



Issue 32: January, 2020: This e-bulletin is aimed at personnel in fisheries and aquaculture, at fish packers, processors, distributors, retailers and finally, consumers.

SuppeSalmo (salmon soup)

SuppeSalmo is a salmon soup product developed in 2019 by 3rd year food science students in University College Dublin (UCD) as part of their 3-month product development module. Most fish soups are chowders that are creamy and don't have a high fish content. A typical plateful may contain small pieces of white fish, salmon and vegetables, a couple of mussels, and potato for thickening. The aim for *SuppeSalmo* was to produce a high fibre gluten-free soup with a significant content of Atlantic salmon, carrots and leeks i.e. a highly nutritious soup. Salmon is an excellent source of EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) which are beneficial for cardiac health, cognitive performance and brain development/health (SeaHealth-ucd Issues 3 & 2). Salmon is a good source of protein and astaxanthin (pink pigment) which is anti-inflammatory, is associated with skin health (anti-ageing), immune-enhancement and DNA repair (Davinelli, 2018). Carrots are an excellent source of beta-carotene (pro-vitamin A) which is beneficial for eye health. Leeks, like garlic and onions, belong to the *Allium* family and are a good source of folate which is a key B-complex vitamin for supporting the cardiovascular system. Leeks also contain polyphenols which protect blood vessels and blood cells from oxidative damage. The high fibre content of *SuppeSalmo* was achieved using SunFiber with small amounts of fibre from the carrots and leeks. SunFiber comes from Indian guar beans and contains a minimum of 85% dietary fibre. It is highly soluble in water (Siebrecht, 2019). The soup was thickened using Clearam CH20 which is a pre-gelatinised waxy maize starch.

Product formulation

Atlantic salmon darnes (*Salmo salar*), carrots, leeks, mixed herbs and fish stock cubes were sourced from a local supermarket. A series of pre-trials was conducted and the optimum soup formula for a batch was: water (500g), salmon (150g), carrots (75g), leeks (65g), SunFiber (58g), Clearam CH20 starch (17g), fish stock cube (10g) and mixed dried herbs (1g). This formula yielded 880g of soup which is equivalent to over 4 x 200g portions. The sequence of ingredient inclusion is important i.e. dissolve fish stock cube in hot water (95°C); add/dissolve SunFiber; add pureed carrots and leeks; add/dissolve Clearam CH20 starch gradually over 10min to avoid clumping; add salmon as 1cm³ cubes; add herbs; boil/simmer

for 15min; restore weight to 880g with water to account for water loss during boiling/simmering; hot fill at 88°C into black tubs (400ml capacity) and lid immediately. Cool to 4°C in a cold room (minus 20°C/20min) and then store at 4°C until consumed..

Product testing

Percent composition of *SuppeSalmo* versus (vs) a commercial chowder was: water (82.7 vs 88.2), carbohydrate (10.9 vs 7.01), protein (3.42 vs 1.74), oil (2.45 vs 3.41) and salt (0.51 vs 0.65). Salt content of both soups was in the low to medium range *SuppeSalmo* contained more EPA+DHA (0.153 vs 0.042%) than the commercial sample suggesting higher salmon content in the former. The EU recommends an intake 0.25g of EPA+DHA per day and the British Nutrition Foundation 1.25g. A 200g portion of *SuppeSalmo* will provide circa 0.31g which is highly satisfactory. *SuppeSalmo* had a much higher viscosity than the commercial sample (3100 vs 547cP; Brookfield viscometer) but both shear thinned with increasing shear rate over a period of 200min (607 vs 140cP). A test with 4% model aqueous solutions of Clearam CH20 and SunFiber showed viscosity values of 287 and 20cP respectively indicating that Clearam CH20 was the main contributor to the viscosity of *SuppeSalmo* i.e. SunFiber had little or no effect on soup viscosity. An informal taste panel of peers preferred *SuppeSalmo* to the commercial chowder.

Safety and shelf life

Microbiological tests on *SuppeSalmo* indicated a low total viable count and absence of pathogens. A hot fill at 88°C followed by storage at 4°C should give a shelf life of up to 6 weeks. In conclusion, *SuppeSalmo* is a high quality gluten-free high fibre (>6%) salmon soup containing Atlantic salmon, carrots and leeks. It is a good source of EPA and DHA. Novel ingredients were used to achieve a high fibre content and a good mouthfeel. With clever marketing *SuppeSalmo* could have a competitive edge in the market place - - truly a soup for the soul!

References:

Davenelli et al. 2018. *Nutrients*, 10(4), 522-530.

Siebrecht, S. 2019. *Innovations in Food technology*, February, 36-37.

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