



Representing all sugar producers in the EU plus Switzerland since 1953

28/03/2014

CEFS Comments to the Draft WHO Guideline on Sugars Intake for Adults and Children

CEFS (Comité Européen des Fabricants de Sucre), representing the EU sugar producers, welcomes the opportunity to provide comments to the public consultation on the draft WHO Guideline on sugars intake for adults and children. CEFS holds the view that only strong convincing scientific evidence should be considered for guidelines on nutrition and health. Please find below the comments, which follow the layout of the online template form.

Background

The background part of the draft WHO guideline on sugars contains a series of statements that do not reflect the scientific reality.

- Drawing a distinction between “free sugars” and other sugars is ill-founded. There is no convincing scientific justification for a distinction between “free”, “added”, and “other” sugars.¹⁴ Sugars, whether “added” to food or “naturally occurring” in fruits and vegetables, provide the same amount of calories (4 kcal/g) and have the same effect on health (they can for instance, all potentially be cariogenic in absence of proper oral hygiene, just like starches^{9, 12, 23}). Moreover, there is no practical, easily enforceable analytical method to distinguish between “free”, “added”, and “other” sugars.^{2, 5}
- Claiming that “free sugars contribute to the overall energy density of diets” ignores the fact that all nutrients add energy density to the diet. Just like other carbohydrates, such as starch, sugars bring 4 kilocalories per gram. In comparison, 1 gram of fat has 9 kilocalories, 1 gram of protein has 4 kilocalories and 1 gram of alcohol has 7 kilocalories.
- The claim that “a high level of consumption of free sugars is of concern because of its association with poor dietary quality” is not based on any review of the evidence on the relationship between sugars intake and the nutrient quality of diets. The two reviews that are cited as sources for this sentence did not make such a review. The same is true for the statement that “consumption of free sugars [...] may reduce the intake of foods containing more nutritionally adequate calories.” The European Food Safety Authority (EFSA) pointed out that “[o]bserved negative associations between added sugars intake and micronutrient density of the diet are mainly related to patterns of intake of the foods from which added sugars in the diet are derived rather than to intake of added sugars *per se*”⁷ and the Institute of Medicine (IOM) 2005 Report simply recommended that added sugars intake should be limited to less than 25%E to achieve micronutrients adequacy.¹³
- Stating that the association between “free” sugars consumption and dental caries is a particular concern ignores the scientific reality that all fermentable carbohydrates

have a potential to induce dental caries. More details on this issue are given below in the part dedicated to the summary of evidence related to dental caries.

- Obesity and dental caries, they are both diseases of multifactorial origin and this approach of developing a guideline ignores these various factors and ascribe the causes of obesity and dental caries only to “free sugars”, which is misleading.

Summary of evidence: body weight

The systematic review on free sugars intake and body weight does not allow conclusions to be drawn specifically for “free sugars” consumption. The review provides no evidence to substantiate a quantitative guideline or to guide advice on any quantitative limit on “free sugars” intake for obesity prevention.

- The review demonstrated that in studies where the energy content of the test diet was the same as that of the controls but where sugar was replaced with another carbohydrate, there was no evidence of any effect of sugar consumption on body weight. This confirms that it is the overconsumption of calories that results in weight gain rather than anything specific to sugar. This is in line with conclusions reached by other Expert Committees like EFSA and with conclusions previously reached by WHO and FAO that no distinction could be made between calories provided by carbohydrates (whether sugars or starch), proteins, fats or alcohol in our diet as “*excess energy in any form will promote body fat accumulation*”.⁸
- No evidence of a dose-response association was found between sugar as a percentage of total energy intake and body weight.
- The review is based on a number of studies involving total sugars and foods containing sugars. The conclusions drawn relating to “free sugars” disregard the fact that the foods analyzed contained caloric nutrients other than “free sugars”.
- The admitted serious risk of bias, which could result in overestimation of the effect, and the potential publication bias found in the studies eligible for meta-analysis (p.16), further question the quality of the scientific evidence base of these guidelines.
- When looking at the randomized trials included in the meta-analysis individually, it is even more obvious that there is no convincing and consistent evidence in support of the suggested association between free sugars intake and body weight changes.
- Overall, the evidence from eligible RCTs is mixed, with study data showing either no effects, an increased body weight with lower sugar intake (or vice versa), or in hypercaloric trials providing sugar at high doses (up to 438g/d) as surplus of total daily energy intake, a slight increase in body weight, or a slight decrease in body weight with caloric reduction. The rating of “no serious inconsistency” in the evidence profile (see Table 2 of the Draft Guideline) could thus be questioned.
- RCTs in children showed no overall change in body weight with altering intake of sugar-sweetened foods and beverages. Moreover, the quality of evidence from meta-analysis of prospective cohort studies in children is low (see Table 4 of the Draft Guideline). Associations between free sugars and adiposity in children were non-significant, non-significant after appropriate adjusting or even inversely associated in almost half of the 21 observational studies included.

- Hence, there is no consistent and convincing evidence for a particular role of “free sugars” in body weight changes, whether in children or adults.
- Given the heterogeneity of data, potential publication bias, and absence of a dose response effect, there is no scientific evidence base to substantiate a quantitative guideline and recommendations on (free) sugars intake.

The review’s conclusions are not consistent with those of other expert groups.

- The IOM stated in 2005 that the evidence relating high intake of sugars (mainly as added sugars), compared to high intakes of starch, to weight gain is inconsistent.¹³
- EFSA concluded that “the evidence relating high intake of sugars (mainly as added sugars), compared to high intakes of starch, to weight gain is inconsistent for solid foods” and that “[t]he available evidence is insufficient to set an upper limit for sugars based on their effects on body weight.”⁷

The Te Morenga *et al* review did not address the totality of evidence that would have allowed drawing objective conclusions on the relationship between “free sugars” intake and body weight.

- For instance, the review did not include a 2012 systematic review and meta-analysis, which concluded that changes in fat intakes will have more effect on body weight than the effects mentioned for “free sugars” by the Te Morenga *et al* paper.¹¹

Summary of evidence: dental caries

The Moynihan *et al* review fails to take into account frequency of consumption of fermentable carbohydrates, oral hygiene, and exposure to fluoride (toothpaste), which are widely recognized as critical variables in the development of dental caries.

- The GRADE evidence profile tables on modifying the intake of added sugars and their effect on dental caries have to be questioned.
 - Data from children were used to provide evidence for adults, with the consequence that four different questions were answered by identical GRADE evidence profiles from data obtained from the same eight observational studies including only about 2900 children (see Tables 1 to 4 of Annex 1).
 - As shown in Table 5 of Annex 1, the analysis of five observational studies with only 1301 children were used to provide evidence for the general population to restrict added sugars below 10 E %, but no study in adults was considered.
 - However, the Michigan-Caries study⁴, mentioned in the review by Moynihan and Kelly (in Table 4 as Burt et al. 1988 and as reference 32 in the draft Guideline) to support the 10% of energy “free” sugars target, was a three-year longitudinal study in 499 children aged 10-15 years (at baseline). The study showed that caries incidence was poorly related to sugars intake, whether measured as total daily amount, between meal intake, sugars as a proportion of total energy or frequency of consumption. As in this longitudinal study, the sugar intake was well above 10% of energy, the Michigan-Caries study does not support the 10% of energy target for caries reduction.

- Through three ecological studies in Japanese children in the 1950's (see Table 6 of Annex 1), the GRADE evidence profile aims to answer the question that decreasing the intake of free sugars below 5 % energy intake can reduce caries. The caries prevalence data seem to be based on one or two teeth of the children. However, the annual sugar supply data do not seem to be reliable during these times: the evidence from these reports is of very low quality and can thus not form the basis for public health policy measures. As already stated above, these old observations from about 60 years ago do not stand up to the current scientific standards.
- There is a clear consensus that frequency of consumption, and not the amount, of all fermentable carbohydrates represent a caries risk in the absence of proper oral hygiene and of use of fluoride toothpaste.^{1, 6, 15, 16} All fermentable carbohydrates (including sugars, starch, but also fruits^{9, 12} or whole grains¹⁹) contribute to dental caries by providing substrate for bacterial fermentation in the mouth. It is also worth noting that lactose in milk is cariogenic when consumed frequently, as was shown by several reports on observations in babies breastfed over longer periods.^{17, 24}
- The authors of the review, themselves, concluded in a previous article that “[t]here is convincing evidence, collectively from human intervention studies, epidemiological studies, animal studies and experimental studies, for an association between the amount and frequency of free sugars intake and dental caries”.²⁰ This work was however not quoted in the review.
- It has also been demonstrated that fluoride use, particularly fluoride toothpaste, is a very effective public health approach to reducing dental caries incidence.^{22, 16} However, restriction of dietary intake of sugars (or carbohydrates in general) has not been shown to be useful; the exclusion of all sugar- and starch-containing foods may even lead to an unhealthy diet.^{3, 16}
- Caries epidemiological monitoring has shown that in Western countries, caries has declined in children and teenagers since the early seventies; over the past 35-40 years without a simultaneous decrease in the mean sucrose consumption.²⁴ The improved dental health status is demonstrated by the increased number of caries-free children, as well as by the reduced number of decayed, missed or filled teeth (DMFT). In 12-year-olds from the very high caries level of more than 6.6 DMFT to a low level (between 1.1 and 2.7 DMFT) or even a very low level of caries (less than 1.1 DMFT). Data on worldwide dental caries prevalence have been collected since 1969 systematically by the WHO and data have been made public in their Global Oral Health Data Bank.²⁴
- The reason why caries is in decline is universally ascribed to the broader oral hygiene consciousness in the population in combination with the regular use of fluoride toothpaste and the availability of fluoride in other forms. During that time of caries decline, no dramatic dietary changes were observed.
- Children with a high sugar intake are not necessarily the ones with more carious teeth, as good or bad oral hygiene habits can modulate the caries risks. Larsson et al. (1992) had compared dietary habits in 15 year-olds with high and low caries prevalence and found strong evidence that bad oral hygiene habits are more important in terms of caries risk than dietary habits, as there was no difference in daily sucrose intake (10-11 energy %) or average number of meals per day (about 5) between these groups.¹⁸

Here again, the review's conclusions are not consistent with those of other expert groups.

- EFSA clearly recognized that “available data do not allow the setting of an upper limit for intake of (added) sugars on the basis of a risk reduction for dental caries, as caries development related to consumption of sucrose and other cariogenic carbohydrates does not depend only on the amount of sugar consumed, but it is also influenced by frequency of consumption, oral hygiene, exposure to fluoride, and various other factors.”⁷
- IOM (2005) concluded that “dental caries is a disorder of multifactorial causation” and that “because of the various factors that can contribute to dental caries, it is not possible to determine an intake level of sugar at which increased risk of dental caries can occur.”

Recommendations

The WHO's justification for its 10%E recommendation disregards the clear consensus of the scientific community.

- The WHO recommendation limiting intake of “free” sugars to 10% of one's daily energy intake on the basis of “observational studies with dental caries as an outcome” ignores the clear consensus of the scientific community on the principle that it is the frequency of consumption, and not the amount, of all fermentable carbohydrates (e.g. starch, sugars but also fruits and whole grains) that represents a caries risk in the absence of proper oral hygiene and of use of fluoride toothpaste.
- In the past, the WHO TRS 916 report of 2003 recommended the target of < 10 % Energy for “free” sugars, but at the same time acknowledged that the basis for this target was controversial. Indeed, there is no scientific support for this target whether it is based on caries prevention or on obesity prevention. These earlier comments are still valid for this new draft guideline, which suggests reconfirming the 10% energy target for “free” sugars.

The conditional recommendation to lower free sugars intake below 5% of energy intake is not at all supported by evidence.

- Data from the WHO Global Oral Health database as well as from then OECD database with indicators on dental caries trend, indicate a decline in caries prevalence and severity in countries with the current sugar supplies.^{21, 24} This is also valid for the < 10% of energy target, as caries declined on the background of the actual sugar supply. Please see figures below^{21, 24}:

Figure 1: source: Health at a Glance 2009: OECD Indicators - OECD © 2009 - ISBN 9789264061538

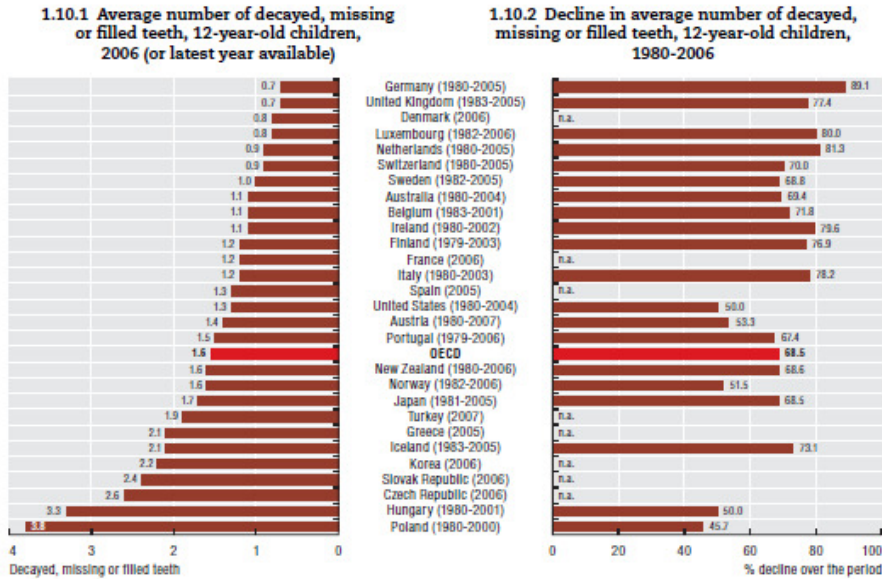


Figure 2: Average number of decayed, missing or filled teeth, 12-year-old children, selected OECD countries, 1980-2006 (source: Health at a Glance 2009: OECD Indicators - OECD © 2009 - ISBN 9789264061538).

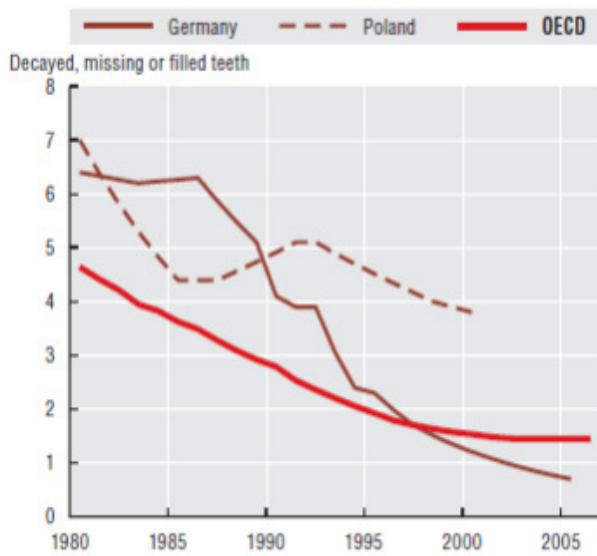


Figure 3A: Caries decline in 12-year-old children in Europe from 1970/80s to 2006 (sources: WHO Europe Health for all Database & WHO Oral Health Country /Area Profile Programme & CECCO)

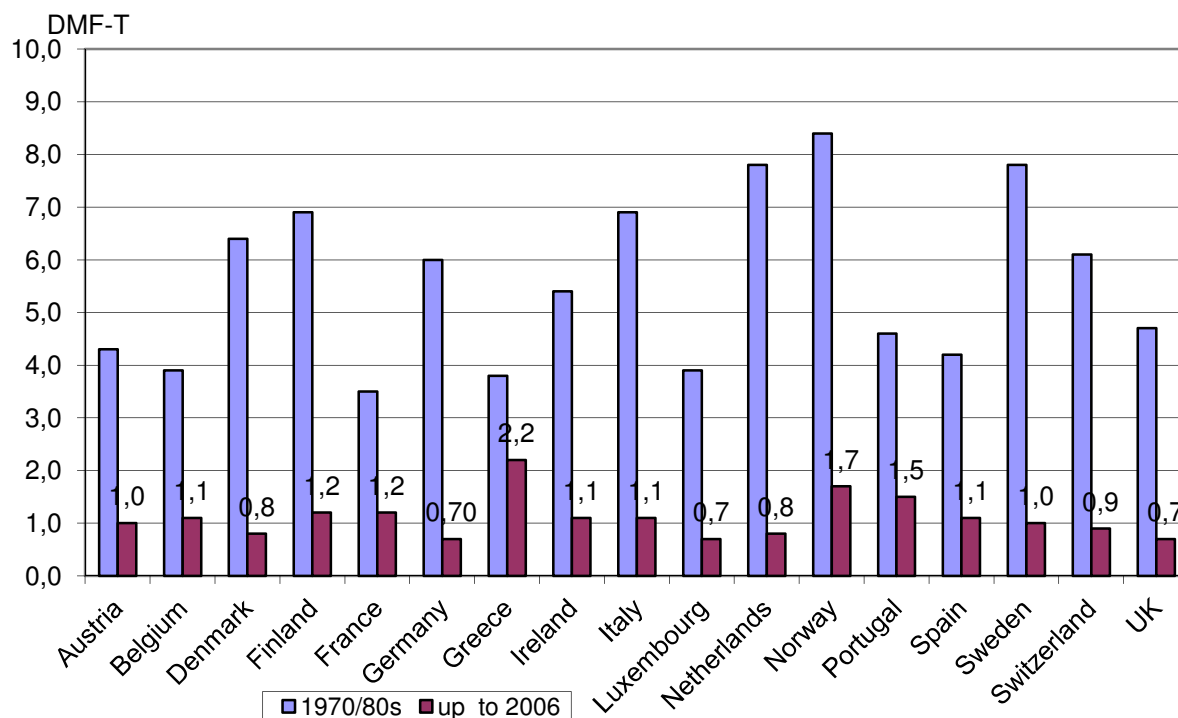
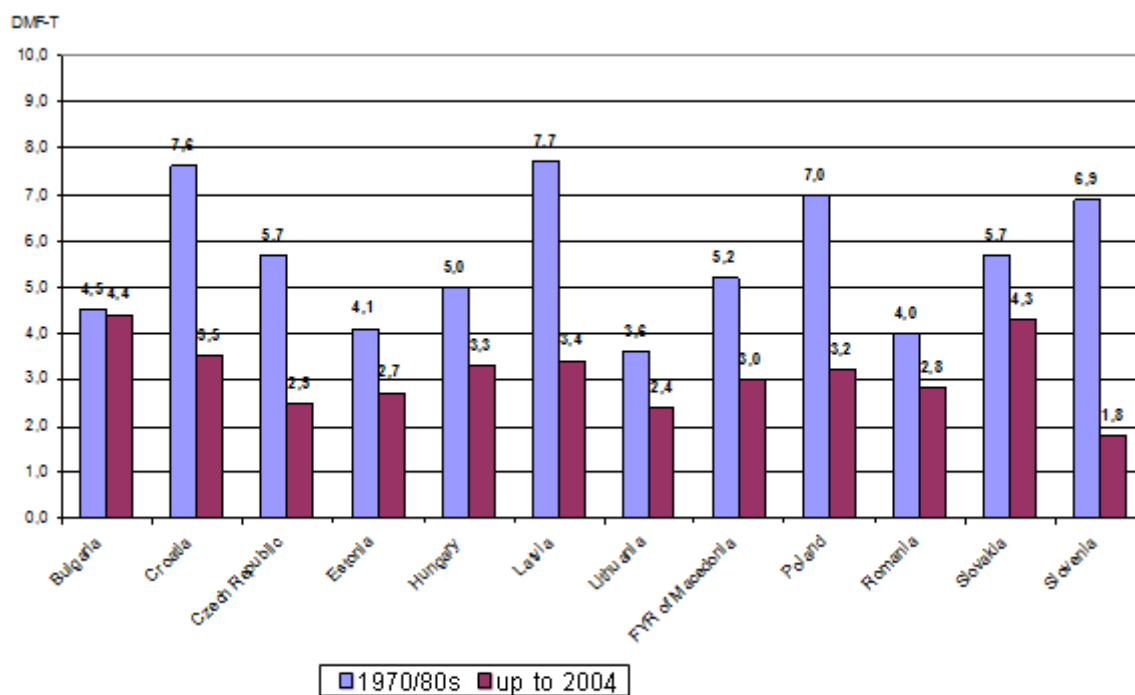


Figure 3B: Caries decline new EU member countries in 12 year-old children in Europe (from 1970/80s up to 2004) (sources: WHO Europe Health for all Database & WHO Oral Health Country /Area Profile Programme & CECCO)



- The 5% of energy value has no scientific basis and, due to low quality of the evidence explicitly acknowledged by WHO, should not be brought forward.
 - The caveat mentioned by WHO with regards to the 5% of energy value expressly indicates that it is a conditional recommendation that is, by definition, made when there is greater uncertainty about the quality of evidence, about the balance of benefits versus harms and burdens, about the values and preferences and resource use, or made if local adaption has to account for a greater variety in values and preferences or when resource use makes the intervention suitable for some locations but not others.
 - The recommendation to further limit sugars intake to less than 5% of total energy is based on ecological studies. It is worth pointing out that in the context of the ecological studies, the quality of the evidence was downgraded to “very low” because ecological studies have problems linking exposure and outcome at the individual level (i.e., it is not possible to be sure that the individuals who consume less sugars are the same individuals who present a reduction in dental caries). Thus the evidence base to suggest a 5% target from free sugars is by no means reliable, as the observations with Japanese children dates back to more than 60 years ago. At that time, the monitoring criteria for epidemiological surveys were not yet established since WHO published the first edition of the “Oral Health Surveys – basic methods” only in 1971. Furthermore, only later in 1954, the Vipeholm study¹⁰ showed that it is the frequency and not the amount of sugar which poses a caries risk. Since then, caries research has shown that all fermentable carbohydrates may pose a risk for dental caries but that the caries risk can be minimized by regular proper oral hygiene and the use of fluoride either topically or via water fluoridation. Thus, the calculated relationship between sugar quantity and caries incidence in these Japanese children from about more than 60 years ago is not valid for many reasons in the year 2014. These data cannot form the basis for recommendations for caries prevention, and these targets derived from the caries issue cannot be transferred and applied to the issue of obesity prevention, since, as previously mentioned, no evidence for a dose-response was found in the contemporary body weight/obesity literature.

Remarks

The recommendations are not based on the totality of evidence regarding the relationship between free sugars intake, and body weight and dental caries. Please see CEFS' comments to the summary of evidence related to body weight and to dental caries of the consultation.

The statement that higher intakes of free sugars threaten the nutrient quality of diets by providing significant energy without specific nutrients, is inaccurate. Please see CEFS' comments to the background part of the consultation.

References

1. Anderson C.A. et al. Sucrose and dental caries: a review of the evidence. In Central aspects of sugars in human nutrition. *Obesity Reviews* Volume 10, Supplement 1, 2009.
2. AFSSA (Agence Française de Sécurité Sanitaire des Aliments) – Saisine n° 2006-SA-0140.

3. Bradshaw D.J. & Lynch R.J. Diet and the microbial aetiology of dental caries: new paradigms. *Int Dent J.* 2013 Dec;63 Suppl 2:64-72. doi: 10.1111/idj.12082. Review.
4. Burt B.A. & Szpunar S.M., The Michigan study: the relationship between sugars intake and dental caries over three years. *Int. Dent. J.*;1994, 44, 230-240.
5. Cummings & Stephen: Carbohydrate terminology and classification, *Eur J Clin Nutr* (2007), 61 (Suppl 1), S5-S18.
6. Duggal M.S. et al. Enamel demineralization in situ with various frequencies of carbohydrate consumption with and without fluoride toothpaste. *J Dent Res*, vol. 80(8) (2001):1721-1724.
7. EFSA Panel on Dietetic Products, Nutrition, and Allergies (NDA); Scientific Opinion on Dietary Reference Values for carbohydrates and dietary fibre. *EFSA Journal* 2010; 8(3):1462[77pp.]. doi:10.2903/j.efsa.2010.1462. Available online: www.efsa.europa.eu.
8. FAO/WHO (1997) Expert Consultation on Carbohydrates in Human Nutrition.
9. Grobler S.R. The effect of a high consumption of citrus fruits and a mixture of other fruits on dental caries in man. *Clin. Prev. Dent*, vol. 13(4) (1991):13-17.
10. Gustafsson B.E. et al. The Vipeholm dental caries study; the effect of different levels of carbohydrate intake on caries activity in 436 individuals observed for five years. *Acta Odontol. Scand* 1954; 11, 232-264.
11. Hooper L. et al. (2012) Effect of reducing total fat intake on body weight: systematic review and meta-analysis of randomised controlled trials and cohort studies. *BMJ* 2012;345:e7666 doi: 10.1136/bmj.e7666 (published 6 December 2012).
12. Hussein I. et al. A comparison of the effects of some extrinsic and intrinsic sugars on dental plaque pH. *Int. J. Paediatr. Dent.*, vol. 6(2) (1996):81-86.
13. Institute of Medicine, Food and Nutrition Board (2005). *Dietary Reference Intakes for Energy, Carbohydrate, Fibre, Fat, Fatty Acids, Cholesterol, Protein and Amino Acids.* The National Academies Press. Washington DC.
14. Johnson I.T. et al. Intrinsic and non-milk extrinsic sugars: does the distinction have analytical or physiological validity? *Int. J. Food Sci. Nutr.* 1996; 47:131-140.
15. Kafatos A.G. & Codrington C.A. Eds (2001) *Eurodiet - Reports and Proceedings.* Public Health Nutrition 4:2(a) Special Issue.
16. Kay. E.J. Caries prevention: based on evidence? Or an act of faith? *British Dental Journal*, vol.185 (1998):432-3.
17. König K.G. (2000): Diet and oral health. *Int. Dent. J* 50:162-174.
18. Larsson B. et al. Prevalence of caries in adolescents in relation to diet. *Community Dent. Oral Epidemiol.* (1992) 20 : 133-137.
19. Moermann J.E. & Mühlemann H.R. Oral starch degradation and its influence on acid production in human dental plaque. *Caries Res.*, vol. 15(2) (1981):166-175.
20. Moynihan P. & Petersen P.E. (2004) Diet, nutrition and the prevention of dental diseases, *Public Health Nutr.* 2004 Feb;7(1A):201-26.
21. OECD database available at https://stats.oecd.org/Index.aspx?DataSetCode=HEALTH_STAT.
22. Petersen, P.E. et al. Effective use of fluorides for the prevention of dental caries in the 21st century: the WHO approach. *Community Dentistry and Oral Epidemiology* 2004; 32:319-21.
23. Van Loveren C. Diet and dental caries. *Eur. J. Paediatr. Dent.* 2000; 1: 55-62.
24. WHO oral health database, Malmö University, available at <https://www.mah.se/CAPP/> and <http://www.mah.se/CAPP/Country-Oral-Health-Profiles/EURO/European-Union-and-European-Economic-Area-/Dental-Caries-for-12-year-olds/>.

For more information, please contact Mrs. Emilie Majster, CEFS Scientific & Regulatory Affairs Adviser, at emilie.majster@cefs.org.

Comité Européen des Fabricants de Sucre

182, avenue de Tervuren – B-1150 Bruxelles

Tél. : +32 2 762 07 60 – Fax : +32 2 771 00 26 – E-mail : cefs@cefs.org - <http://www.cefs.org>

T.V.A. : BE 436.324.311 – Banque : BBL 310-1000803-43