



Issue 23: March, 2017: This e-bulletin is aimed at personnel in fisheries and aquaculture, at fish packers, processors, distributors, retailers, and finally consumers.

AránBradán - - - salmon bread

AránBradán was the name chosen for a white soda bread containing salmon developed in 2016 by 3rd year food science students in University College Dublin (UCD) as part of their 3-month product development module. AránBradán was based on traditional Finnish bread (Kalakukko) which consists of multiple types of fish usually baked in a loaf of rye bread in a masonry oven. Bread is often referred to as 'the staff of life' and provides complex carbohydrate (starch), protein, dietary fibre, vitamins and minerals. Salmon oil is rich in omega-3s EPA and DHA with proven benefit for cardiovascular health and for brain development/function. Salmon protein and component compounds amino acids, peptides and polypeptides have the potential to reduce blood pressure. Salmon also supplies minerals and vitamins. Rapeseed oil is used in the bread formula and provides the essential fatty acids linoleic and linolenic acids. The objectives of the study were: (i) produce a white soda bread with a high salmon content thus combining the nutritional properties of bread and salmon and providing a new product choice for Irish consumers; (ii) study the effect of freezing on the quality characteristics of AránBradán as a route to an extended shelf life and a safe product.

Optimum formulation

Including additional ingredients (e.g. bran) in white bread doughs may give decreased loaf volume and less good crumb structure i.e. it causes disruption of the gluten matrix. In the current test the additional ingredient was chopped fresh salmon pieces about the size of match heads. Chopped salmon inclusions ranging from 0 (control) to 70% of flour weight were trialled at 10% increments and the results showed that the dough would accommodate a chopped salmon inclusion of 50% of flour weight without having a deleterious effect on loaf volume and bread quality. Based on this the optimum formula (expressed as % of flour weight) used in subsequent trials was white flour (100g), water (95), salmon (50), rapeseed oil (8), baking powder (4), sugar (2) and salt (0.5g).

Mixing, baking and freezing

Dry ingredients were mixed (1min) in a Kenwood Chef. Chopped salmon was added with mixing (0.5min) followed by rapeseed oil

(mix 1min). Water was added with mixing over a 2min period. The resulting dough was transferred in 230g lots to greased mini baking tins which were covered with cling film and the dough was rested for 15min to promote bubble growth. A horizontal slit was made in the dough in each tin to facilitate the escape of excess carbon dioxide (CO₂) during baking. The doughs were baked at 200°C for 35min and the mini loaves (circa 160g each) were cooled to ambient. Some of the loaves were tested fresh while others were frozen/stored (-18°C) in a cold room followed by thawing to ambient and testing.

Testing, tasting, safety and shelf life

Loaf volume of AránBradán (221ml) was slightly lower than the no salmon control bread (233ml) and both had good crumb structure. AránBradán had a richer golden crust colour than the control and small salmon pieces were visible in the crumb - an important factor for consumers. Penetrometer readings (Instron Universal Testing Machine) indicated that AránBradán had a firmer crust (5.85 vs 4.58N) and much firmer crumb (3.84 vs 1.79N) than the control. In addition, AránBradán samples that were frozen/thawed had a firmer crust (5.07 vs 3.65N) and crumb (3.02 vs 2.62N) than samples that were not frozen. However, this did not influence acceptability as indicated by a mean score of 7.7/10 given by 8 experienced tasters. A 150g AránBradán loaf potentially delivers 0.76g EPA/DHA based on a salmon oil content of 12% and a content of 16% EPA/DHA in the oil (Cronin et al., 1991). This is above the minimum European Dietary Daily Reference Value of 0.25g. Frozen samples have been set aside and will be tested for EPA/DHA content at a future date. Microbiological tests confirmed that AránBradán is safe and has a high quality shelf life of at least 3 months at -18°C. It is best served as (i) slices with dips (hors d'oeuvre) after refreshing the bread in a hot air oven, or (ii) a bruschetta. AránBradán 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 were gourmet sausage, crab bouillon, high protein bar, coffee crumbles, crab arincini, soft cheese and frozen yoghurt.

Reference: Cronin, D.A., Powell, R. and Gormley, R. 1991 Irish Journal of Food Science and Technology. 15, 53-62.

Acknowledgements: Thanks to Vincenzo del Grippo (UCD) and Eamon Power (UCD) for skilled technical assistance.

AránBradán group: Catherine McGinn, Katie Glynn, Leanne Coyle, Lorraine Crowley, Patrick Swan, Laura Keane (Demonstrator) and Ronan Gormley (Supervisor).

Compiled by Professor Ronan Gormley of the UCD Institute of Food and Health, Belfield, Dublin 4. More information from ronan.gormley@ucd.ie

DISCLAIMER: While every care has been taken in ensuring the accuracy of the material presented, no liability as to its use or interpretation is accepted by the author or by UCD.

