SeaHealth UCD

Issue 42: February, 2023: This e-bulletin is aimed at personnel in fisheries and aquaculture, at fish packers, processors, distributors, retailers and finally, consumers.

Prawn-Seafood Terrine *(TerrMer)*

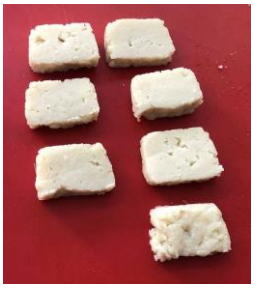
A prawn-seafood terrine was the target product of a 3rd year Food Science Group mini-project conducted in UCD in September-November 2022. This was a component of the annual product development module organised by Michael O'Sullivan, UCD. The concept was to make a product containing 10% prawns extended with a cheaper white fish (90%) thus reducing the price relative to a prawns only product. A prawn essence was included to boost product flavour and dietary fibre was added to give a product which could be claimed as healthy i.e. high good quality protein content plus dietary fibre.

Ingredients

Cooked prawns (Seafeast Brand; €12/kg) were used and raw whiting (*Merlangius merlangus*) fillets (€6/kg) were chosen as the product extender. Both were purchased in a local supermarket, the former from a deep freeze cabinet and the latter from an ice counter. Sunfiber R (Taiyo GmbH), which is 88% dietary fibre, was the fibre source. This is a water soluble fibre derived from partially hydrolysed guar gum. The prawn essence (concentrated flavour) was sourced from Plant-Ex Ingredients Ltd, UK. Blue whiting (*Micromesistius poutassou*) was the intended product extender but only small sized fish could be sourced. These came as a 20kg frozen block (€3/kg) which was thawed and filleted professionally and gave only 5kg of filleted product i.e. a 25% yield due to the small fish size. Skin removal from the fillets resulted in a further loss of 37%. On this basis it was concluded that blue whiting was not a candidate for use as an extender unless much larger fish were used; hence the use of ordinary whiting as the extender.

Formulation & cooking

TerrMer terrines are fish gels which were prepared from the above ingredients. The target was gels with 10% prawns and 90% whiting which were minced together in a blender (4min) to a smooth consistency. The mince was filled into small tins lined with tinfoil which acted as moulds (150g/tin; see image) and steamed (20min) to ensure a core temperature >80°C. Sunfiber R was added in powder form during blending and care was taken to ensure uniform mixing and also uniform filling of the tins i.e. like a carefully made sandcastle to ensure no 'hollows'. The prawn flavour was added dropwise near the end of blending. Five trials were conducted, two with different amounts of Sunfiber R and one trial with added water as shown below. Many fish gels readily support some added water with minimal effect on gel strength. This further reduces product cost. The formula in Trial 5 was adopted as the final one based on gel strength, slicing and bending tests. Salt was added during blending to assist gel binding.



Trials 1-5
Trial 1: Whiting (90%)+prawns (10%)
Trial 2: Whiting+prawns+Sunfiber (3%)
Trial 3: Whiting+prawns+Sunfiber (6%)
Trial 4: Whiting+prawns+Sunfiber (6%)+H_2O (10%)
Trial 5: Whiting+prawns+Sunfiber (3%)+prawn flavour (0.30%)+salt (0.2%)

Fish content in *TerrMer* decreased as Sunfiber R and water were added but the ratio of whiting to prawns always remained at 9:1 in the 150g blend added to each tin/mould. Weight loss (water) during steaming/cooling was circa 9% which had the effect of raising compositional values, e.g. 3% fibre became circa 3.5%.

Product testing, safety & shelf life

Minolta colour meter whiteness (L*) values were similar for gels from Trials 1-5 and ranged 71-75. Gel strength was measured directly in the tins using Stable Micro Systems texture testing equipment fitted with a probe of diameter 1.27cm, entry speed 1mm/sec, and gel penetration depth 1cm. Gel strength (g force) values were 1936 (Trial 1), 1474 (Trial 2), 923 (Trial 3), 798 (Trial 4) and 1426 (Trial 5) indicating that the addition of Sunfiber R reduced gel strength with 3% (Trials 2 & 5) the upper limit. Addition of water further reduced gel strength (Trial 4). Gel slicing/bending tests (conducted manually) reflected the gel strength data i.e. slices from Trials 2 and 5 sliced evenly and with minimal breakage during bending (see image). Sensory feedback on *TerrMer* (Trial 5) indicated it was of acceptable quality. Compositional values/100g) for *TerrMer* were protein (20), carbohydrate (4), salt (1.2), fat (1%) with circa 4% dietary fibre and energy content of 435kJ. A core gel temperature >80°C ex-steamer ensured a sterile product which was largely maintained during handling/packing as confirmed by microbiological analysis. Shelf life was estimated as 4-6 days at 2-4°C and 6-9 days in modified atmosphere (30%N_2+40%CO_2+30%O_2).

Conclusions

TerrMer is a healthy whiting/prawn product which is cheaper than a prawns-only terrine. It contains high quality protein, >3% dietary fibre and can be claimed as 'a source of fibre'. SunFiber R was added in granular form; however, future tests with SunFiber R added in aqueous solution may prove a more fruitful route to a higher fibre content. TerrMer has a shelf life of 4-6 days at 2-4°C and 6-9 days in MA. It is ideally suited for retail sale, use in the home, or as starter/snack in food service outlets. It is best served sliced with Marie Rose sauce/lemon juice.

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The previous 41 issues of Seahealth-ucd can be viewed at:
https://www.ucd.ie/foodandhealth/more/seahealthucd/

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