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<td><strong>Authors(s)</strong></td>
<td>Braida, Marina; Gormley, T. R. (Thomas Ronan)</td>
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**R&D ROUND-UP**

**Ready-meals with**

Ready-meals, both chilled and frozen, are well established in the international market report by Marina Braida and Ronan Gormley of Ashtown Food Research Centre in Dublin.

Intel data shows that the value of the frozen ready-meals market in the UK has been reduced by the effect of price promotion, while chilled ready-meals continue to be a big rival in the market place. This has caused the main players to diversify into premium and luxury range prepared meals. The developing market for food in central and Eastern Europe may also represent an opportunity for increased sales of these products.

Most ready-meals are made up of a combination of carbohydrate (eg rice, potato or pasta), protein (fish or meat), vegetables and sauce. Despite increasing awareness of the health benefits from eating fish, ready-meals containing fish are less common than those containing chicken or beef and the appearance of such fish meals on the market are a relatively recent occurrence.

### Phases of sous vide and freeze-chilling

R&D on ready-meals has been a major focus at Ashtown Food Research Centre (AFRC) for a number of years. Much of the activity has been focused on freeze-chilling, which is a combination of freezing and chilling as the name suggests. This gives major logistical benefits for the processor as large amounts of a particular ready-meal can be produced, held in deep freeze, and then lots can be tempered and released into the chill chain as required, ie the consumer buys the meal as a chilled product.

R&D shows that freeze-chilling is a safe and suitable technology for most types of ready-meal and also for other products such as fresh fish fillets held in modified atmosphere packs (MAP).

Trials have also been conducted on fish processed by sous vide technology which ensures a gentle and low temperature process that causes minimal damage to the product in terms of nutritive value and sensory properties. A number of fish species in gourmet sauces have been processed at AFRC by sous vide technology with good outcomes.

Going beyond ‘low fat’

We are in the era of ‘healthy choices’ and ready-meal companies are responding to this with meals containing reduced salt and calories. However, companies are only just beginning to realise the potential of ready-meals as carriers of functional (healthy) ingredients and nutraceuticals. Such meals have applications in all sectors of the community but especially to the elderly who may find meal preparation difficult and who may also be lacking in trace minerals and other nutritives and non-nutritives (eg dietary fibre).

The production of such enriched meals is likely to be a major growth area in the near future especially when the inherent health benefits of fish are superimposed, in these items become ‘doubly attractive’.

Three drivers led to the current study at AFRC on the formulation, preparation and freeze-chilling of a gluten-free salmon lasagne containing nutraceuticals and also a sous vide processed ready-meal of the same formulation but with Rigati pasta instead of sheets (still gluten-free). The gluten-free aspect was introduced as intolerance to gluten and to flour-containing products is becoming more widespread in Europe. For example, one in 60 people in Ireland is a diagnosed coeliac and it is suspected that a much higher number is undiagnosed, ie latent coeliacs.

The research was conducted in association with Irish ready-meal producer, Dawn Fresh Foods as part of the EU-funded Seafoodplus project.

**For further information contact Ronan Gormley at ronan.gormley@teagasc.ie**

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**THE TRIAL - LASAGNE FORMULATION**

The gluten-free lasagne contained salmon sauce (45% of which was salmon paste), bechamel sauce, gluten-free pasta sheets and parmesan cheese. Visual trials were conducted with 90 panelists who were asked to state a commercial sample of conventional salmon lasagne and the gluten-free lasagne prepared at AFRC, and to indicate their choice of ready-meal. Participants were asked to state their reason for these responses and an average scoring system was calculated as follows:

- The control, conventional lasagne had a score of 86. The commercially available lasagne was ranked 20 points behind the control. The gluten-free lasagne was ranked 20 points behind the control.
- The gluten-free lasagne sauce was less viscous than its wheat containing counterpart as indicated by the microelectronic viscometer readings (speed 500) of 44 to 49% respectively of 579 C to 619 C at 20 deg C. The effect was more pronounced using the M refers to viscometer (Maks pesticide).
- The gluten-free lasagne was slightly whiter than the wheat containing lasagne and had a higher whiteness, yellowness (64.9) ratio (Hunter’s colour meter). The gluten-free lasagne was slightly whiter than the wheat containing lasagne by 3.6% at 315 cm and 31 cm at 31 deg C. The gluten-free lasagne was slightly whiter than the wheat containing lasagne and had a higher whiteness, yellowness (6.9) ratio. The gluten-free lasagne was slightly whiter than the wheat containing lasagne at 31 deg C. The gluten-free lasagne was slightly whiter than the wheat containing lasagne at 31 deg C.
- A triangle taste panel indicated a difference between the sauces with 11 out of 11 testers correctly identifying the odd sample out. The intensity of the difference was considered large by more than five times relatively 20 deg C and 20 deg C. A triangle taste panel indicated a difference between the sauces with 11 out of 11 testers correctly identifying the odd sample out. The intensity of the difference was considered large by more than five times relatively at 31 deg C and 31 deg C. A triangle taste panel indicated a difference between the sauces with 11 out of 11 testers correctly identifying the odd sample out. The intensity of the difference was considered large by more than five times relatively at 31 deg C and 31 deg C.
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- Other tests included the measurement of the pH of the samples which indicated that the gluten-free lasagne was slightly less acidic than the wheat containing lasagne.
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place and competition is strong both in terms of choice and price. But in this special show that there is more than one way to add value to these products.

Salmon lasagne with nutraceuticals

Grill three pasta sheets were cooked in boiling water containing a small amount of salmon paste, 150g. The salmon lasagne was shortlisted as one of the best and was cooked using three sheets of fish paste and processed as a product. It was served with a salmon creamy sauce containing the nutraceuticals which were supplemented with a variety of vegetables and served in a glass beaker. The sauce was shortlisted as one of the best in the category, and was served in a glass beaker. The sauce was shortlisted as one of the best in the category, and was served in a glass beaker.

Sous vide salmon ready-meal with nutraceuticals

A sous vide salmon ready-meal was developed using a nutraceutical, which was a combination of the salmon lasagne and a commercial product. The nutraceutical was developed using a combination of the salmon lasagne and a commercial product. The nutraceutical was developed using a combination of the salmon lasagne and a commercial product. The nutraceutical was developed using a combination of the salmon lasagne and a commercial product.