

## Plenary 2: Functional Food

### Weight control: commercial approaches and 'functional' ingredients

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Both the general public and food companies will benefit from the development and marketing of proven, effective weight control solutions. This has motivated food and ingredient R&D activities directed at a variety of benefits related to weight management, including appetite control, body composition, energy metabolism, weight loss and maintenance, and obesity-related co-morbidities. Most existing and emerging commercial food-based approaches to weight control focus on energy intake, primarily by use of traditional and newer technologies to achieve a low or reduced energy content of products. Although this approach has strong scientific support, there are technical, economic, and regulatory hurdles to wider implementation, and consumer acceptance of reduced-energy products also remains a challenge.

More recently, greater effort has been directed toward establishing and enhancing added, 'functional' approaches to weight control. These tend to focus on 3 possible routes:

- 1) Reduce voluntary energy intake (appetite)
- 2) Slow or reduce energy uptake (absorption)
- 3) Alter energy metabolism (substrate oxidation or body composition)

There is particularly increasing interest in enhancing the ability of food ingredients and products to suppress hunger feelings or food intake. Food-based enhancement of appetite control is usually directed at gastrointestinal mechanisms, but could potentially range from sensory stimulation to direct hormonal or even neural targeting. There is considerable scope for influencing appetite based around understanding the physical characteristics of food materials under gastro-intestinal conditions. To date, however, objective measurement of these properties has been lacking in studies of, for example, different types of dietary fibres. 'Screening' of materials based on physical rather than biochemical testing, or perhaps combinations of these, is therefore creating new opportunities for identifying and selecting ingredients. Future advances are expected from research approaches that integrate expertise in food structures, physiology, and nutrition, and apply a wide variety of research tools and models. This route is further justified by poor rates of success with putative 'functional' food ingredients identified using traditional *in vitro* (cell/receptor) discovery strategies.

Food ingredients that act by reducing energy uptake or altering energy metabolism also continue to attract interest, although (relative to food intake) the achievable, safe and tolerable range of activity is generally much more limited. These could nevertheless have important cumulative effects, as exemplified by recent data on the effects of green tea extracts on abdominal fat. There is, overall, rising interest in potential food-based influences on body composition and fat distribution, although still considerable gaps in knowledge about potential mechanisms and targets.

A cursory search of the scientific or consumer literature turns up a huge array of 'functional' agents making weight management claims. However, the quality and quantity of supporting evidence for these varies greatly, and the different standards and evidence used to support commercial claims is a difficult and increasingly problematic issue. Companies with higher scientific standards find themselves undermined by borderline claims and less scrupulous operators. This is not just an issue for industry: Arguably, the academic community should become more self-critical and vocal in scrutinizing 'functional' ingredient research and claim substantiation. Lastly, even for ingredients that can be shown to be consistently effective, potential applications in foods will be influenced by e.g., supply chain, processing, food quality, regulatory, consumer and marketing considerations.

#### References

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