

Alpro Foundation Student Symposium

"The impact of food choices on satiation processes"

What relationships exist between the foods people choose and satiation processes? This was the key question addressed by the Impact of food choice on satiety symposium which was held by the Alpro Foundation in late November at the University of Wageningen. About 100 nutrition students attended the symposium. There were three lectures which looked at the physiological and mental processes that play a part in satiation and satiety. The speakers presented evidence that eating slowly and consciously can contribute to a greater sense of satiety.

The Professor of Nutrition at Wageningen, **Kees de Graaf**, addressed the intake of "liquid" calories and their impact on excess consumption. He indicated that the intake of calories from solid food is many times slower than the intake of energy from liquid or semi-liquid food. One illustration is eating a 500 gram apple, which takes 17 minutes in the solid form and one and a half minutes in the liquid form (apple juice), although the same macro- and micronutrients are supplied. The effect on satiety corresponds to this. This apple study dates from 1977, but the quantities of each type of food consumed (solid, liquid and semisolid) were subsequently confirmed in multiple studies. "In a later study we established that the effort a person has to make to eat actually has little influence on the free consumption of liquid or semisolid food", said De Graaf. **"A correlation can be seen between the quantity of food that people are offered and what they ultimately consume.** It has also been found that the amount of time during which the sensory system is exposed to food is directly related to the quantity that a person will eat."

De Graaf's research group established that **there is a linear relationship between portion size and solid food consumption.** When it comes to drinks, a direct relationship was found between sip size and the amount ultimately consumed. Using the American Nurses Health Study, in which some 51,000 people were followed up for weight changes over eight years, De Graaf showed that women who drank soft drinks containing sugar regularly during the study (daily or weekly), put on weight over the years. "When consuming solid food the body learns to estimate calories. Increased consumption of liquid food over the years has not led to improvements in human estimation of calorie intake. **Human beings are actually not well-equipped to estimate the effect of liquids on their body**", commented De Graaf.

The Professor also addressed the importance of the cephalic phase, in which the body produces a physiological response to sensory signals. Research has shown that if this phase is omitted, which occurs when food is eaten quickly, the body becomes satiated more slowly. "It is a challenge for the food industry to produce foods that taste good but simultaneously stimulate the feeling of satiation. In the case of fast food, with a high energy density, this is not the case."

COGNITION

British researcher **Jeff Brunstrom**, from the School of Experimental Psychology, followed up the lecture by Kees de Graaf by looking at cognitive control over portion size and energy intake. In his view, cognition is closely linked to learning and attention. In relation to eating he observed that in the current obesogenic environment a lot of "**mindless eating**" takes place, which means eating without thinking about it. He illustrated this using a number of studies in which people unconsciously consumed more energy from a free selection of snacks. "A study has shown that people are well able to plan their meals", he commented. **"If they plan, the majority of people will stick to the planned quantity of food that they are able or willing to eat,** although there are some people who might be able to eat more after a planned meal."

Brunstrom investigated, among other things, how planning and expectations in relation to eating influence satiation processes. He tested the expectation of satiety by showing people meals and eliciting their comments on the extent to which they thought a specific meal would make them feel satiated. **"It has been found that people are capable of predicting satiety,** which means that they are able to indicate how large portions would have to be without knowing their physical characteristics. The more familiar they are with the foods, the greater their expectation of satiety. It seems that satiety is conditioned, which means that we can learn it. The same applies to expectations surrounding the process of satiation. **We do not expect much satiation from new foods until our**

experience has taught us otherwise. The better people know foods, the more they are able to estimate the quantity of calories they are consuming and thus know how much they will have to eat until they are full."

MENTAL PERFORMANCE

The third speaker, researcher **Louise Dye** from the Institute of Psychological Sciences at the University of Leeds, addressed the **effect of eating and satiation processes on mental performance**. "There are **no magic bullets in our food that can allow us to achieve immediate improvements in mental performance**", she commented. "Some people, from their own experience, might for example benefit from eating a portion of blueberries, but what works for one person does not necessarily work for someone else, and there is no strong evidence for this. What we do know is that having breakfast has a positive effect on mental performance in both adults and children: it improves their reactions, memory and concentration. A number of studies have also shown that a good lunch has an effect in terms of improving reactions and concentration. Of course it would be helpful if we knew exactly what foods we should eat to achieve the best mental performance."

Dye presented the results of six studies that were carried out into the **effects of soya and soya isoflavones** on cognitive performance in postmenopausal women. Approximately half the studies indicated **improvements in the area of memory function**. She also mentioned a study that looked at the effect of soya proteins on satiation processes. In this study, breakfasts and lunches based on soya proteins were compared with breakfasts and lunches containing proteins from a different source. The meals all had the same caloric value, virtually the same ratios and quantities of macronutrients and looked essentially identical. The evening meal and any snacks during the evening could be taken freely. It was only stipulated what type of foods the participants could choose. Both after the evening meal and before going to bed the participants had to complete a questionnaire.

"We found that **total energy consumption was significantly lower in the soya group than in the control group**, approximately 172 kilocalories at the evening meal and 144 kilocalories during the evening. The participants also indicated **that they felt more satiated after a meal containing soya**. The research indicates that soya proteins may contribute towards **weight control**, but more studies are needed to confirm this."

The Alpro Foundation is an independent non-profit organisation that has been supporting scientific knowledge and research since 1996. It focuses on the health impacts of ingredients of vegetable origin, with the emphasis on dietary soya.