

References :

Saris W.H.M., Astrup A., Prentice A.M., Zunft F.J.F. and Formiguera X. (1998) *The dietary carbohydrate/fat ratio debate : Results from a European multicentre intervention trial : CARMEN. Hot topic abstract HTO 02 of the 8th International Congress on Obesity, Paris August 28-September 3 1998*

Saris W.H.M., Astrup A., Prentice A.M., Zunft F.J.F. and Formiguera X., Verboeket-van de Venne W.P.H.G., Raben A., Poppitt S.D., Seppelt B., Johnston S., Vasilaras T.H. and Keogh G.F. (2000) *Randomized controlled trial of changes in dietary carbohydrate/fat ration and simple vs complex carbohydrates on body weight and blood lipids. Int. J. Obes., 24, (10), 1310-18*

Campfield L.A. (1998) *What should be primary treatment : obesity or obesity complications? Int. J. Obes., 22, suppl 3, 09*

The CARMEN study was supported by the EU-FAIR programme of the European Commission and by the European Sugar Industries.

N. H.



UNIVERSITIES THAT TOOK PART IN THE STUDY :

University of Maastricht
Nutrition Toxicology and Environment Research
Netherlands
Coordinator : Prof. W.H.M. Saris

The Royal Veterinary and Agricultural University of Copenhagen
Research Department of Human Nutrition
Denmark
Coordinator : Prof. A. Astrup

MRC Dunn Clinical Nutrition Centre of Cambridge
United Kingdom
Coordinator : Prof. A. Prentice

Deutsches Institut für Ernährungsforschung of Postdam
Germany
Coordinator : Prof. H.-J. F. Zunft

University Hospital Germans Trias I Pujol of Barcelona
Eating Disorders Unit
Spain
Coordinator : Dr X. Formiguera

FORTHCOMING EVENTS

17th International Diabetes Federation Congress

5 – 10 November 2000
Mexico City, Mexico
Contact : S. Callow
E-mail : sharon.callow@email.msn.com

European Public Health Association Annual Meeting 2000 : Reducing Health Inequalities in Europe

14 – 16 December 2000
Paris, France
Contact : Europa Organisation
Fax : + 33-(0)-534 45 26 46

Editorial Board

Mrs. Marie-Sylvie Billaux
Dr. Richard Cottrell
Mr. Jean-Louis Barjol

Dr. Nathalie Henin
Responsible Editor



COMITÉ EUROPÉEN DES FABRICANTS DE SUCRE

182, Avenue de Tervuren
B - 1150 BRUXELLES
Tel : 32.2.762.0760
Fax : 32.2.771.00.26
E-mail : nathalie.henin@cefs.org
<http://www.cefs.org>

APPROPOS - SUGAR
SUCROSE - SACCHAROSE

EDITORIAL

The prevalence of overweight and obesity continues to rise world-wide. About 40 % of the European population are overweight. Obesity is a risk factor for chronic diseases, such as cardiovascular diseases, diabetes and cancer. To prevent obesity in the future, it is of great interest to identify predictors for weight gain. Nutrition research has identified the quantity of fat in the diet as an important factor. Consequently, current dietary guidelines focus on lowering dietary fat and increasing carbohydrate intake. The CARMEN study, presented in this issue, argues in favour of such diets as a means to control body weight in the long term. Moreover, the study demonstrates that there is no difference between sugars and starches. Consequently, both types of carbohydrate can be used in low-fat diets to prevent weight gain.

IN THIS ISSUE

The CARMEN study :
an important contribution
to the debate on the role
of fats and carbohydrates
in weight control 1

Forthcoming events 4

The CARMEN study : An important contribution to the debate on the role of fats and carbohydrates in weight control

Many articles appearing in the scientific literature in recent years have highlighted the special role of fats and the fat/carbohydrate ratio in the development of excess weight and obesity. Although we know that the predisposition to become overweight depends on a number of factors, of a genetic or environmental nature (e.g. diet, physical activity), it seems that the consumption of fats plays an important role. This is not only due to their energy density (amount of calories per gram) but also because the intake of fats is less finely regulated by the appetite's control system.

The increase in the number of overweight people in recent decades reflects major changes in lifestyles, these include a higher proportion of fats in the diet, sedentary tendencies and a reduction in the level of physical activity. Frequently, weight is gained gradually and insidiously, at the rate of 1 kg a year, for example. After several years this gain can lead to substantial excess weight and its potentially harmful effects



on health (raising the risk of diabetes, cardiovascular diseases or even cancer). The increase in the prevalence of obesity has also become a social and economic problem. The costs of obesity-associated diseases represent 4 to 7 % of all health care expenditures in EU countries.

To prevent weight gain, it is recommended that we exercise regularly and to moderate fat intake. Calories from fat can then be replaced by carbohydrate. Several scientific studies have reported the effects on body weight control of low fat/high carbohydrate diets (see table 1).

Effects of reducing fat from 38 % to 23 % of total calorie intake

Table 1

Study	Duration of the study (weeks)	Mean weight Changes (kg)
Puska et al (1983)	6	- 0.7
Sheppard et al. (1991)	26	- 3.2
Hunninghake et al. (1993)	9	- 1.4
Kasim et al. (1993)	13	- 3.4
Levitsky & Strupp (1994)	6	- 0.9
Shah et al. (1994)	26	- 4.4

From ILSI Europe Concise Monograph Series "Healthy lifestyles – Nutrition and physical activity", 2000

The novelty of the CARMEN study was to show that simple carbohydrates (sugars) have the same effect as complex carbohydrates (starches) in this respect. This had not previously been directly demonstrated (although there was no evidence to suggest that these different types of carbohydrate affect weight differently). On the contrary, a clear inverse relationship between the percentage of sugar in the diet and body fatness has been established. Moreover, there is no difference in the satiating effect of sugar and starches. The CARMEN study compared the effect of low-fat diets offset by an increase either in sugars, or in starches, in overweight volunteers in order to help to establish science-based and feasible recommendations for the prevention of weight gain.

CARMEN...

CARMEN is the acronym for **C**ARbohydrate **M**anagement in **E**uropean **N**ational Diets. The study was performed in 5 European research centres. They studied the effects of reducing the intake of fats and increasing the intake of simple carbohydrates (sugars) or complex carbohydrates (starches) on dietary intake, body weight and blood fats (cholesterol, triglycerides) over six months, among overweight people

tending towards obesity. The Dutch, Danish, English, German and Spanish volunteers received nutritionally similar diets made up of local foods. There were three main groups each including 100 persons (see table 2) :

- a control group continued to eat their usual diet, containing about 40 % of total energy intake as fat
- a group called CCHO (for complex carbohydrates) with a diet lower in fats (10 % less energy than usual) compensated with more energy coming from starchy foods
- a group called SCHO (for simple carbohydrates) also with the lower fat diet, but with the 10 % reduction in energy coming from fat being replaced mainly by energy coming from sugar-containing food products

The volunteers continued to live at home, but they obtained the bulk of their food supplies from food shops specially installed for the study at the research centres. Between 60 and 100 foodstuffs were made available to each group in this way. Volunteers of the CCHO and SCHO groups used fat-reduced products. The SCHO group received foods high in sugars and the CCHO group starchy foods. Volunteers had to buy some fresh foods (e.g. bread, fruits, vegetables and meat) in the ordinary way. This store system, using normal commercial products, provided about 70 % of the fats and carbohydrates in the diets. A specially developed computer system allowed close monitoring of food intake by every group.

CHARACTERISTICS OF THE DIETS

During the study, total calorie intakes were comparable for the control and SCHO groups (2500 kcal). People in the CCHO group consumed slightly less energy (2200 kcal). The increase in carbohydrate intake was about 6 % and 10 % of total energy in the CCHO and SCHO groups yielding 52 and 56 % of total energy intake, respectively. These levels correspond to general nutritional recommendations. The carbohydrate increase was

Diet composition and observed weight changes

Table 2

Groups	Diet composition						Weight changes after 6 months
	Energy (kcal)	Protein	Fat	CHO	CCHO	SCHO	
Control	2460	15.2	36.5	45.5	23.8	21.4	+ 0.8 kg
Low fat/high SCHO	2490	15.8	25.5	55.5	25.5	29.5	- 0.9 kg
Low fat/high CCHO	2220	17.9	27.8	51.8	32.6	8.8	- 1.8 kg

CCHO : complex carbohydrates
SCHO : simple carbohydrates

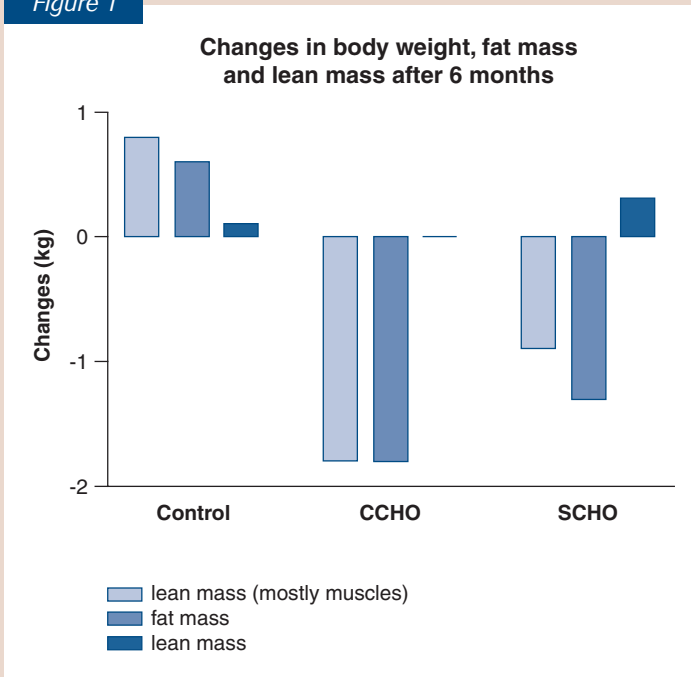
attributable to the consumption of more starchy foods in the CCHO group. In the SCHO group, the majority of the extra carbohydrate was represented by an 8 % increase in sugars (see table 2).

From the analysis of the diet composition, it was interesting to note that the fibre intake was the same in all three groups, and that vitamin and mineral intakes were not diminished in the experimental groups.

MODIFICATION OF THE FAT/CARBOHYDRATE RATIO IN THE DIET HAS AN EFFECT ON WEIGHT CONTROL

As a result of following these diets over 6 months, body weight was significantly reduced (1 to 2 kg) in the two low-fat diets compared to the control diet (table 2). A substantial weight loss was not expected, since overall energy intake was not restricted in experimental groups. A finer analysis revealed that these weight losses more specifically concerned the fat mass. The lean mass (i.e. mostly muscles) was not reduced. It was even slightly increased in people who were on a SCHO diet (figure 1).

Figure 1

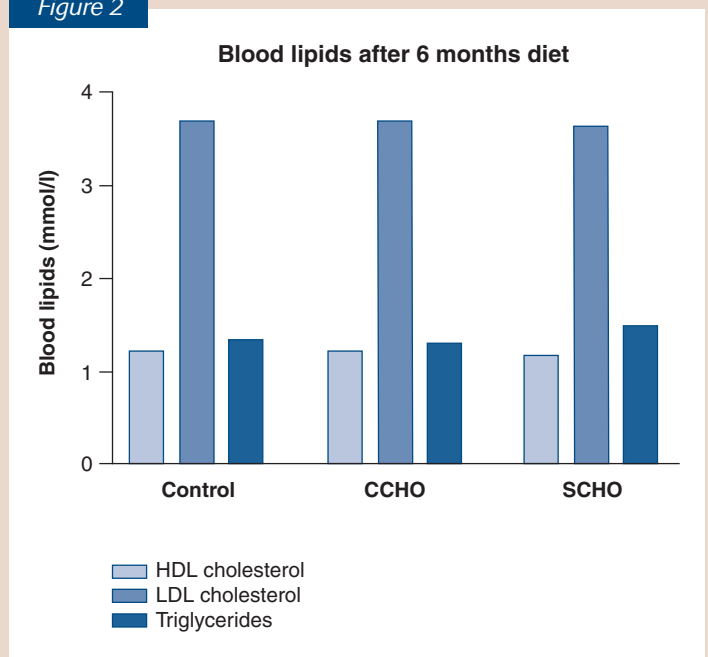


AND THE EFFECT ON BLOOD FATS ?

A reduction in the intake of fat and increase in carbohydrates did not give rise to any appreciable changes in blood fat levels (figure 2). Triglycerides, HDL-cholesterol (which is commonly known as "good" cholesterol) and LDL (the "bad" cholesterol) showed no significant differences between the three groups. These results are interesting. Diets low in fats and rich in carbohydrates are sometimes claimed to have a negative effect on blood fat (increase in triglycerides and decrease in good cholesterol, both risks factors for the cardiovascular diseases). However, these claims are based on short term studies. The

CARMEN study thus provides very important evidence that low-fat high carbohydrate diets in the long term allow maintenance of body weight without cardiovascular risk.

Figure 2



IN CONCLUSION

The CARMEN study makes an important contribution to redressing the growing epidemic of excess body weight. Weight control was improved, without imposing any restrictive diet, but just through the choice of foods consumed. It is the first study to show that a reduction in the quantity of fats ingested, offset by an increase in carbohydrates, be they simple or complex, allows weight to be controlled in the long term. The volunteers lost weight significantly (essentially in the form of a reduction of fat mass) without a reduction in overall energy intake. This study is also of special importance because the latest scientific data indicates that in overweight people a weight loss of around 5 % to 10 % leads to a reduction in obesity-related complications and improves health. Furthermore, modifying the diet in this way could well prove to be effective in keeping weight constant after a weight loss. Regaining weight is a common occurrence after conventional slimming regimens.

The type of carbohydrate does not seem to be of any importance in this context. The inclusion of simple sugars in diets low in fats and rich in carbohydrates did not negate the beneficial effects on weight and blood fat levels.

The scientific community has been divided recently on the safety and efficacy of diets low in fats and rich in carbohydrates for the treatment of obesity; and on the potential consequences of this type of diet on blood fats and cardiovascular diseases. In this respect, the CARMEN study provides a better understanding of the role of fats and carbohydrates in the diet of overweight people.