



Issue 19: February, 2016: This e-bulletin is aimed at personnel in fisheries and aquaculture, at fish packers, processors, distributors, retailers, and finally consumers.

MarineTerrine – a high fibre product

MarineTerrine was the name chosen for a high fibre seafood product developed by 3rd year food science students in University College Dublin (UCD) as part of their 3-month product development module. The decision to use smoked cod, fresh cod and salmon for the terrine was based on their excellent health properties while dietary fibre was included to give the product an additional health benefit. The project had three goals: (i) to produce an upmarket high fibre fish terrine containing smoked cod, fresh cod and fresh salmon thus combining the health properties of dietary fibre, fish protein and omega-3s EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid); (ii) to study the effect of different dietary fibres on the colour, textural and sensory properties of the terrine; (iii) to assess the effect of freezing in comparison with chilling on the textural and sensory properties of the terrine.

Choosing the dietary fibre

Dietary fibre passes largely intact through the small intestine and acts as a feedstock for beneficial gut bacteria causing them to proliferate, hold water and increase faecal bulk. It reduces gut transit time and thereby the residence time of potentially harmful agents in the gut. The Irish diet is deficient in dietary fibre with an intake of 19g/adult/day (National Adult Nutrition Survey, 2011) compared to 25g/adult/day recommended by the European Food Safety Authority. A food must contain at least 6% dietary fibre in order to make the claim 'high fibre' (Food Safety Authority of Ireland). Therefore, a target of 6% dietary fibre was set for MarineTerrine. Three fibre types were chosen i.e. wheat bran, high methoxy citrus pectin and resistant starch. Wheat bran contains about 40% insoluble dietary fibre, citrus pectin is almost 100% dietary fibre, a considerable amount of which is soluble and is associated with cholesterol reduction. Resistant starch is resistant to digestion in the small intestine and is formed during the cooling of cooked starchy products such as potatoes, e.g. cooked sliced cold potatoes used in potato salad. Commercially it is produced by a chemical process. Resistant starch contains about 88% dietary fibre, is white, odourless, tasteless and has a low water binding capacity thus making it an ideal candidate for incorporation as a fibre ingredient in foods.

Formulation, cooking and testing

Batches (150g) of fish (30g smoked cod + 60g fresh cod + 60g fresh salmon), dietary fibre and water were blended for 30sec. Red Bell pepper (5g) was added during blending to introduce specks of red colour and the mix was filled into mini bakery tins (11 x 7 x 4cm) as moulds lined with tinfoil. Sufficient dietary fibre (wheat bran, high methoxy citrus pectin or resistant starch) was added to ensure 6% in the final product. Some water was added during to blending as a texture improver. Samples were steamed (20min) to ensure a core terrine temperature of at least 80°C (tested by probe). Terrines were cooled (2-5°C), placed in plastic trays and covered with cling film. Some samples were also frozen (minus 20°C) to determine their suitability for freezing. The samples were tested for composition, colour (Minolta meter), texture (probe penetration system) and also sensory appeal by 25 expert tasters.

Outcomes

Minolta colour values combined with texture probe results and group consensus on sensory aspects suggested that the formula with 80% fish (smoked cod/cod/salmon as 1/2/2) + 13% water + 7% resistant starch was best. This product averaged 8/10 when assessed by 25 expert tasters. It had a light pink colour and sliced easily. Terrines with bran were too chewy and the appearance was that of brown bread. Inclusion of pectin gave a gel that was too weak and sticky. MarineTerrine has a good nutritional profile (protein; dietary fibre; EPA and DHA), very low bacterial counts and has a shelf life in chill (2-5°C) of at least 6 days. MarineTerrine freezes well resulting in a long shelf life at minus 20°C. Freezing also confers logistic benefits in production, distribution and retailing.

MarineTerrine was one of the products developed in the 3rd year food science module coordinated by food scientist Mick O'Sullivan in UCD. Products produced by other groups in September-November 2015 were kambucha, chicken sausage, soft cheese, vegetarian sausage, vegetarian crisps, chocolate mousse and frozen yoghurt.

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