

Summer Meeting, 4–6 July 2011, 70th Anniversary: From plough through practice to policy

Development of sauces with high energy density, flavour and taste impact for older people, aiming to increase food acceptability and consumption

R. Tsikritzi¹, J. Wang¹, M. Wong¹, Y. Mavrommatis¹, P. J. Moynihan², M. A. Gosney³
and L. Methven¹

¹Department of Food and Nutritional Sciences, University of Reading, Reading RG6 6AP, UK, ²Institute for Ageing and Health, Newcastle University, Framlington Place, Newcastle upon Tyne, NE2 4BW, UK and ³Clinical Health Sciences, University of Reading, London Road, Reading, Berkshire, RG1 5AQ, UK

It is thought that food fortification may be an acceptable way to increase energy and nutrient intake. Food fortification with macronutrients via the utilisation of sauces and condiments, including gravy, mayonnaise, tomato ketchup, was able to increase the food familiarity and pleasantness for the older population⁽¹⁾. In another study it was shown that the use of a sauce with a meal can increase energy intake of protein and fat in older adults without affecting pre-meal hunger, desire to eat, or post-meal pleasantness⁽²⁾. The Food Standards Agency recommend that foods for older people should be served with tomato or vegetable based sauces rather than creamy, buttery sauces where appropriate to lower the fat content⁽³⁾, however this is likely to be more important for long-term care than for an acute care setting where increasing energy intake is considered the most important factor to aid recovery. The purpose of this study was to develop acceptable sauces with both high energy and flavour and taste impact for hospitalised older people in order to increase their overall energy intake. Tomato sauce (control) was cooked using chopped tomatoes, olive oil, onion, garlic, salt and herbs. The tomato sauce was then fortified with butter, double cream, sunflower oil, whey protein isolate (90% protein) and/or maltodextrin resulting in three different types of tomato sauce with an energy content of 619.23–728.01 kJ/100 g and 1.6–2.8% protein, comparing to the control at 188.28 kJ/100 g and 1.5% protein. A trained sensory panel found the fortified samples to be significantly darker, less herby, less thick and less have a lumpy appearance than the control as well as stronger tomato smell. They also had sweeter, less acidic and less bitter taste than the control ($P < 0.05$). Concerning the flavour, they presented a creamier, less gelatinous flavour and they had a significantly less gelatinous, less astringent, less mouthcoating and less burning mouthfeel than the control. When thirty-eight older healthy volunteers participated in hedonic liking trial using a nine point hedonic scale, they liked the three fortified samples more than the control ($P < 0.0001$), with non-significant differences between the three modifications. In the case of gravy, three fortified options were produced using butter, double cream, vegetable oil and dark soy sauce with energy content ranging from 435.13 to 439.32 kJ/100 g, while the control had 146.44 kJ/100 g and contained gravy granules in boiling water alone. Generally, the fortified options present a similar sensory profile to the control, however they had significantly more buttery and dairy flavour as well as a richer mouthfeel. In addition, there were no statistical differences in hedonic liking among thirty-seven older healthy volunteers ($P = 0.57$). It is expected that the development of fortified sauces is a simple approach to improving energy intake for hospitalised older people, both through the nutrient composition of the sauce itself and due to the benefits of increasing sensorial taste impact and lubrication in the mouth.

Acknowledgements: Study sponsored by the New Dynamics of Ageing programme through ESRC, as part project 'mappal'; developing new approaches to improving the nutrition of older people in hospitals.

1. Stallberg-White C & Pliner P (1999) *Appetite* **33**, 209–221.

2. Appleton KM (2008) *Appetite* **50**, 555.

3. Food Standards Agency (2006) Food served to older people in residential care. <http://www.food.gov.uk>