

PUBLICATION OF THE SUPERIOR HEALTH COUNCIL No. 8622**“Energy drinks”**

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1. INTRODUCTION AND ISSUES

The Superior Health Council has thought it useful to issue an advisory report on energy drinks for the authorities and the general public. The concern about energy drinks results from the increased knowledge that has been gained over the last twenty years about the effects of their ingredients on human health and their safety of use. Another worrying issue is the recently noted tendency for energy drinks to be consumed in excessive quantities and in combination with alcoholic beverages by young people in search of stimulating effects.

Energy drinks¹ are designed to give the consumer new energy, i.e. an intellectual and/or physical boost. They contain a mixture of various (allegedly) stimulating ingredients such as caffeine, taurine and D-glucuronolactone, as well as group B vitamins and plant extracts which are, amongst others, derived from guarana or ginseng. They have to be distinguished from so-called energetic drinks (sports drinks), which are designed for sportspeople. These drinks contain carbohydrates as their energy source, as well as electrolytes to preserve the balance of energy and ions after an effort and to promote rehydration.

The best known energy drink is undoubtedly “Red Bull”, which has been dealt with in numerous discussions in scientific and public health circles since being marketed in Austria in 1987. There is no denying, however, that this sort of drink is a clear commercial success nowadays. This is evident not only from both the numerous copies and variants that are now available world-wide, but also from the high sales figures for some of these products. In Belgium, the commercialisation of these products has been authorised for over ten years.

2. CONCLUSION AND RECOMMENDATIONS

The Superior Health Council takes due note of the fact that the European Authorities have made available re-assuring data about the innocuousness of two of the main ingredients of energy drinks, namely taurine and D-glucuronolactone. However, the Council remains concerned that these energy drinks increase the risk of excessive and potentially harmful caffeine consumption and its consequences (such as insomnia, nervousness, anxiety, headaches, trembling and tachycardia), as well as the risk of potentially inducing an addiction to caffeine and, as has been noted more recently, a dependence on other substances (nicotine, alcohol and/or cannabis).

Moreover, the Council is concerned about the tendency for energy drinks to be consumed in combination with alcoholic beverages, which results in an increased consumption of the latter. In

¹ Based on the definitions of the Scientific Committee on Food (SCF, 1999).

addition, they lessen the symptoms of alcohol intoxication and thus one's awareness of it. This leads to a rise in the detrimental consequences of drunkenness, which include behaviour changes, e.g. altered behaviour during sexual contact (more unwanted intimacies), accepting a lift from a drink-driver more easily, more bodily injuries or affections or the more frequent need to consult a doctor.

Given the lack of a unified approach to energy drinks at a European level, the Superior Health Council confirms its reservations about these energy drinks. More particularly, it recommends that they should not be consumed:

- either regularly or excessively, with the daily dose of caffeine ingested remaining under 400 mg, or better still, 300 mg;
- in combination with alcoholic beverages or whilst engaging in an intense physical activity;
- by pregnant and breastfeeding women, children (up to the age of 16) and caffeine-sensitive people.

The Council re-affirms the need to make sure that the legal provisions are applied to caffeine-enhanced beverages in Belgium. The Council urges the authorities competent for public health to make available both this information and these warnings to the target audience of energy drinks. Finally, it requests the legislator to take the necessary measures concerning the labelling of these drinks, especially as far as the recommendations mentioned in this report are concerned.

3. FURTHER DETAILS AND ARGUMENTATION

3.1. Methodology

This advisory report is largely based on expert reports and advisory reports made by the authorities competent for public health, which are themselves based on scientific articles from the international literature and reports of experimental studies. It is also based on recent articles from the international scientific literature with the help of databases for bibliographic research.

3.2. Elaboration

The Superior Health Council has, first of all, looked into the composition of energy drinks and the evolution of the knowledge and views on their main ingredients over the last twenty years. As mentioned above, quite a number of considerations and advisory reports have been issued about "Red Bull", which was, historically, the first of these beverages and is still the most famous. Each 250 ml bottle of this product contains the following ingredients (the following list is restricted to the ingredients that can cause problems in terms of food safety): 80 mg caffeine (or 320 mg/litre), 1 000 mg taurine (4 000 mg/litre), 600 mg glucuronolactone (2 400 mg/litre), 5 µg vitamin B12, 5 µg vitamin B6, 5 mg vitamin B5, 1.5 mg vitamin B2 and 20.5 mg vitamin B3. The consumption recommended by the manufacturer is 2 cans a day. In Belgium, as in other countries, there are other energy drinks available which are often faithful copies of the original and which contain the same quantity of the three main ingredients, as well as other ingredients. In the United States, there are hundreds of similar drinks available, their caffeine content per unit varying from 50 to over 500 mg (Reissig et al., 2009).

The issue of the rather high supplementary intake of group B vitamins - which raises questions at a nutritional level (AFSSA, 2006 and previous advisory reports of the Belgian Superior Health Council: see below) - is not discussed in this advisory report because, in spite of their unnecessarily high addition, they do not appear to cause any concern with respect to food safety. The Council has restricted itself to the 3 main ingredients of these drinks, viz. caffeine, taurine and D-glucuronolactone, while taking into account the opinion of the counselling authorities in the area of public health at a European level and in several countries of the European Union.

On a European level, the Scientific Committee on Food (SCF) issued a first opinion on caffeine, taurine and D-glucuronolactone as ingredients of energy drinks in 1999 (SCF, 1999). After investigating the existing preparations, the experts first focussed on caffeine and concluded that a daily intake of 160 mg caffeine/day – in the form of cans containing up to 320 mg/litre - amounts to a considerable contribution to the total daily caffeine intake. This intake is, however, comparable to that of most other drinks, such as tea or coffee, with a caffeine content varying from 100 to 400 mg/litre. If energy drinks are really consumed instead of other caffeinated drinks, including tea and coffee, the consumption of these beverages does not appear to cause any problems in adults (with the exception of pregnant women). In children, who usually do not drink tea or coffee, substituting energy drinks for both cola drinks (brown drinks on the basis of plant extracts) and other soft drinks can significantly increase their daily caffeine consumption. Experts point out that such an intake can cause temporary behaviour changes, such as agitation, irritability, nervousness or anxiety, in short, effects that typically accompany caffeine consumption (Nawrot et al., 2003). The risk evaluation in case of pregnancy proved to be more difficult: it is true that most of the epidemiological studies available at the time led to the conclusion that a total caffeine intake of less than 300 mg/day does not constitute a problem. Yet the question of the potential consequences of a higher intake for the offspring remained unanswered, thus suggesting that it is advisable to restrict the caffeine intake during pregnancy, regardless of its source.

Roughly equivalent results are obtained in Nawrot et al., 2003, who carried out an exhaustive survey in 2003 that was exclusively devoted to the effects of caffeine on human health. The latter also shows that, in a healthy adult population, a moderate caffeine intake of up to 400 mg/day (which amounts to 6 mg/kg/day in a person weighing 65 kg) is not linked to such undesirable consequences as cardiovascular effects, effects on the bones and the calcium balance, behaviour changes, increased incidence of cancer and reduced male fertility. However, children and women of childbearing age constitute high-risk groups. Their caffeine intake in particular needs to be limited. This survey shows that women of childbearing age are allowed to consume less than 300 mg caffeine a day (4.6 mg/kg/day), whereas children should restrict their use to 2.5 mg/kg/day, which amounts to e.g. 75 mg/day for a child weighing 30 kg.

As regards taurine and D-glucuronolactone, in 1999, the SCF declared itself “incompetent” to decide whether the safety of these two ingredients, at doses found in these drinks, had been correctly determined. Therefore, the Committee found it necessary to continue the investigation of the maximum intake at which there appears to be no toxicity for these two products. Finally, the SCF pointed out that the possible interactions between caffeine, taurine and alcohol had not been correctly studied and that new research into the interactions between these ingredients was necessary in humans, especially in the event of physical effort accompanied by a considerable loss of water through sweating (SCF, 1999).

A few years later, the same SCF published an additional report that was triggered by the fact that the firm which produces “Red Bull” had made available further information and experimental data concerning the product. This report also took into account further developments (SCF, 2003). Here the SCF points out that it does not change its view on caffeine. As for taurine, the experts emphasise that high taurine doses can result in neurological side effects. This concerns doses that are 36 times higher than the usual taurine intake by humans as regards the chronic consumption of this type of beverage and doses that are 6 times higher than the normal intake as regards their acute intake. They therefore express their reservations about an acute intake of taurine of 3 000 mg/day via this type of drink (or 12 cans of 250 ml), in view of the fact that the highest taurine intake of natural origin via food amounts to 400 mg/day. As regards D-glucuronolactone, the SCF confirms its reservations about a daily chronic intake of 840 mg of the product (1.4 can) and an acute intake of 1 800 mg of the product (3 cans) via this type of drink, taking into account that the natural intake of D-glucuronolactone via food amounts to 1 to 2 mg/day (SCF, 2003).

In a report of 15 January 2009, the European Food Safety Authority (EFSA) gives its opinion about the innocuousness of taurine and D-glucuronolactone as individual ingredients of energy drinks. This is based on new data from the literature and recent studies by the same applicant (EFSA, 2009). However, it does not go on to assess the innocuousness of energy drinks as such. Owing to the absence of new data concerning chronic and acute exposure, the exposures used in this advisory report are based on an average daily chronic consumption of 0.5 can per person and a high chronic exposure of 1.4 cans for a regular consumer. The EFSA notes that it may turn out to be necessary to collect data on the real exposure that results from consuming energy drinks, especially for teenagers and young adults. In the opinion issued by the SCF in 2003, 3 cans/day were considered a reasonable high (acute) consumption, corresponding to the average consumption mentioned in an Irish study as regards the highest number of cans consumed in a single drinking session (SCF, 2003) The SCF has also pointed out that in two inquiries mention is made of a consumption of 8 to 12 cans a day by some extreme consumers. Both the SCF's 2003 opinion and the advisory report recently published by the German Federal Institute for Risk Assessment (BfR, 2008) mention a number of observation cases and reported cases with acute adverse effects, including death, in people who consume energy drinks. In these cases, these beverages were either consumed in very high quantities (1 420 ml) or whilst engaging in physical activity, or, what is more frequent, they were used in combination with alcohol. The EFSA takes the view that the reported effects may be due to the known negative side-effects of consuming high quantities of caffeine.

As for taurine, the EFSA group (2009) confirms that the toxicological studies do not reveal any signs of genotoxic, teratogenic or carcinogenic potential. It takes the view that the new results that are available are sufficient to respond to the previously expressed concern and concludes that the exposure to taurine at the above-mentioned levels does not lead to a safety issue. As for D-glucuronolactone, the group believes that this concerns a normal human metabolite deriving from glucose, which does not involve a structural risk with regard to mutagenicity or carcinogenicity. It also holds that both this component as well as its hydrolysis product, glucuronic acid, are endogenous metabolites in humans and other mammals, that they are naturally present in various food sources and that they are quickly metabolised into innocuous products and excreted. It concludes that the exposure to D-glucuronolactone at the levels mentioned above does not imply a safety risk. Finally, the EFSA observes that there is unlikely to be any interaction between glucuronolactone and caffeine, taurine, alcohol or the effects of physical effort. Yet, it points out that a number of potential interactions between taurine and caffeine have not been examined (EFSA, 2009).

In the above-mentioned recent advisory report of the German Federal Institute for Risk Assessment (BfR, 2008) concerning energy drinks and caffeine in particular, there was an explicit re-evaluation of the potential consequences of consuming beverages containing up to 320 mg/litre of caffeine, 4 000 mg/litre of taurine and 2 400 mg/litre of D-glucuronolactone. It continues to express its reservations on this subject and makes the following recommendations:

- undesirable effects should not be excluded when large quantities of these beverages (higher than the limits mentioned above) are consumed whilst exerting intense physical effort or in combination with alcoholic beverages;
- such beverages, especially when consumed in large quantities, are not recommended for children, pregnant or breastfeeding women, or caffeine-sensitive people (patients with arrhythmia or mental disorders).

Moreover, the BfR (2008) argues that these beverages need to be dealt with in a standardised way on a European level.

In the same train of thought, a very recent report of the Committee on Toxicity of Chemicals in Food, an independent scientific advisory body in the United Kingdom, shows the state of affairs concerning the potential toxicity of caffeine in pregnant women and affirms, with great circumspection, that caffeine is already likely to affect the development of the foetus from a daily consumption of 200 mg (COT, 2008). For such values, the effect can only be observed in 2% of

children. This apparently takes the form of a low birth weight and spontaneous abortions. In its previous report (2001), the COT preferred to use the value of 300 mg/day, which is identical with that of the SCF (1999).

One of the neighbouring countries whose agency is most firmly opposed to energy drinks is France. Since 2001, the French Agency for Food Sanitary Safety (Agence française de sécurité sanitaire des aliments, AFSSA) has been requested several times to assess the innocuousness and nutritional importance of the aforementioned drinks. It has given several negative advisory reports on this. Taking into account the concentration levels of such substances as taurine and D-glucuronolactone in a can of this type of drink (respectively 5 and 500 times the daily doses consumed via food), the Agency has repeatedly (March 2001, May 2003, January 2006 and November 2006) taken the view that it cannot be guaranteed that their consumption is safe. Moreover, the French experts are not convinced of their nutritional value. Nevertheless, in view of the fact that this type of drink is already allowed in several European countries and taking into account the European regulations concerning this type of product, in the end, the competent French authorities have been obliged to give their approval (Decree of the European Court of Justice, Press release No. 12/04, 2004) for this beverage, which was marketed on 15 July 2008. The Ministry of Public Health has, however, requested that a post-consumption follow-up be carried out and that the general public be given detailed information about the product's adverse effects. These precaution and supervision measures deal with adverse effects and warn against the risk of consuming these beverages in combination with alcohol. They also aim at warning some potential consumers, especially pregnant women and children. The Agency also recommends that an instrument be developed for the follow-up of heavy consumers. This should be done on the basis of consumer inquiries and in collaboration with the Institute for Sanitary Control (Institut de Veille Sanitaire – IVS), taking into account the fact that this very specific situation will occur again as a result of the European legislation concerning the free movement of goods (AFSSA, 2008).

In its last unfavourable report about energy drinks, which was mentioned above (AFSSA, 2008), the French Agency summarises most of its objections to this type of beverage and mentions the following elements in particular:

- despite the prohibition of sale in France, the French anti-poison and toxicovigilance centres (Centres antipoison et de toxicovigilance – CAPTV) collected data on documented notifications. For 9 individuals, there was shown to be a connection with their consuming this beverage. These individuals presented the following symptoms: agitation, tachycardia and digestive disorders. These observations have to be tied up with the experimental data mentioned above. Yet one has to be aware of the fact that the long-term risks could not be assessed.
- some contexts in which these beverages are consumed (sports activities, in combination with alcohol) have been associated with a cardiovascular risk whilst exerting physical effort as well as a risk of lessened perception of the effects of alcohol. However, objectively, the latter remain intact.

A final element that needs to be added to this file is the very recent report of the French toxicovigilance co-ordination committee (Comité de Coordination de Toxicovigilance Français – CCTF) (CCTF, 2009). It describes the results of the prospective follow-up of the adverse effects of consuming energy drinks, especially during the five months that passed after the most famous of these drinks was allowed to be marketed in France (15 July 2008). Despite the instrument introduced, the active surveillance has only yielded a small number of cases of acute intoxication. The apparent symptoms may be due to the presence of caffeine or the simultaneous consumption of alcohol. On the whole, there was no evidence that consuming these drinks led to acute adverse effects apart from those that may be due to caffeine. The active surveillance has made it possible to establish connections between the consumption of these beverages and several serious but frequent pathologies. However, the commission points out that the links mentioned in the French toxicovigilance system are likely to be merely coincidental, but

emphasises that the instrument is not specifically designed to detect effects that may result from chronically consuming these beverages.

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The situation in Belgium does not differ from that in other European countries as far as the authorisation to market various energy drinks is concerned. It is, however, interesting to recall several of the advisory reports issued by the Superior Health Council and some of its experts:

- In 1995, the Council was consulted by the Food Inspection of the Ministry of Public Health in connection with a request from the firm that marketed “Red Bull” regarding the modification of the authorised content of an additive that was already on the list of authorised additives, viz. caffeine. Up till then, the Belgian legislation tolerated the addition of caffeine up to the amount of 150 mg/litre for lemonades containing brown fruit or plant extracts (e.g. Coca Cola). As regards the issue of authorising the use of a caffeine content of 320 mg/litre, the Council delivered an unfavourable advisory report based on two scientific expert assessments. Here it was argued that neither the nutritional significance of high caffeine doses nor the beneficial energy-boosting effects of taurine had been demonstrated. The Council does, however, admit that, in all probability, it will be impossible to prohibit the marketing of the beverage it disapproves of, given the fact that it is already authorised in several European countries.
- In 1996, two Belgian experts questioned the inspection of some caffeinated products in a scientific publication (Lafontaine and Noifalise, 1996).
- In 1997, the Council was consulted by the Permanent Secretariat for Prevention Policy of the Ministry of Internal Affairs regarding the wider issue of “Smart Drinks/Drugs”, which include caffeine-enhanced energy drinks. In addition to communicating the previous reports mentioned above, the Council expresses its concern about these preparations and calls for a joint action by the competent European authorities.
- In 2002, the Council was consulted by the Food Inspection of the Ministry of Public Health concerning the high vitamin B12 content of this type of beverage, which is not in conformity with current Belgian legislation. In doing so, the Council notes that there is no scientific evidence to suggest that the presence of a vitamin B12 dose equivalent to 500 % of the recommended daily amount could impair the health of the Belgian population. However, it asks that the label on the bottles intended for the Belgian market should include pregnant women as well as diabetics, caffeine-sensitive people and children in the list of individuals who are advised not to consume these beverages, as is already the case in Switzerland.

For the moment, the Belgian legislation explicitly stipulates in a Royal Decree concerning the additives that are authorised in foodstuffs (RD of 1 March 1998) that the caffeine content in aromatised non-alcoholic beverages may not exceed 320 mg/litre. On the other hand, the federal Minister of Public Health points out that, until harmonised provisions have been introduced at the European level, caffeine falls under the food additives legislation in Belgium and that this harmonisation will be carried out in a different context than the food additives legislation. A European regulation that has entered into force on 1 July 2004 stipulates that, in order to inform the consumer of possible health risks, the labelling of beverages that contain caffeine in a proportion in excess of 150 mg/l should contain the mention “high caffeine content” followed by the caffeine content expressed in mg/100 ml in the same field of vision as the name under which the product is sold (Directive 2002/67/EC).

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The Superior Health Council follows these developments and is especially pleased with the provisions in the Royal Decree mentioned above, which offers protection against firms in search of new stimulants for consumption raising the caffeine content in energy drinks. Also, the Royal Decree reflects the present advisory report from the European authorities competent for that matter. The present views concerning the relative innocuousness of taurine and D-glucuronolactone in this type of drinks, when consumed within the limits mentioned above (average chronic consumption of 0.5 cans/day), should, however, not make us disregard the issue of caffeine, which, as mentioned above, remains a reason for concern as a result of the

concentrations found in energy drinks. A recent American study (Clauson et al., 2008) confirms that caffeine is indeed largely responsible for the adverse effects of the excessive consumption of energy drinks that were mentioned above (such as insomnia, nervousness, anxiety, headache, trembling and tachycardia), whereas, in the end, the other ingredients are believed to have no adverse short-term effects. This fact is confirmed by other authors (Reissig et al., 2009), who stress that consuming these drinks may lead to caffeine intoxication as well as caffeine dependence and withdrawal symptoms, which are to be discussed below.

Therefore, the Council is concerned about the possibly harmful character of energy drinks when consumed in excessive quantities. Although the firms recommend to limit the consumption of these beverages to one or two packages a day (generally 80 to 160 mg of caffeine), these drinks, when compared with more traditional drinks, entail a regrettable increased risk of caffeine-abuse. This is due to both their presentation (glossy, easy-to-use cans and alluring names that promise enhanced performances) and the manner in which they are promoted (to a young, dynamic, sports-loving etc. audience). The target audience is often inexperienced and/or little used to caffeine. Also, its alleged effects (stimulating effects, with enhanced performance, reduced fatigue) are not really regulated by the health authorities. They are consumed in addition to other caffeinated beverages such as coffee (80 to 180 mg per serving), tea (30 to 40 mg) or various non-alcoholic beverages (25 to 60 mg) as well as such foodstuffs as cocoa or chocolate (Nawrot et al., 2003).

Reissig et al. (2009) mention the caffeine dependence and withdrawal symptoms that are induced by these drinks and point out that they may serve as a gateway to other forms of dependence. At the same time, they underline the exceptional vulnerability of children and teenagers to this addiction. Energy drinks are not directly involved in such drifts, yet these authors fear that sooner or later this will be the outcome of the aggressive advertising campaigns for this type of beverage. In this line of thought, an American sociologist (Miller, 2008) has established a connection between the consumption of energy drinks and risk behaviour in young people who consume a great deal of energy drinks (more than 6 times a month). They are believed to run a higher risk of getting addicted to nicotine, alcohol and cannabis.

Two studies from the USA and Italy also note that there is a very clear tendency for young people to consume these drinks in combination with alcohol, which reduces the symptoms of alcohol intoxication, as well as their awareness of this state. This in turn results in a rise in accidents and an increased likelihood of becoming addicted to alcohol (Oteri et al., 2007; Malinauskas et al., 2007). Nearer to us, a Belgian university thinks it useful to warn its students both against the abuse of beverages that suppress fatigue without eliminating the need for rest and against mixing them with alcohol (De Duve, 2009). Similarly, O'Brien et al. (2008) show that an inquiry on American campuses has revealed that combining energy drinks with alcohol increases the alcohol consumption, which results in such harmful consequences as: an increased ingestion of alcohol during events where there is drinking (5.8 as opposed to 4.5 drinks in one sitting), a significant rise in the episodes of great alcohol consumption (an average of 6.4 as opposed to 3.4 days over a one-month period) and a doubling of those during which alcohol is drunk on a weekly basis (1.4 days/week as opposed to 0.7). Moreover, students who consume these beverages experience more harmful consequences of drunkenness, which is, for instance, shown in altered behaviour during sexual contact (more unwanted intimacies), accepting a lift from a drink-driver more easily, more bodily injuries or affections or the more frequent need to consult a doctor (O'Brien et al., 2008). Such facts were recently reported in the French press, which states that energy drinks are used as “boosters” for alcoholic beverages during episodes of “*binge drinking*”, an alarming phenomenon that has recently appeared amongst teenagers. It consists in drinking a high number of alcoholic beverages in rapid succession (according to some definitions: 5 for boys and 4 for girls within a two-hour period), thus reaching high levels of alcohol in the blood very quickly.

The Superior Health Council takes note of the reassuring data concerning the innocuousness of two important ingredients of energy drinks, viz. taurine and D-glucuronolactone. Yet it remains

concerned about the increased risk of potentially harmful caffeine-abuse and all its consequences (such as insomnia, nervousness, anxiety, headache, trembling and tachycardia), as well as the fact that these beverages may induce an addiction to caffeine or, as has been discovered more recently, a dependence on other substances (nicotine, alcohol and/or cannabis).

Moreover, the Council is concerned about the tendency for energy drinks to be consumed in combination with alcoholic beverages, which leads to a higher consumption of the latter. In addition, they lessen the symptoms of alcohol intoxication and one's awareness of it. This in turn increases the harmful consequences of high levels of alcohol in the blood, which include altered behaviour during sexual contact (more unwanted intimacies), accepting a lift from a drink-driver more easily, more bodily injuries or affections or the more frequent need to consult a doctor.

Given the lack of a unified approach to energy drinks at a European level, the Superior Health Council once more confirms its reservations about these energy drinks. More particularly, it recommends that they should not be consumed:

- either regularly or excessively, with the daily dose of caffeine ingested remaining under 400 mg, or better still, 300 mg;
- in combination with alcoholic beverages or whilst engaging in an intense physical activity;
- by pregnant and breastfeeding women, children (up to the age of 16) and caffeine-sensitive people.

The Council re-affirms the need to make sure that the legal provisions are applied to caffeine-enhanced beverages in Belgium. The Council urges the authorities competent for public health to make available both this information and these warnings to the target audience of energy drinks. Finally, it requests the legislator to take the necessary measures concerning the labelling of these drinks, taking especially into account the recommendations mentioned in this report.

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5. COMPOSITION OF THE WORKING GROUP

All experts joined the working group *in a private capacity*. The names of the experts of the Superior Health Council are indicated with an asterisk*.

The following experts were involved in drawing up the advisory report:

DE BACKER Guy *	(nutrition and public health – University of Ghent)
DE HENAUW Stefaan *	(public health nutrition – University of Ghent)
DE MEULENAER Bruno *	(food chemistry, especially chemical quality and the safety of food – University of Ghent)
DESTAIN Jacqueline *	(industrial microbiology, technology – FUSAGx)
FONDU Michel *	(chemistry, additives, contaminants – Free university of Brussels)
HUYGHEBAERT André*	(chemistry, technology – University of Ghent)
MAGHUIN-ROGISTER Guy *	(foodstuff analysis – University of Liège)
NEVE Jean *	(therapeutic chemistry and nutrition sciences – Free University of Brussels)
NOIRFALIS(S)E Alfred *	(toxicology, bromatology – University of Liège)
PAQUOT Michel *	(chemistry, technology – FUSAGx)
RIGO Jacques *	(paediatric nutrition – University of Liège)
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The administration was represented by:

DE GRUYSE Pascale (FPS Public Health, DG 4)

The working group was chaired by Alfred NOIRFALIS(S)E, Katty CAUWERTS and Michèle ULENS were the scientific secretaries.