



Issue 19: January, 2024: This e-bulletin is aimed at health professionals, consumers, growers, farmers, packers, processors, distributors, retailers, and others in the plant foods area.

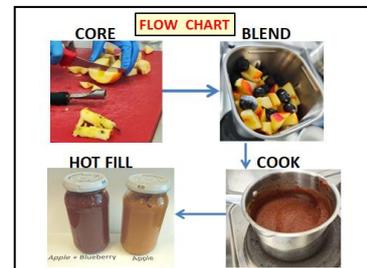
Low-sugar fibre-enriched fruit conserve (*'SimplyFruits'*)

Jams and marmalades are popular food items for many consumers and are classified as having a low/moderate glycaemic index (typically 51-65; glucose=100) with those made from glucose-fructose syrup among the lowest. A low-sugar (brix<20%) fibre-enriched fruit conserve (*'SimplyFruits'*) with potential for consumption by type-2 diabetics was the target product of a UCD 3rd year Food Science Group mini-project conducted in September-November 2023. This was a component of the annual product development module in UCD organised by Peter Dunne. The project concept was provided by Charles Lamb and involved developing a thickened (not gelled) conserve with blueberries and apples (including skins) with no added sugar. SunFiber was added to increase fibre content, pectin to thicken and stevia to sweeten the product. It is probable that *'SimplyFruits'* would be suitable for type-2 diabetics due to its low brix; however, it was not possible to conduct clinical trials due to cost and time limitations.



Ingredients

Bramley and mixed varieties of red skinned apples were sourced from the UCD Rosemount orchard and blueberries from Keelings. SunFiber R (88% dietary fibre), was obtained from Taiyo GmbH. GENU pectin LM-101 AS (from Kelco) is suitable for thickening but not for gelling. The natural product sweetener (stevia) was supplied by Key Ingredients.



Formulation, processing & hot filling

The product formulation in descending order was: mixed red skinned apple varieties (57%); Bramley apples (20%); blueberries (15%); SunFiber (4%); GENU pectin LM-101 AS (4%); stevia (0.1%). All the ingredients, including the apple skins, were blended together at high speed (5min) with added water (100ml) to facilitate blending; most if not all of this water was removed during the heating step. The blended material was cooked/processed (80-100°C/0.5h)

and then hot filled (100°C) into jars with a steam flush to sterilise lid/s (see flow chart). Skins were included as skin-on apple slices have a higher antioxidant potential than peeled slices (Roessle *et al.*, 2008).

Test outcomes on product

Product texture/consistency was measured using a Stable Micro Systems (SMS) instrument in compression mode (cylindrical probe - diameter 1.27cm; test speed 2mm/sec; penetration depth 2cm) (see image). The instrument identified 'SimplyFruits' as a gel with fracture force and adhesiveness values of 28g.force and -40g.sec respectively. Corresponding values for a commercial raspberry jam were 90g.force and -42g.sec i.e. the gelled raspberry sample had a much higher gel rupture value than thickened 'SimplyFruits' but both were equally adhesive on probe retraction. The major effect of blueberries on the colour of 'SimplyFruits' is evident from the jar images above i.e. the product with apples only is brown but blueberry inclusion generates an attractive magenta colour. The extent of the colour change was confirmed by Hunter colour meter lightness and redness readings. 'SimplyFruits' has a brix of 16.7% and pH of 3.5. These compare with values of circa 60% and 2.8-3.2 for commercial jam samples. Routine microbiological tests showed that 'SimplyFruits' was sterile ex-jar. Probe tests showed that 'SimplyFruits' freezes satisfactorily; fracture force values fell from 24.6 (before) to 20.3g.force (after) indicating minimal freezing damage. Anthocyanin content of 'SimplyFruits' was excellent at 1044mg cyanidin-3-glucoside equivalents per 100g of product. This compared more than favourably with the value for commercial raspberry jam of 178mg/100g. Informal tastings of 'SimplyFruits' suggested it was a high quality product.

Conclusions

'SimplyFruits' is a healthy product containing circa 77% apples and 15% blueberries both of which are highly accepted by consumers as healthy fruits (Gormley *et al.*, 2009). Both contain bio-actives including anthocyanins (nature's antioxidants) and dietary fibre. SunFiber supplements the fibre content of 'SimplyFruits' as does added pectin and the product has a health claim i.e. 'source of fibre'. The product contains no sugar other than that naturally present in the fruit which suggests that 'SimplyFruits' is suitable for consumption by type-2 diabetics. 'SimplyFruits' is a safe product with a predicted shelf life of 3 months (ambient temperature - unopened jars), and 2 weeks (4°C - opened jars). 'SimplyFruits' also addresses sustainability in that lower grade fruit (misshapen; windfalls) that otherwise might be discarded can be used. 'SimplyFruits' can be used as a spread on bread/confectionery, and also as an inclusion with porridge and other breakfast cereals. Health conscious consumers and perhaps type-2 diabetics are the target market for 'SimplyFruits'.

Acknowledgements

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References

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