



## Fruit and vegetables and nutritional issues

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Man has sought to secure and regulate his food resources for thousands of years. The preservation of fresh or processed foods has been and still is a good response to this objective. However, it seems necessary today to put things in perspective to a certain extent. The relation between our society and food has changed since the basic calorie requirements are usually met, at least in the northern hemisphere. Eating his fill, secure from the quantitative point of view, man is now seriously addressing the quality of his diet because he is beginning to establish the link between food and health and to understand that food is not just the biochemical description of protein, carbohydrate and lipids and that other micronutrients in his diet are truly essential for health. Tomorrow's food must absolutely incorporate this parameter: any new agrifood technology is doomed to failure if it cannot conserve the previous micronutrients naturally present in agricultural crops. This issue should not be neglected in fruit and vegetable processing and preservation.

In a single century, the bread consumption of the average French person has decreased by 70 percent, that of legumes by 90 percent and at the same time consumption of meat has doubled and that of sugar has tripled. Furthermore, the products eaten are increasingly prepared by the agrifood industry where the refining of agricultural raw material is performed almost systematically. The material is thus deprived—and our diet with it—of a substantial list of micronutrients whose major role in the preservation of health is confirmed every day by new scientific studies. Bread used to be a staple and was the first food to be affected by this cleansing. Millers remove the various layers of bran and wheat germ to make the '55' white flour used for the *baguette*

loaves loved by the French. Bakers add too much salt (2.2 percent) to bake in peace at the expense of consumers who eat their daily bread with the high-salt diet imposed by the agrifood industry. Salt in yoghurt? Salt in dark chocolate? Yes, to the extent that the excess salt eaten by our contemporaries is becoming a true problem of public health and that the public system makes a huge outlay on hypertension drugs whose performances are not very convincing.

### Revise our eating habits

Scientists from Institut Pasteur, the INRA *Unité des Maladies Métaboliques et Micronutriments* at Clermont-Theix and INSERM spent an entire day drawing up a true indictment of end-of-century eating habits in the name of the control of increased obesity, of protection against oxidative stresses, of protection against osteoporosis, diabetes and heart disease, hypertension and cancer. These affections are in no case unavoidable fatalities and an appropriate diet throughout life is the best guarantee of enduring good health. Christian Rémésy (INRA) considers that preventative nutrition requires the rationalisation of our diet with attention paid to the balance of its energy component and the checking of its variety and hence the complexity of the non-energy component. He vigorously rehabilitates cereal products, fucula (pulses: protein crops), encourages greater consumption of complex, unrefined products and especially fruit and vegetables. The instructions of the various participants throughout the three days of this summer school leave one amazed, as they recommend the daily consumption of 700 grams of fruit and vegetables (e.g. 400 g fruits and

300 g vegetables). The researchers specify that this ration is beneficial not as much for the energy that it contains (10 percent of daily requirements) but for the gold mine formed by the considerable sum of micronutrients that it contains! If all the French were to adopt such a ration, an annual 15 million tonnes of fruit and vegetables would be required, that is to say three times the present quantity! However, it is often difficult or even impossible to change the eating habits of people who are more inclined to take medicine than take control of their nutrition! And state nutrition policy seems to be finally taking the major option of prevention after spending the whole of the twentieth century treating diseases at a high cost! Today, progress in nutrition and human health are enabling continuous consolidation of claims and practical nutritional recommendations. The high micronutrient content and comparatively low calorie levels make fruit and vegetables ideal foods for protecting the health of our stressed contemporaries and for diluting plates of food whose energy content is often too great. How can we do without them?

### The food consumption and nutritional conditions of the population of France

#### *Trends in the consumption of different foodstuffs*

Several sources of data provide fairly precise data on the evolution of the consumption of the various groups of foodstuffs in recent decades. In parallel with the diversification of the diet, a disturbing decrease in micronutrients is not without consequences for the health of the French according to a report entitled

'Pour une politique nutritionnelle de santé publique en France' ('For a public health nutritional policy in France') (Secrétariat d'Etat à la Santé et aux Handicapés, 15 June 2000).

The nutritional consequences of the evolution of eating in France (like that of the other industrialised countries) in recent decades display the following features:

- an overall decrease in the energy intake (related to the decrease in energy expenditure);
- considerable diversification of the diet (including different foodstuff groups in the daily ration);
- a change in the distribution of the different macronutrients in covering energy requirements;
- a decrease in the share of particularly complex carbohydrates and an increase in the proportion of single sugars (sucrose);
- an increase in the proportion of animal proteins and a decrease in plant protein;
- an increase in the proportion of lipids, especially of the invisible and saturated types, and a decrease in the intake of numerous micronutrients resulting on the one hand from the overall decrease in energy intake and on the other from the structural change in a diet characterised today by an increasing proportion of foods contributing 'empty' calories, that is to say foods (fizzy drinks and sweets) that contain single sugars but no micronutrients.

This phenomenon has contributed to reducing diet micronutrient 'density' (the vitamin and mineral concentration per energy unit) and reducing the intake of food fibres. This change has been beneficial for public health in certain respects and negative in others. It would be regrettable to be unaware of the positive features of the change in our diet, which is undoubtedly more varied than it used to be. A varied diet is much better for health than a monotonous one. One should be pleased to see that the diet has become 'democratic': meat and fruit were reserved for particularly well-off classes at the beginning of the

twentieth century and, like all the other main foodstuff groups, have become accessible to practically the whole of the population of France. However, although the major deficiency problems have disappeared (even if new vitamin and/or mineral deficiency problems are emerging today), the change in diet in France has had several negative effects on the risk factors concerning certain diseases that are of considerable relative importance in terms of public health. Eating much more than is necessary to cover requirements, not taking enough exercise, too high a lipid consumption, especially of saturated fatty acids, or too much alcohol, eating too little complex carbohydrates and fibres, vitamins or minerals and an unbalanced diet all increase the risk of metabolic or nutritional diseases that may not only decrease life expectancy but also impair the quality of a substantial proportion of life.

#### Bread

Per capita bread consumption (extrapolated from indirect data concerning availability and purchases) is now a third of what it was at the beginning of the twentieth century and half of what it was 50 years ago (approximately 220 kg/year in 1880, 120 kg/year in 1950 and 60 kg/year in 1996). The increase in the consumption of other cereal products (this has doubled in the past 50 years) does not compensate the decrease in cereal intake related to the decrease in the use of bread. Bread consumption seems to have stabilised in recent years, in particular because of the diversification of the types of bread on the market.

Individual food surveys of some 5,000 persons within the framework of the SU.VI.MAX study (18 food surveys per subject corresponding to 90,000 food days over a 3-year period) show that average bread consumption by men aged 45 to 60 is 133 g/day and that by women aged 35 to 60 is 84 g/day (Herberg *et al.*, 1998). The various surveys (SU.VI.MAX, ASPCC, Val-de-Marne) show that bread consumption varies greatly according to sex, age and

socio-professional category (Herberg *et al.*, 1998; Rigaud *et al.*, 1997; Preziosi *et al.*, 1991).

#### Potatoes

Potato consumption varies according to the region (consumption by the population of the 'Nord' (north) region remains the highest) and the socio-professional category. Extrapolated from availability data, consumption has considerably decreased in recent decades. It was 178 kg/person/year in 1925, 118 kg/person/year in 1975 and 64.5 kg/person/year in 1996. A slight upturn in consumption has been observed since 1990, enhanced by the supplying of prepared products (peeled potatoes, crisps, etc.) by the agrifood industry. The SU.VI.MAX study shows that average potato consumption is 61 g/day by men aged 45 to 60 and 43 g/day by women aged 35 to 60.

#### Pulses

For many years, pulses (lentils, beans, chickpeas, etc.) have played an important role in covering the protein requirements of the least privileged social classes (beans were 'poor man's meat'). The consumption of pulses fell noticeably from 1920 (7.3 kg/person/year) and 1985 (1.4 kg/person/year). Pulse consumption has remained stable in recent years or even increased slightly as a result of industrial preparations and the development of preserved forms (1.6 kg/person/year in 1996). Average pulse consumption in the SU.VI.MAX study is 12 g/day by men aged 45 to 60 and 8 g/day by women aged 35 to 60.

#### Fruit and vegetables

Fruit consumption increased markedly between 1950 (40 kg/person/year) and 1990 (72 kg/person/year). It has decreased steadily since 1990 (being 65 kg/person/year in 1996). In the SU.VI.MAX study, average fruit consumption is 211 g/day by men aged 45 to 60 and 187 g/day by

women aged 35 to 60. Vegetable consumption has increased continuously since the 1950s, moving from 60 kg/person/year in 1950 to 119 kg/person/year in 1995. It seems to have stabilised or decreased slightly in recent years (it was 115.7 kg/person/year in 1996). In the SU.VI.MAX study, average vegetable consumption is 119 g/day by men aged 45 to 60 and 113 g/day by women aged 35 to 60.

### National Nutrition and Health Plan: fruit and vegetables in the front line

The result of long reflection at the national and European scale, this national programme is aimed at encouraging consumers to eat well for good health. A series of measures has been designed to implement the vast plan, consisting in particular of information, education in nutrition, medical consultations and research programmes. After devoting 50 years and an increasing proportion of its resources to treating diseases and winning the health battle on the curative front, our society is at last discovering the merits of prevention and in particular that of a good diet. This is good news for all those who make social security contributions and very good news for all the stakeholders in the fruit and vegetables sector. Indeed, fruit and vegetables have an important position in the PNNS

(National Nutrition and Health Programme). The first of the nine objectives mentioned in the plan is the increase in fruit and vegetable consumption and the reduction of small consumers by 25%. Indeed, 55% and 64% small fruit consumers are observed among men and women aged 45 to 60 and 75% and 64% small vegetable consumers. A small fruit and vegetable consumer is defined as eating less than one and a half portions of fruits and less than two portions of vegetables (excluding potatoes) each day.

The action plan includes a communication campaign with the PNNS logo and free distribution of fruits in schools to make a concrete demonstration of the nutritional importance of fruit and vegetables. This is an important flagship operation in terms of the promotion of awareness and the training of children's taste. Various areas of intervention (the school environment, catering, etc.) are addressed. The campaigns are relayed locally under the aegis of regional health education committees. A new theme will be the subject of a new campaign each year. Free distribution of fruits in primary schools will be carried out in liaison with town halls, producers and associations. Interfel and Aprifel have contacted the ministries of Health and Agriculture for forceful joint action on this common objective, the promotion of the benefits for health of increased fresh

fruit and vegetables consumption within the framework of a balanced diet.

#### *The ten golden rules for balance*

Each plant that we eat has a specific nutritional composition. Citrus fruits, strawberries, cabbage, peppers and parsley are rich in vitamin C. Carrots, apricots, mangoes and spinach are rich in carotene. Salads are rich in vitamin B9. Polyphenols are found in black grapes and red fruits in the form of anthocyanins, in citrus as citroflavonoids and in apple as quercetin. The distribution of minerals is just as uneven even if the general profile of fruits and vegetables can be defined as follows: large amounts of potassium (but very little sodium) and useful amounts of calcium, magnesium, iron and various trace elements. No fruit or vegetable covers all our nutritional requirements and balance is found in variety. Eating a broad range of micronutrients covers the body's requirements more easily and above all gives maximum effectiveness to these protective systems that operate in synergy. This is true teamwork and each team member has its importance! Antioxidants (vitamins C and E, carotene and polyphenols) protect each other and enable the body to make better use of its protection resources. The broader the range of plants, the greater the chances of being protected!■



## The processing of tropical fruits at CIRAD-FLHOR

Abstract

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Complete version  
<http://technofruits2001.cirad.fr>

CIRAD-FLHOR's mission in the technology and mastery of the quality of fruits and vegetables is that of being able to provide back-up for the development of sectors by operating at the level of each player. Contribution to a better quality local diet, the improvement of growers' incomes and the better matching of

production to markets are sought in a foodstuff-quality-security approach. The themes addressed should lead to:

- the characterisation of quality factors,
- the reduction of post-harvest losses,
- the development of technologies

suited to markets and raw materials.

They are centred on three lines of approach:

- produce quality (export),
- agro-industries (northern countries),
- food security / economic development (southern countries).