



Emulsifiers for binding properties.

The future of weight management

The media focus on issues related to body weight has never been greater. This focus has been on individuals who are either overweight or underweight and the impact of weight on general health and well being, or the desire of many new mothers to lose weight quickly following childbirth. This is a consequence of prevailing societal views; for example, having the ideal weight compared to height and physical status is viewed as a clear signal that this person is in control, capable and, ultimately, successful. In addition,

and more importantly, we know that being overweight or obese has many potentially serious health implications.

Overweight and obesity are the fifth leading risk for global deaths. At least 2.8 million adults die each year as a result of being overweight or obese. According to the World Health Organisation (WHO), 44% of the diabetes burden, 23% of the ischaemic heart disease burden, and between 7% and 41% of certain cancer burdens are attributable to overweight and obesity.¹ Once considered a high-income country problem, overweight

and obesity are now on the rise in low- and middle-income countries, particularly in urban settings. Close to 35 million overweight children are living in developing countries and 8 million in developed countries (source: International Obesity Taskforce).

Obesity and being overweight are linked to more deaths worldwide than if underweight. For example, 65% of the world's population live in countries where overweight and obesity kill more people than underweight (this includes all high-income and most middle-income countries).¹

The 2010 International Association for the Study of Obesity (IASO)/International Obesity Task (IOTF) analysis estimates that approximately 1 billion adults are currently overweight (BMI 25-29.9kg/m²), and a further 475 million are obese. When Asian-specific cut-off points for the definition of obesity (body mass index >28kg/m²) are taken into account, the number of adults considered obese globally is over 600 million.

Globally, IASO/IOTF estimate that up to 200 million school-aged children are either overweight or obese, of those 40-50 million are classified as obese.²

Causes and consequences

The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended. Globally, there has been: an increased intake of energy-dense foods that are high in fat and sugars; and a decrease in physical activity due to the sedentary nature of many forms of work, changing modes of transportation, and increasing urbanisation.¹ Being overweight can lead to high blood pressure and adverse metabolic effects such as high cholesterol, triglycerides and insulin resistance. The non-fatal, but debilitating health problems associated with obesity include respiratory difficulties, chronic musculo-skeletal problems, skin problems and infertility.

For weight management to be successful, a multi-faceted approach is required which includes a change in

eating habits and an increased awareness of calorie intake and calorie requirements of an individual. A preload of soluble fibre consumed before a meal, in the form of a beverage, may be effective in inducing satiety and reducing the overall energy intake following a subsequent meal. A general increase in dietary fibre content and increased levels of physical activity is also effective in balanced weight management.

Manufacturers are constantly innovating to formulate products with healthier nutritional profiles without comprising taste and texture. **DuPont Nutrition & Health** believes in a holistic approach for weight management and can offer a wide portfolio of functional ingredients used in a variety of food products that can make a useful contribution to weight management. These comprise enablers (including pectin, carrageenans and emulsifiers), fibres and certain sweeteners which can assist manufacturers to reduce calories in their final product formulation.

Reduce calories, sugar and fat

Reduction of calorie intake can help in maintaining a healthy body weight. One way to reduce overall calories of a product is to replace high calorie components with lower calorie components in the formulation. Manufacturers can either look at reducing sugar or fat content in their products. However, the reduction of calories may not be sufficient, as a reduction in particularly fat in a food often result in a reduced sense of satiety, leading to an increase in portion size. Hence a food formulation that is designed to give less energy per weight also needs to contain sufficient levels of ingredients that promote satiety (feeling of fullness).

Sugar, and more specifically reducing sugar intake, is one food trend present in many parts of the world. This trend has led to the introduction of products with the claims 'sugar free', 'no sugar added' and 'reduced in sugar'. This is not only of importance for people trying to lose or maintain their weight, but also for

diabetics. A research by Mintel GNPD reported the global cost of diabetes in 2010 was approximately US\$500 billion and this figure is projected to rise to US\$745 billion by year 2030.

Figure 1 shows how often consumers in the Asia Pacific region check the

nutritional label for the sugar content. The diagram shows a geographic trend. New Zealand and Australia are the two countries with the highest percentage of respondents claiming to look for the sugar content in packaged food on a regular basis. Japan, Korea, Taiwan, and Singapore are the countries with the highest percentage of respondents claiming to look for the sugar content in packaged food on a sometimes basis. India, Hong Kong, Indonesia, and Thailand are the countries with the highest percentage of respondents claiming to never look for the sugar content in packaged food.

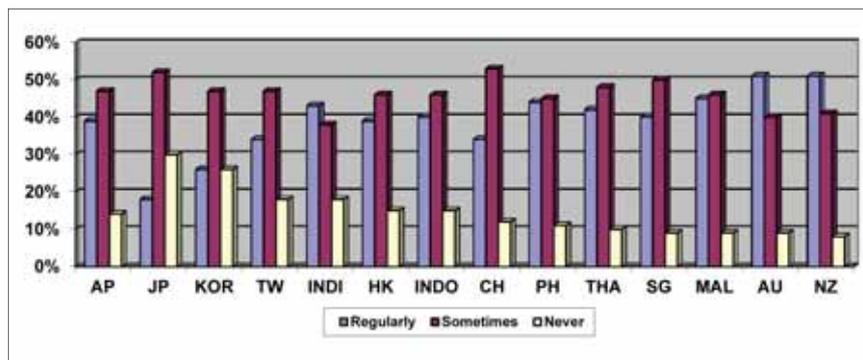


Figure 1: Percentage of people that regularly / sometimes / never look at the sugar content in the nutritional label of packaged food

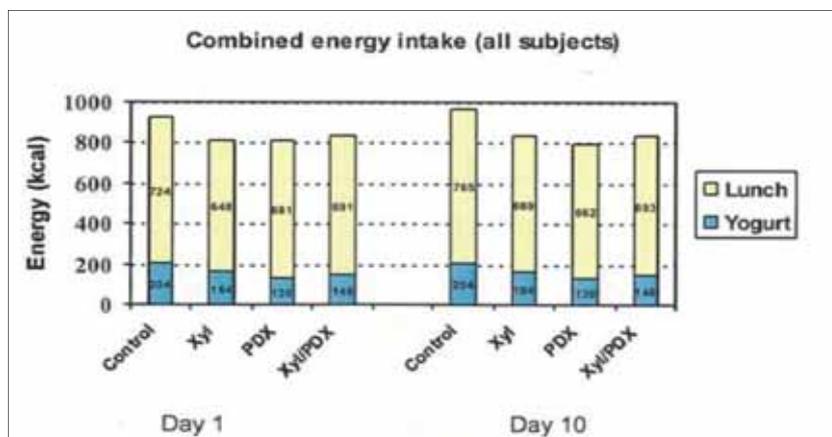


Figure 2: Evaluation of the independent and combined effects of xylitol and polydextrose consumed as a snack on hunger and energy intake over 10 days.

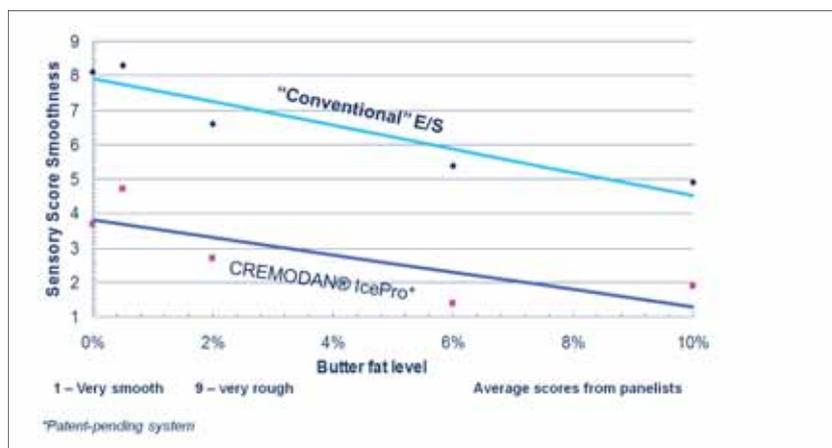


Figure 3: CREMODAN® LF IcePro helps secure a rich and full-bodied texture, resulting in a smoother ice cream.

and China are at the same time the countries with the lowest percentage of people searching for the sugar content in the nutritional labels. The regional average for Asia Pacific is 39%.³ It may be interesting to note that the regions wherein people tend to be concerned about sugar content are also the ones most likely to look for sugar alternatives.

Low energy ingredients are often used in formulation of low calorie products. Ingredients such as Litesse® polydextrose, XIVIA™ xylitol, lactitol and fructose have also shown to have a low glycaemic response. Low energy sweeteners e.g. lactitol and xylitol are used to replace sugars. Lactitol and xylitol both contain 2.4kcal/gram while Litesse® contains 1kcal/gram. Although fructose contains 4kcal/gram, the sweetness level is 1.8 times more than sucrose. Therefore, using fructose allows for lowering of overall carbohydrate thereby achieving calorie reduction.

Litesse® is a speciality carbohydrate that can facilitate the production of satiating foods with a smaller portion size and reduce glycaemic response. Litesse® is also a prebiotic that promotes desirable microbial populations in the digestive tract, including bifidobacteria. In addition, Litesse® is a source of dietary fibre.

Viscous soluble fibres may prolong the intestinal phase of nutrient digestion and absorption. Adding fibre to low calorie/low fat foods may enhance satiety, however, not all fibres have the same impact on satiety. The effect on satiety is to a great extent depending on the viscosity and solubility of a fibre, where soluble fibre tends to give a greater effect on satiety than less soluble fibre. In addition, viscous fibre tends to give induce greater satiety than fibre with less viscosity.⁵

In the study conducted by King et al (2005) as shown in Figure 2, Xylitol (25g), Xylitol:Litesse® (50:50; 25g) or Litesse® (25g) in yogurt ingested at breakfast three hours before lunch suppressed combined calorie intake by 5-8% versus sucrose control (i.e. reference). Whilst the dose of Litesse® and/or Xylitol was relatively

high, the reduced energy intake was sustained over the 10-day treatment period. There was also no significant difference in self-report of negative symptoms (e.g. bloatedness and nausea).

The results from a more recent study demonstrates that Litesse® gives a significant reduction in energy intake at a meal, when 12.5g Litesse® was consumed some time before this meal.⁶ This suggests that a significant reduction in daily intake of energy can be achieved by consuming a relatively small amount of this unique fibre.

Premium-ness

It is easy for food manufacturers to reformulate and reduce calories in food products. However, such replacements often result in a change in texture and taste profile. The challenge is to produce healthy, nutritious foods without compromising the “premium-ness”. Enablers are ingredients that provide functional benefits and allow the development of products for nutrition claims. They possess water-binding and stabilising properties to help food manufacturers achieve smooth texture, good flavour, creamy mouthfeel and shininess in foods and beverages. This inevitably helps to create a feel of “premium-ness” to the product. Examples of enablers include hydrocolloids, emulsifiers and stabiliser systems.

Emulsifiers are produced from natural vegetable oils and fats, and they bind oil and water in an emulsion. DuPont™ Danisco® has a range of emulsifiers which include PANODAN® and DIMODAN®, and may be used in baked goods to develop new textures and to reduce the fat content without compromising the bite, taste or quality.

GRINDSTED® Pectin CF series allows indulgence and fortification of confectioneries. It provides optimal texture and taste of products which are reduced in sugar and/or fat, and works well with natural fruit confectionery with “No sugar added” claim. GRINDSTED® Stabiliser systems are traditionally used in a wide range of applications such as dressings, beverages, ice cream where they act as a thickening and stabilising agents. They help improve mouthfeel that make low or reduced fat or sugar products palatable to consumers. Below are some common problems related to non-fat/low fat ice cream:

- Lack of smoothness
- Weak body (thin)
- Lack of creaminess
- Fast melting
- Short quality shelf life
- Lack of form i.e stability
- Shrinkage

CREMODAN® LF IcePro helps secure a rich and full-bodied texture, resulting in a smoother ice cream. This smooth texture can be maintained throughout storage and distribution. From the sensory evaluation test shown in Figure 3, the ice cream with CREMODAN® IcePro was smoother than that with a conventional E/S system. Panelists also perceived that ice cream made with CREMODAN® IcePro had higher fat content than the latter.

In conclusion, while formulating healthier products with reduced calorie, sugar and/or fat is important to meet consumer demands, there are customised solutions available for manufacturers to achieve the desired mouthfeel and shelf stable products. **FBA**

More info: www.food.dupont.com

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