

Processing and Preparation-Two Key Issues to Increase and Preserve Nutritional Value of Fish and Meat Products

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As a food chemist, I'm excited to be part of the editorial board of this journal as one of my central interests is the sustainable production of nutritionally valuable animal products. As a specialist in questions around the factors influencing fatty acid composition in meat and fish I'm looking forward to seeing novel research on fish and livestock production. In addition research on modified processing techniques of meat and fish to keep and if possible increase the nutritional value of what we breed is needed. The positive effect of omega 3 fatty acids (n-3 FA) on various human health aspects as for example metabolic syndrome, obesity, diabetes, atherosclerosis, neural and brain development are well known [1]: Due to that, lately a strong focus of research has been towards the production of meat and fish rich in n-3 FA [2,3]. Genetics, rearing systems and feeding strategies are tools that are investigated and modified to produce livestock and fish with increased n-3 FA [4]. The main source of long chain polyunsaturated omega 3 fatty acids (lc-n-3 PUFA) are fish and fish oil, which is getting scarce due to increased use for aquaculture, nutraceuticals and multiple other purposes [5,6]. Hence the search for novel feeding strategies, novel sources of lc-n-3 PUFA and possibilities of increased metabolism in fish or livestock are urgently needed in order to secure a sustainable production of fish and meat rich in lc-n-3 PUFA.

However, also the processing of meat and fish into diverse products from sausages over pâtés to fast-food and canned products needs to be investigated and adapted. Because the best fish rich in lc-n-3 PUFA will not do any significant good on human health if it is battered in dough and fried in sunflower oil. The frying fat is taken up to a significant amount by such products [7]. As sunflower oil is rich in omega 6 FA and the ratio of n-6 to n-3 in a fillet fried with sunflower oil will be changed completely and hence decrease the nutritional value of the original fish significantly as also shown by [8,9]. Similar effects have been shown for meat products, even if the effects are less drastic [10]. Also in canned products the added oil plays an important role to the final nutritional value of the products [11]. In general, whenever oil is added during processing or used for final preparation at home, this will influence the nutritional quality in terms of lipid composition. Consequently, from a human health perspective not only the FA composition of the animal diet, but also the choice of oil during processing and preparation of animal foods and food products are essential in order to keep a high nutritional value from raw material to ready product. The use of a fat source with a low n-6/n-3 ratio, as for example rapeseed oil, instead of oils rich in n-6 FA, will therefore make a significant improvement in FA composition of the ready product.

Until now there have been investigations to develop novel n-3 FA rich products [12,13], but the general processing in the industry and especially what people do at home to their meat or fish has been neglected from science [10]. I strongly believe that science and our knowledge need to be communicated to the industry in order to guarantee a real impact of the results achieved by improved production system towards livestock and fish with increased proportions of n-3 FA. So I would like to encourage an increased interdisciplinary dialogue between scientists, the food administration of the different countries and representatives of the whole food production chain - from feed producers and animal farmers, to food industry and nutritional professionals - to develop strategies for the processing of nutritional

valuable animal food products and for consumer education about the preservation of the high nutritional value during the preparation of omega 3 rich food products and convenient foods at home.

Beside lipids also vitamins and antioxidants play an important role both in meat and fish product quality as well as in human health questions [14]. The addition of other bioactive compounds to either the animal feed or the food products could have beneficial effects as it has been shown that they can enhance uptake or metabolism of FA and vitamins [15,16]. The addition of antioxidants is necessary to increase storage stability, sensory quality and nutritional value of animal products [17]. Especially in products with an increased amount of easily oxidized PUFA a higher content of antioxidants will be necessary in the end-product to protect the nutritional valuable FA [18]. Beside the traditionally used antioxidants in meat and fish also a wide variation of herbs, spices and fruits with antioxidative capacity are used more and more as additives in feed as well as during processing [17, 19,20]. In addition to their antioxidative capacity, many of these natural substances have positive effects in the human body and documented health benefits and are therefore highly appreciated food additives [21,22] as reviewed by [14]. So a combination of foods rich in omega 3 PUFA and plant substances rich in phenols and anthocyanins might result in novel food products with an increased nutritional value, as suggested for proteins in meat products by [23]. This should be another focus of the research in our field.

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