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<td>Authors(s)</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 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 ranges 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 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, ie 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 are 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

THE TRIAL - LASAGNE FORMULATION

This gluten-free salmon lasagne (55% of which was salmon pate), bechamel sauce, gluten-free pasta sheets and ready-made Chinese-style tofu bricks were tested on a commercial sample of conventional salmon lasagne and as part of a new world-beating project, the trial aimed to find alternatives for their evening meal. Based on these responses, an average portion size was calculated at 250g.

The nutraceutical targets were based on 400g of lasagne (contains 14g of salmon pate). These were vitamin B6, vitamin B12, folic acid, iron, copper, zinc, magnesium, calcium and potassium. These minerals are considered essential for maintaining good health and are involved in a great number of functions in our bodies. The study also covered the supply of antioxidant carotenoids in salmon pate. sesame oil, garlic (cloves) and red wine as this was described as desirable for its antioxidant nature. In the study, we examined the antioxidant properties of the supplements as a means to enhance the overall health of the product. Such properties are often associated with the health benefits of salmon lasagne and are claimed to improve the overall health of the product.

The texture of the bechamel sauce is tested on a viscometer

Béchamel sauce

Initially, the focus was on the Béchamel sauce, which is the base of the lasagne and as such was the carrier for the nutraceuticals. Physicochemical and taste panel tests were conducted to study how the sauce properties were influenced by the gluten-free ingredients and by the nutraceutical inclusions. The gluten-free sauce was prepared by separating out a constant heat source (the sample heated at 100°C) and containing medium/milk powder, eggs, thick cream, sunflower oil and water.

The gluten-free bechamel sauce was less stable than its wheat-containing counterpart as indicated by decreased viscometer readings (speed 30 of 23 vs 190 rpm respectively at 60°C C, 70°C and 80°C). The effect was more pronounced using the Haake Viscometer System (Thermo Electron System, Germany). We also tested the gluten-free sauce and wheat-containing sauce on a rheometer (Rheometrics RSA). The gluten-free sauce was slightly whiter than the wheat-containing sauce but had a higher whiteness (100) ratio, which is closely related to the light scattering properties of the samples. The gluten-free sauce was slightly higher in texture than the wheat-containing sauce at 90°C and 100°C.

A triangle taste panel indicated a difference between the samples at 90°C and 100°C, where a majority correctly identified the odd sample out. The effect of the difference was considered large by most tasters, moderate by 20% and no common by three. However, the difference was not significant in a preference test, with eight tasters picking the gluten-free sauce and a majority choosing the wheat-containing sauce. The differences exhibited strong, with the gluten-free sauce exhibiting stronger flavor, texture and mouthfeel.

Effect of inclusions

A RANT of inclusions was added to the sauce, both individually and together (Table 1). All of the inclusions (moderately) increased their color except the pectin.
a difference

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 nutaceuticals

The finished product: salmon lasagne

Sous vide processed salmon pasta

Salmon sauce

SALMON-SOURCE LEMON: salmon sauce is added to this dish that provides a healthy alternative to white pasta.