



Issue 22: January, 2025: This e-bulletin is aimed at health professionals, consumers, growers, farmers, packers, processors, distributors, retailers, and others in the plant foods area.

Blueberry/oat high-fibre dessert (`CremBlue`)

Blueberries and oats are popular food items due to their recognised health promoting properties and to their flavour and mouth feel. Blueberries are an excellent source of anthocyanins and other bio-actives which counter inflammation via their antioxidant properties that help negate harmful free radicals (Kalt *et al.*, 2020). Oats are a good source of complex carbohydrate, protein and oil; they also contain β -glucan which is a soluble fibre. Health properties attributed to oats include faster gut transit times, cholesterol reduction, regulation of blood sugar levels and in some cases lowering blood pressure (Martínez-Villaluenga & Peñas, 2017). A fibre-enriched creamy, blueberry/oat dessert (CremBlue) with a shelf life at ambient temperature of more than 3 months was the target product of a UCD 3rd year Food Science Group project conducted in September-November 2024. This was a component of the annual product development module in UCD organised by Associate Professor Nigel Brunton.



Ingredients

Blueberries were supplied by Keelings while porridge oats, single strength cream and condensed milk were sourced from a local store. Fructalose[®] SF75 (Key Ingredients) was used as a multifunctional sugar replacer because of its low glycaemic index (28). It is an oligofructose produced by partial hydrolysis of chicory inulin. It has a high fibre content (54%) and pleasant sweet taste (sugar content 21%). Orafiti[®]GR (Healy Group) was used as a high fibre (89%) prebiotic food ingredient with an inulin content of 90%; it also gives a slightly creamy mouthfeel. Inulin consists of oligo- and polysaccharides composed of fructose units linked together by β -(2,1)-linkages. Almost every fructose chain is terminated by a glucose unit. The number of fructose and glucose units in inulin ranges between 2 and 60.



Table 1: Composition (g/100g) of CremBlue based on weight of each ingredient used^{1,2}

kJ	2911
kCal	698
Protein	2.34g
Fat	6.21g
Fibre	6.62g = Health Claim
Carbohydrate ³	31.6g

¹Data from pack labels for oats, cream, condensed milk; from Supplier Specifications for Fructalose F75 & Inulin GR; from published literature for blueberries; ²Percentages based on final product weight of 520g; ³includes fibre

Formulation, processing & hot filling

Six trials were conducted. Trials 1-4 involved testing different blueberry/oat ratios and also different times of addition of the various ingredients. The product formulation was the same for trials 5 and 6 except in trial 5 the blueberries were added in 'streaks' as a low sugar jam (left jar in product image above). This gave an attractive appearance but a sterilised product could not be ensured at laboratory level as it was a 2-phase operation. However, it may be feasible at industrial level assuming aseptic filling is an option. On this basis it was decided to proceed as in trial 6. The product formula for one batch was: blueberries (80g), condensed milk (60g), single strength cream (60g), porridge oats (40g), Frutalose[®]SF75 (30g), Orafti[®]GR inulin (14g). Water (600ml) was added. The process involved blending the blueberries and oats in water (100ml) for 5 min to ensure a smooth product followed by addition of all other ingredients together in a saucepan. The product was boiled to a final weight of 520g and hot filled into jars with pre-sterilised lids (right jar in product image above). However, if produced/filled aseptically in-factory CremBluo could be presented for sale in attractive biodegradable packaging.

Product outcomes

Taste tests in trials 1-4 indicated that Frutalose[®]SF75 did not add sufficient sweetness to CremBluo nor did Orafti[®]GR give sufficient creaminess. Hence cream was included in the formula with the dual function of providing good mouthfeel and a desirable caramelised flavour; this was generated during the heating process. Condensed milk was added to increase sweetness and also to provide a caramelised flavour. CremBluo has a fibre content of 6.62% thus giving it a high fibre Health Claim (Table 1). CremBluo texture/consistency was measured using a Stable Micro Systems instrument. The penetration force (18.3g.f) indicated a soft yogurt-like consistency in comparison with a gelled marmalade sample which had a value of 72.6g.f. HunterLab colour readings indicated a slightly grey product ($L^*=38.9$) with some redness ($a^*=12.1$) and a slight blue hue ($b^*=-3.1$) due to the blueberries. CremBluo is acidic (pH=5.63) and has a soluble solids (Brix) content of 30.8%.

Conclusions

CremBluo is a dessert product with healthy ingredients (blueberries, oats, Frutalose[®]SF75, Orafti[®]GR) but also 'indulgence' items (cream & condensed milk). It has a pleasant caramelised fruity flavour, an attractive colour and a high fibre health claim. CremBluo is sterile ex-pack and has a predicted shelf life (unopened) of at least 3 months at ambient temperature and one week at 4°C post-opening. Health conscious consumers and those requiring a new flavour experience are the target market for CremBluo.

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References

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- *Martínez-Villaluenga, C. & Peñas, E. 2017. Health benefits of oats: current evidence & molecular mechanisms. *Current Opinion in Food Science*, 14, 26-31.

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