



**Issue 26: February, 2018:** This e-bulletin is aimed at personnel in fisheries and aquaculture, at fish packers, processors, distributors, retailers and finally, consumers.

## **Marinating: - an opportunity for flavour innovation**

Cod Mari Mar was the name chosen for a marinated cod product developed in 2017 by 3<sup>rd</sup> year food science students in University College Dublin (UCD) as part of their 3-month product development module. Marinating is one of the oldest food technologies. It is simple to conduct, is relatively cheap, and is an opportunity for colour and flavour innovation. Most marinated fish products on sale in retail stores are 'heavy' marinades i.e. thick highly flavoured yellow/orange coloured semi-pastes. These fish products are difficult to handle and the paste almost completely masks fish flavour. The alternative is a 'light' marinade where the fish surface is moist, but not messy, and the product is easy to handle. The flavours in *lightly* marinated fish are less intense and complement rather than mask fish flavour. Both types of marinades were addressed in this study.

### **Heavy marinades**

Tests were conducted on arrabiatta (ARB) and Cajun (CJN) commercial glazes. Both are free flowing orange powders with green and red flecks containing a number of spices. The former has carbohydrate, fibre, protein, fat and salt contents of circa 58, 17, 12, 8 and 8% respectively, and the latter 59, 16, 12, 7 and 10% i.e. they are both similar in terms of major constituents but differ in spice profiles, flavourings and other minor constituents. Pastes were made containing glaze powder (30g) and water (70g) and these were brushed onto cod darnes with a resulting weight gain of 16% and calculated fibre and salt content in the treated darnes of 0.7% and 0.35% respectively. The treated darnes had a deep orange/brown colour and a strong flavour which largely masked the flavour of the fish. Less strong flavours in the fish can be generated by making pastes with a lower content of glaze.

### **Light marinades (parts 1 & 2)**

Part 1: ARB and CJN powders are only partly soluble in water and were prepared as dispersions of 10, 15 and 20%. Whiting portions (50g) were soaked in the dispersions and were reweighed after 1, 2, 3 and 4 hours soaking. Weight gains were less than expected at

6 and 7% after 2 hours for the 20% ARB and CJN dispersions respectively and 12 and 10 % after 4 hours soaking. This gave whiting portions that were moist but not messy. Group consensus was that whiting colour was too brown and flavour too strong for all treatments. Whiting salt contents after 2 and 4 hours soaking were 0.4 and 0.6% (ARB) and 0.6 and 0.9% (CJN). This compared with salt values of 0.3 (marinated cod) and 0.5% (marinated seabass) in samples purchased in a supermarket.

Part 2: Cod portions (50g) were soaked for 2 and 4 hours in four different mother solutions. Solution 1 contained salt (5%) and sugar (15%), and solutions 2, 3, 4 contained only sugar at 15, 20 and 25% concentration. Solution 1 gave the best results with a weight gain of about 25% for the cod portions in 2 hours indicating a satisfactory ingress of salt and sugar. A range of flavour cocktails were included in this mother solution but those containing vinegar (5%) and lemon juice (15%) resulted in a zero weight gain during soaking. The solution finally selected as best by the group gave a 10% weight gain in 2 hours. The percentage composition was: sugar (15), lemon juice (10), salt (5), tabasco (4), turmeric (4), garlic paste (4) and paprika (2). This gave moist (not messy) cod portions with an attractive yellow colour, and a good flavour and texture. They were also suitable for freezing. The fish was served to tasters with a sauce based on olive oil (72), lemon juice (20), Herbs de Provence (4) and dried garlic (4%).

## Health and safety aspects

Cod Mari Mar is a good source of protein, vitamin D and beneficial bioactives such as taurine. However, it does contain some salt and sugar which could be viewed as negatives. As with all fish it needs careful refrigeration to maintain safety and a practical shelf life. Further tests are needed to assess the extent of build-up of microorganisms in the marinating solution after repeated use.

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*The previous 25 issues of Seahealth-ucd can be viewed at:  
<http://www.ucd.ie/foodandhealth/newsevents/outputs/>*

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