of factorial design and response surface methodology (RSM), the latter using a three level face-centered cube design. Examples of factors considered include degree of tissue disruption, exposure time to chloroform and sample to solvent ratio. The individual and interaction effects of the experimental parameters that influence the response variables the most are determined. From both sub-studies, data will be presented on chloroform layer recovery, total lipid recovery, lipid hydroperoxide recovery, fatty acid profile and lipid purity (protein contamination). A lipid extraction procedure especially suitable for very lean fish protein isolates will also be presented.