

Aquaculture and fisheries conference 2018: Waste management for smoking salmon by-products to extract omega-3 fish oil -Tarek Fouda-Tanta University, Egypt**Tarek Fouda***Tanta University, Egypt*

The main objective of this research was to investigate the possibility of producing fish oil from smoking salmon waste by using cold pressing and wet rendering methods. The amount and the characteristics of extracted oil were tested. The samples were used about 33.810 kg, smoked fish caused about 9.610 kg. As a salmon waste (skin, viscera, backbone frames and cuts off) it's recorded about 20% of the total mass from salmon slices. The results showed the smoking salmon waste have more than 18% of oil fish per one kg of salmon waste. The oil weight from salmon by-products was increased with pressing time increase as well as oil productivity increased. The oil extraction yield increased and characterization of quality. The optimum conditions at pressing time was 180 minutes, oil weight was 93 g oil/500 g salmon by-products, oil productivity was 18.00%, and extraction efficiency were 98.46% at constant pressure. The oil weight from salmon by-products was increased with heating time increase as well as oil productivity increased. The oil extraction yield increased with the wet rendering processes at heating time of 60 minutes have oil weight about 90 g oil/500 g. Salmon by-products, oil productivity about 18.00%, and extraction efficiency was 95.23%. The oil extraction yield increased with the wet rendering processes and characterization of the oil increasing with cold pressing processes. The fish industry developed around fishing ports at a time when landings were plentiful and there was little concern about environmental impacts. Nowadays, natural resources and the environment are under threat and are increasingly protected by law. Government policy is now focussing on the protection of resources, promoting sustainable utilisation and reducing emissions to the environment. Fishing opportunities are reduced and waste generation and disposal are increasingly penalised. A further problem faced by the fish industry is the increasing concern about farm animal diseases, particularly those transmissible to man such as BSE. This is resulting in the closure of

some of the existing routes of waste utilisation and adding further restriction and costs to waste disposal. Whilst the UK fishery resources are reducing and the costs of our industry are increasing, imported fishery products remain available, often at low cost, and now take the major share of the retail market. Retail price competition is fierce and our industry is squeezed to very low profit margins between low retail prices and high operating costs. It is therefore essential that the industry minimises waste and maximises the value of the material available to it. The fish industry generates a significant amount of waste. It has been previously estimated by Seafish that for each tonne of fish eaten, over a tonne of fish material is discarded either as waste or as a low value by-product. For each tonne of cod purchased by a processor nowadays for about £2,000, about 50% of that material is classed as processing waste, which typically generates less than about £40 income and at worst may incur about £60 disposal costs. There is considerable potential for gaining more value from fish waste. It is rich in valuable minerals, enzymes, pigments and flavours that are required by many industries including food, agriculture, aquaculture and pharmaceuticals. Possible alternatives include silage production, which has potential in livestock feeding, and the production of chitin and chitosan from crustacea waste, which have many commercial uses including in water and effluent treatment and as food additives. Fish waste can also be utilised in the production of organic fertilisers and composts, which have significant benefits over chemical based products. These and other alternative uses for fish waste could potentially generate significant revenue but there are commercial and practical hurdles to be crossed before these options become a viable reality. The UK industry may be missing valuable opportunities as many of these alternatives are already commercially utilised in other countries. This report estimates the types and quantities of fish waste generated in the different

sectors of the UK industry, from catching to processing, and summarises the current utilisation or disposal of that waste. It then details many of the potentially higher value utilisation opportunities for that waste and identifies some of those that may be most suitable for the UK industry. The Animal By-Products Order 1999 (as amended) applies to animals and includes fish, crustaceans and other cold-blooded creatures of any species. It specifies that any animal by-product (animal carcass, parts of animal carcasses or products of animal origin not intended for human consumption) must be disposed of through appropriate channels. These include rendering in approved premises, incineration, burning or burial (only under restricted circumstances) and treatment at a knacker's yard. For low-risk material, the by-products can also be fed to fur animals or to maggots farmed for fish bait, providing they are held in registered premises, or can be used in the production of pet food, pharmaceutical or technical products. Fish and shellfish waste is typically classed as low risk but there are exceptions. Skins and shells are excluded from the requirements of the Order provided they are not used in the manufacture of feedingstuffs. For traceability purposes, there are documentation requirements related to waste transportation and transferral. The Order was amended in August 2001, resulting in a ban on the production and feeding of swill produced from catering waste which contains meat products or products that have been in contact with meat, or originates from premises where meat or meat products are handled, processed or produced. It includes a ban on using poultry and fish waste in swill, unless that material has first been rendered in an approved rendering plant. There is an existing UK feed ban, enforced through the Animal Protein Regulations 2001, prohibiting the use of mammalian protein (with certain specified exceptions) to ruminants and the feeding of mammalian meat and bone meal (MMBM) to all farmed livestock. Additional EU wide controls prohibit the feeding of processed animal protein to animals which are kept, fattened or bred for the production of food. Processed animal protein, as defined by the EU, includes materials other than mammalian protein and MMBM, so goes further than the UK Regulations. There are certain exceptions,

however, including allowing the feeding of fishmeal to animals other than ruminants. Approximately 40% of UK derived fishmeal is currently used in ruminant diets, therefore this EU action will have serious implications for processors who send material for fishmeal production.