FOODINTER

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Food interactions : effects on health, consumer perception and impact on agro-food industries

WorkPackage 3 – Sociological tasks, comprehensive report

Information collection, quantitative surveys and "risk focus groups" with consumers of "food" (or "dietary") supplements

Results, analysis and policy support

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1. INTRODUCTION AND SUMMARY

Organizing interactions between scientists and stakeholders (and more largely citizens and society) is now considered as a condition of credibility and of efficiency as well for the "sustainable management" of risks in general. In the field of food consumption, this objective is important because food safety depends not only on production and control but also depends on consumption practices, underlining that *good* information must be promoted to consumers. It is far from being only an expert-based education plan ; the objective is also to promote a dialogue between science and society in order to better identify the social preoccupations and needs that research has to satisfy.

One important aspect of this topic is the definition of risks : we assume that risks linked to contaminants and interactions between food, functional food (FF), food supplements (FS) and para-pharmaceutics are poorly integrated by consumers. The question by which dialog could be fruitful could be the framing of the problem. We make the following assumptions :

- there are different framing of the questions by industry, consumers and scientists ; making these frames explicit will help to target research activities, but also to shape social communication about risks ;
- giving more information to consumers could be helpful in order to manage these risks but communication processes and actions must take in account the way ordinary citizens frame and perceive these risks, as well as the way they legitimate the advices and advisers (media, health professionals, any kind of resource people, internet, ...).

One originality of this project is to build a specific setting to develop this kind of dialogue. The specific objective is to start with a consultation of stakeholders. Agro-food industries are one among the important stakeholders : companies and representatives of food industry have to be interviewed to describe the ways they treat these risks. Citizens have also been consulted, but specific protocols have to be developed to translate their preoccupations, practices and representations into suitable risk communication and risk management practices.

FF and FS are a challenge to food health policies, not only because of their « ambiguous status », somewhere between food and medicine. Further than the strategic, professional or marketing plays around the status of FF and FS, and beyond bio-chemical or medical complexity of risk assessment studies, sociological literature concerning food trends show that technical rationality does not fully explain consumer's attitudes and choices, and that other food related rationalities (such as practical and economic rationalities, social and relational rationalities, and symbolic rationality) do play a role in eating habits. An exploratory analysis of lay views shows that scepticism co-exists with interest in and consumption of FS and FF, underlining that ambiguity characterizes consumer's representations and practices (which are both not well known), and that risks associated with FS consumption are largely underestimated.

Several sociological research actions were conducted in FOODINTER[1] :
(1) a study of FS consumers through three exploratory focus groups on FS in general, and on risk concerns
(2) study of FS consumers (consumption practices, representation, knowledge, ...) through quantitative surveys (two identical questionnaires, but on different places of enquiry ; one conducted in Liège and Brussels (in various types of FS outlets), one in Gent (only in pharmacies) ; *(Total of respondents : 443)*
(3) contacts with producers' representatives (through 4 semi-directive interviews)

(4) an overview and a review of the European and Belgian legislations ;
(5) an overview on the information (articles, advertising, websites, ...) and choice of products available on the internet and in commercials, as well as overview of the scientific literature dealing with health effects and interactions, and also social sciences literature dealing with "modern", "complex risks" (assessment, communication, management, evolution of science, links with policy and marketing, ...)
(6) the organisation of two "risk focus group" sessions with consumers of FS ; objectives were to grasp consumers' reactions to a summarised presentation of some of the FOODINTER research results ; analyse consumers' risk concerns ; and debate/reflect on risks communication and management, as well as try a collective and deliberative formulation of remarks or proposals about risk communication and management.
(7) redaction of a report, formulation of recommendations to the authorities and discussion within the scientific teams of the FOOODINTER project, with members of the public administration and with FS industry's representatives.

The first objective in WP1 was to characterize opinions and representations of consumers and non consumers about FS, as well as consumption practices and risk perceptions. As a second objective, we tried to explore more in detail these representations and practices by confronting a group of consumers to expert knowledge (science and legal specialists and a producer). As a third objective, we interviewed a few producers to question the way they define consumption and related risks, and to know how they managed these risks.

In WP3, the two focus groups sessions were "risk communication focus groups". Two sessions (with the same group) were addressed to FS consumers or "concerned simple citizens".

These focus group sessions had three main objectives : the first was to present the general discoveries of FOODINTER, and to analyse the participants' reactions on these results ; the second was to discuss consumers' perception of risks, as well as risk communication or management strategies surrounding FS ; and last (but not least) objective was to eventually let the participants make arise risk communication and/or risk management propositions.

1 The methodology of these actions is detailed further in the report, in each corresponding chapter ; The three first tasks were conducted in WorkPackage 1 (*WP1*) (though fully analysed and updated d in WP3) and the four lasts were conducted in WorkPackage 3 (*WP3*).

2. RESULTS AND ANALYSIS

2.1 Preliminary information collection

2.1.1. Definitions of FS according to current regulations, scientific literature and marketing practices

Food supplements (FS), functional foods (FF) and para-pharmacy products are commonly used terms in nowadays scientific literature, regulation as well as advertisements. Nevertheless, acceptances regarding these terms are far from being shared by all, from consumers to stakeholders. For consumers, the situation may therefore be really confusing. It is of utter importance to establish precise definition to avoid incomprehension and overlapping in product classifications.

The European Directive 2002/46/EC stated food supplements as "*foodstuffs the purpose of which is to supplement the normal diet and which are concentrated sources of nutrients or other substances with a nutritional or physiological effect, alone or in combination, marketed in dose form, namely forms such as capsules, pastilles, tablets, pills and other similar forms, sachets of powder, ampoules of liquids, drop dispensing bottles, and other similar forms of liquids and powders designed to be taken in measured small unit quantities*". One can notice that the definition contains criteria regarding active substances as well as their conditioning.

Examples of FS are ampoules of omega-3, tablets of vitamin A, tablets of multi-vitamin and multi-mineral capsules or capsules of plant extracts such as valerian, garlic,… Nowadays, there is a trend towards increasing marketing of plant based FS. Botanical material itself is not a FS. Example of botanical material are whole, fragmented or cut plants but also algae, fungi, or lichens are classified as botanicals. Botanical (or plant based) preparations can be obtained from these materials by various processes such as extraction, distillation, purification, concentration or fermentation (EFSA, 2004). Botanical preparations can be marketed either as medicinal products (see relevant EU and Member States legislations) or as FS. Since their introduction in the FS market, consumer exposure to some plant based preparations has become significant from a public health point of view. The present project will focus more precisely on the botanical preparations marketed as « FS ».

Functional food (FF) is a term created in the mid eighties in Japan after some researches on beneficial properties of foodstuffs. A functional food is similar in appearance to, or may be, a conventional food, is consumed as part of usual diet, and is demonstrated to have a physiological benefits and/or reduce the risk of chronic disease beyond basic nutritional functions. Basically, there are two types of functional food: "FF inherently", i.e. food containing naturally beneficial components (omega-3 fatty acids in fish, flavonoids in fruits, lycopene in tomato,….) and "FF enriched", i.e. food enriched with beneficial components (eggs enriched with omega-3, margarine with sterols, bread with polyphenols, juice with vitamins, milk with Ca, …). A « nutraceutical » is a product isolated or purified from foods that is generally sold in medicinal forms not usually associated with food. A nutraceutical is demonstrated to have a physiological benefit or provide protection against chronic disease. Example include capsules containing bioflavonoids or gamma-linoleic acid. The term parapharmacy is indeed a widely used term in the field of human health. It encompasses products such as

nutrients, FS, cosmetics, diet products, babyfood and several other products (surgical tapes, bandages,….).

We already quoted the official definition of "FS", according to European Directive 2002/46/EC and Belgian legislation. From a marketing perspective, in contrast, FS and FF or "novel food" are useful to "enrich" our lives because they will help to optimize modern bodies and personal performance under conditions of acceleration, competition and stress. Moreover, present food and nutrition is implicitly thought (and this is actually a concern that will implicitly be stressed by producers or retailers) to be of lower quality, maybe not providing us enough nutrients ; which should obviously be balanced through FS consumption ! Though we can not assess whether present nutrition, in its globalism, is deficient or not, we can underline the impact that the spread of such messages can have on consumers' minds, when used strategically by producers and not criticised by consumers nor the media, who often lack a critical distance as well as scientific expertise and competences.

As we have seen in the first phase of the project, Belgian consumers are aware of the financial interest of such a market. They feel suspicious about the big FS industries, which are considered as *"interested only to the high benefits, for example through unproven assumptions of efficacy or "magical" effects"*. They also feel that the lobbying around the FS is as strong as the one around drugs. They point here the pharmacists and the doctors. However, FS and plant-based therapies, or "alternative health products", are shown great interest, as we saw. This can seem paradoxical, but we can indeed find a lot of reasons to explain consumers' "ambiguities" ; the lack of control of their practices in this system (its "liberal" orientations) can be one of those, but it could also be the strong will to choose its preferred type of therapy, one that is more "natural", "soft", and not only refer to drug use.

2.1.2. Short review of the social sciences literature dealing with FS consumption, health or food risks management and/or risk communication

In the first industrial phase of modernity science, technology and progress were regarded as a salutary triad which assured continued advancement of Western societies and their welfare. Since World War II, new conditions made the progress being considered differently. Following Ulrich Beck's assessments (Beck, 1986; 1991) and his analysis of what he calls our "risk society", techno-scientific progress is suspected to increase risks to human health and natural environments rather than to substantially improve current living conditions. Keywords here are nuclear waste, climate change and health risks in the aftermaths of chemical products. Faith in science and technology and the doctrine of progress appears to slowly erode. Rapid, global scientific and commercial development of biotechnologies has made it nearly impossible for consumers to determine which products are useful and safe, and which are not. Experts can no longer act beyond any doubt, and their arguments have become suspiciously eyed, also when they are giving consumer advice. Instead of assuring certainty and confidence in decision making, scientific advice plays a major part of its own in producing uncertainty and ambiguity. Consumers who realize that scientific warnings

are somewhat innocent and come and go - whereas ambivalence and uncertainties stay - not only stop acting on this type of advice but even dispute or ignore scientific risk communication altogether (Beck & Kropp, 2010).

The risk assessment is therefore not objective by itself, because too often consumers are faced with a plurality of (contradictory) information. Risk assessment should else be seen as a step, a tool having to be used with caution.

For well risk governance, the risk assessment can't be separated from the risk communication and the risk management (or risk governance). Risk assessment is defined as the scientific estimation of a risk in terms of hazard identification, exposure probability and distribution. Risk communication means more than just educating the public about the results of scientific risk assessment. At least it is the claim to enable citizens to better handle uncertainties. Risk management, the third element of the triad of risk governance, is defined as the task to take measures to prevent risks from causing actual damage, control the implementation of measures and even to identify new risks that have not yet been assessed (Beck & Kropp, 2010).

Concerning risk communication, there is a dispute to know whether the "general public" is willing or not to accept the scientific risk assessments. For example, if a householder living near the site of a new chemical factory is told about "high-tech" safety precautions, or if a consumer is told about the low probability of gene transfer between species, it is quite likely that neither the householder nor the consumer will change their initial opposition to the factory or the genetically modified food (Brown, 2009). Those examples can be applied for the plant-based FS ; the problem is yet entire : people may have an *a priori* (may it be positive or negative) and be demanding for scientific advice and assessments, which may be needing "translation" (that is simplification or vulgarisation that does not loose the complexity of the risk issues). On the other hand, they are also probably already over-flood with health concerns (at a point they just can't "over-caring"), may display non-careful practices as they can choose just not to care about risks, can deeply think they face nothing *really* severe, or else "*would it be proven true, well... I suppose that everyone shall die in the end, … I mean … you have to die from something, whatever that is" (discussion with a consumer)*... What should therefore be the most suited answer to address these risk issues ? Probably no unique, ultimate solution, but an association of multiple, tailored solutions addressing particularly each situation. But we will discuss it later on...

According to Brown (Brown, 2009), the "Deficit Model" considered that the general public does not understand science or apply scientific recommendations, and that public needs to be educated in order to fill this gap between science and concerned people's practices. But simply giving more information to people does not necessarily change their views. People want to feel that they have had their say (and have been heard) in any decision-making process, and people make decisions whether a produce is healthy or not based on a host of factors that don't bound to scientific 'facts'. These factors include ethical, religious beliefs, in addition to culture, history and personal experience. Accordingly, presenting scientific data is not sufficient.

A "New Deficit Model" was then based on the idea that we simply need "scientific facts" or "assessments" to remove all current uncertainties and allow comprehensive risk assessment. It is supposed to decrease confusion in the public beliefs by providing

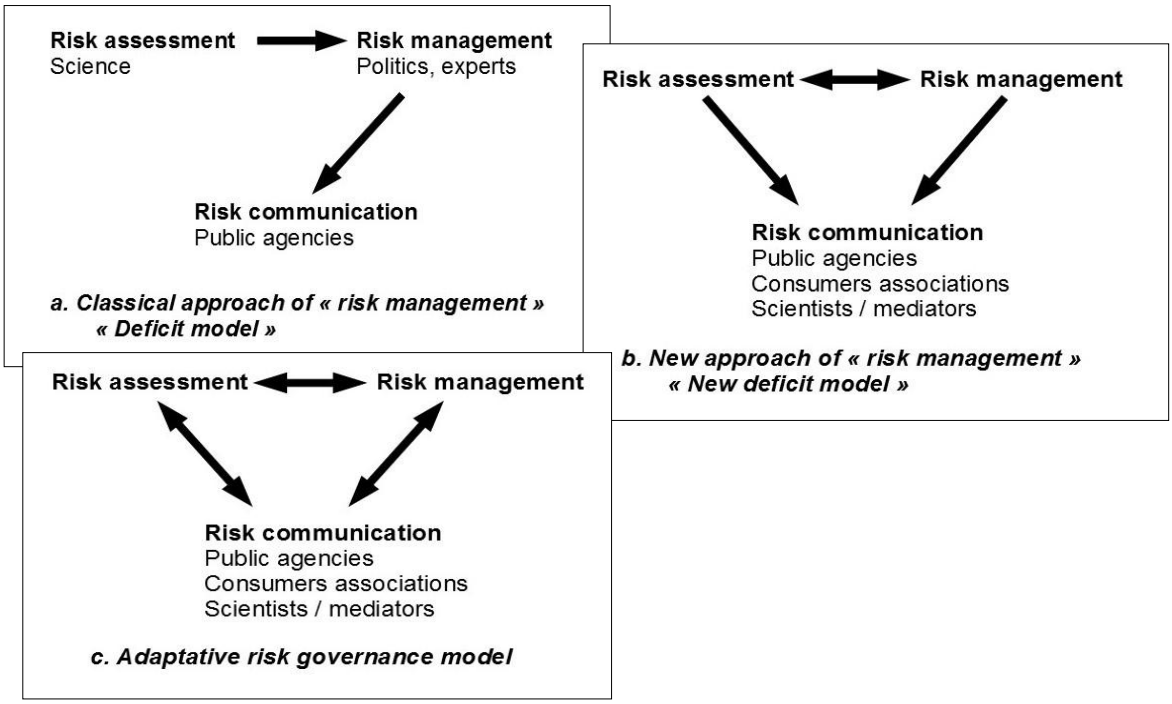
them with 'scientific facts'. But as we have seen in our studies, it is clearly impractical to gain detailed knowledges about all existing products in a short time-span and in a context where products are very numerous and innovation rate is quite quick. While waiting for the results of the tests (rarely conclusive), new products and drugs continue to appear with little regulation or testing (often superficial testing). The "New Deficit Model" (that points the "deficit" more on the side of science than consumers) leads inextricably to a kind of paralysis by analysis. Moreover, "*although an enormous amount of research is needed, I believe that the argument for more research (…) provides an illusion that the deficit can be fixed (…) [and] fails to deal with the real issue, which is how to regulate in face of uncertainty*" (Brown, 2009).

Brown pointed this issue in debates about nanotechnology. His overview of the issues has similar aspects than the ones treated for the drugs interactions with food supplements:

- Each piece of scientific data is only a part of a complex puzzle,with an always increasing number of parts ;
- Scientific data are often contested, and initial reports (whether positive or negative) may be contradicted by subsequent data, what usually generates confusion to the public ;
- While waiting for the results of the tests (rarely conclusive), new products and drugs continue to appear with little regulation or testing, adding more unknown ;
- There are always going to be unknowns and uncertainties, but the lack of a clear path forward cannot be an excuse for standing still., that is for findings ways to "act in uncertainty".

From the "New Deficit Model" on, Brown tries to describe an ideal, adaptive governance regime more transparent for consumers (through complete and precise labelling, accessible and readable central database via the web, …) and allowing two-sided transmission, cooperation and reflexivity between the three pillars or risk governance. This governance regime would have the four following characteristics : (1) informed for "governors" ; (2) transparent for consumers ; (3) prospective (as opposed to reactive), providing mechanisms to anticipate future, yet unknown harm ; and (4) adaptive and reflexive (as it can never be finished nor perfect, but has to be continuously built "on the move", from its experiences).

We tried to picture those three models of "risk governance" and the way their three pillars are linked to each other (the way of circulation of information and knowledge) :



Science has been drawn into political debates that expose both ignorance about potential risks and disagreements or controversies among experts. "*Thus, policy makers cannot hope to base their decisions on secure knowledge, even if this is precisely what they expect. Policy making becomes in a certain sense "experimental", which means neither hampered nor rendered irrational by the lack of reliable knowledge but open to learning from experience, of which research is an important part*" (Bechmann and Grunwald, 2002, cited in Weingart, 2003 : 55). In this evolution, the public seems to have assumed a critical role in shaping technologies and arising risks, while in the same movement "*the spectrum of relevant knowledge needed to assess the impact of new technologies has been broadened to social sciences*" (Weingart, 2003 : 55).

Other concerns in literature put in question the evolution of the roles and responsibilities of science. This evolution may be due to the very nature of risks (that are more and more complex), but also to the application of new management principles (such as the precautionary principle), and the way those risks are seen and feared through society, as well as to the ways they have to be discussed and managed. Some, like Gago, advocate that "*rather than regarding risk governance as a burden, science should embrace it as an opportunity to build public trust*" (Gago, 2003 : 4). "*The networking of scientists and the general public will probably become one crucial component in performing and organising science in the years to come, and should therefore be addressed as an explicit science policy objective. (…) To ignore these opportunities or to avoid addressing the need for independent knowledge and scientific advice on public controversies and democratic decision-making processes would mean suicide for science in modern societies*" (Gago, 2003 ; 5).

Other authors, like Renn and Klinke (Renn and Klinke, 2003), and risk experts from the OECD agree on the idea that new concepts of risks are needed for policy design and implementation, to manage or govern (which implies *all* actors) the « new » risks coming along with with "new" health products or associated technologies of processing. Those can be seen as « new » risks because they have new characteristic (mainly their diversity/heterogeneity, their complexity and dimensions of uncertainty, as well as their high potential of hazard and their spread[2]) and embed in the ongoing evolution of the relations we as societies have with them (or with « risk » or « hazard » in general (not always distinguished), through practices and behaviour, representations, norms, but also through protest or deny, ...). Those new concepts for evaluating and managing risks have on one hand to integrate social, technical, and scientific diversity (be multidisciplinary), and on the other hand to allow risk managers and policy makers to institutionalize routines and standardize their practices (Renn and Klinke, 2003 : 41). Moreover, they have to move beyond their two classical dimensions, that is their extent of damage and probability of occurrence, that are insufficient to understand and to manage "systemic risks", and to understand the attitudes of the actors towards them.

In order to deal with this, the German Scientific Advisory Council for Global Environmental Change has developed an novel approach to risk evaluation, classification and management, that we will reproduce here as we think it is very relevant to risk management of FS and "other health products". The Council identified several new risk criteria (while recognizing that expanding the scope of criteria for evaluating risks is a risk in itself) : (1) the extent of damage ; (2) the probability of occurrence ; (3) incertitude ; (4) ubiquity (geographical dispersion of potential damage) ; (5) persistency ; (6) reversibility ; (7) delay effects ; (8) violation of equity ; and (9) potential of mobilization, generation of social conflicts. (Renn and Klinke, 2003 : 42)

Renn and Klinke also introduced the "traffic light model" , which evaluates risks according to the criteria mentioned above and assigns them to one of the three categories : the normal area, the intermediate area, and the intolerable area.

"The normal area is characterized by little statistical uncertainty, low catastrophic potential, and a small overall product of probability and potential damage. It also scores low on persistency and ubiquity of consequences and high on reversibility of risk consequences. Such 'normal' risks are characterized by low complexity and are well understood by science and regulators. In this case, the classic formula 'risk equals probability multiplied by damage' is more or less identical to the 'objective' threat. The intermediate and intolerable areas cause more problems because these risks go beyond the ordinary dimensions of risk management. The reliability of risk assessment is low, the statistical uncertainty is high, the catastrophic potential can reach alarming dimensions and there is little or no systematic knowledge about the distribution of consequences. These risks may also cause global and/or irreversible damage, which may accumulate over a long time, while mobilizing or frightening the population. It is hardly possible to come to an unequivocal conclusion about the validity of scientific evaluations of risks in these areas." (Renn and Klinke, 2003 : 43)[3]

The council then identified six types of risks according to these factors, which can be linked to specific risk management and risk communication strategies ; they are summarised in the table below, designed by (Renn and Klinke, 2003).

2 Regarding particularly globalization (Pang and Guindon, 2003).

3 Authors also notice that "given the Council's criteria and numerous sub-criteria, theoretically there is a huge number of possible risk classes that would not necessarily fit into the rather simple traffic-light model".

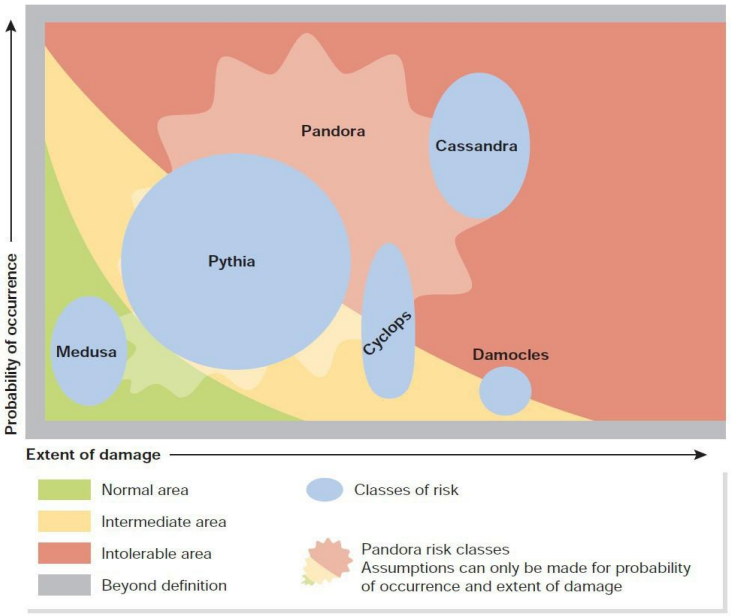


Fig 1 | Risk classes

(Source : WBGU, 2000 ; copied from Renn and Klinke, 2003 ; 42)

Table 1 | Overview of the management strategies

Management	Risk class	Extent of damage	Probability of occurrence	Strategies for action
Science-based	Damocles Cyclops	High High	Low Uncertain	•Reducing disaster potential •Ascertaining probability •Increasing resilience •Preventing surprises •Emergency management
Precautionary	Pythia Pandora	Uncertain Uncertain	Uncertain Uncertain	•Implementing precautionary principle •Developing substitutes •Improving knowledge •Reduction and containment •Emergency management
Discursive	Cassandra Medusa	High Low	High Low	•Consciousness building •Confidence building •Public participation •Risk communication •Contingency management

(Source : Renn and Klinke, 2003 : 46)

We could then relieve the field of study of consumers practices and representations, specifically on FS and "other health products" consumption. In this field, there are numerous examples of the use of focus group methodology around nutrition, medical or health themes (Bender and Ewbank, 1994 ; Abelson & al., 2003 ; Wong, 2008).

Other studies, such as the "Eurobarometer", revealed recent results concerning the consumer's perceptions of food-related risks. These mentioned that Belgians express a high level of confidence to their physician/doctor and health professionals (93%), the family and friends (79%) and equally to the scientists (78%) and to the consumer's organizations (77%) (TNS Opinion & Social, 2010). Opinion is more divided

on whether scientific advice and public authorities are independent from other interest. The following sources of confidence are, in order of relative importance : national and European food agencies (76%) ; environmental protection groups (75%) ; European institutions (66%) ; farmers (59%) ; national government (58%) ; media (52%) ; supermarkets and shops (46%) ; internet (44%) ; food manufacturers (39%).

Other examples of studies have directly targeted FS consumption, such as (Gaignier and Hebel, 2005) or (Touvier and al., 2003), aiming at better understanding "who are the FS consumers", so trying to understand their "profiles" and purposes of consumption.

2.1.3. Legislation review

European regulation : The regulation of FS and FF at the Member States' national levels is to be harmonized by European Directive 2002/46/EC. Therefore this Directive helps gathering better conditions for free circulation of FS, equal competition conditions in Europe, and protection of consumers. Each country has its own regulation or notification scheme regarding FS, which can show differences (though they tend to decrease with 2002/46/EC). Let's notice than this Directive doesn't apply to medicine or drugs defined in Directive 2001/83/EC, enforcing a communitarian code for medicine and drugs for human use.

As regards traditional herbal medicinal products, Directive 2004/24/EC of the European Parliament and of the Council of 31 March 2004 amends Directive 2001/83/EC on the Community code relating to medicinal products for human use.

We can underline the active opposition undertaken by some « traditional herbal medicinal products » (and assimilated « traditional plant-based treatments ») consumers or related producers and professionals. In short, they fear than European Directive 2004/24/EC (modifying 2001/83/EC) will completely kill « traditional herbal medication », and associated professionals such as herbalists, by making the management of those products more similar to the mode of medicine-management.

European regulation (EC) 178/2002 of the European Parliament and of the Council of 28th January 2002, establishes the general principles and prescriptions of food legislation, instituting the European food security Authority and determining procedures for foodstuff safety. This regulations is the basis of food safety regulation at European and national levels, as is directly applicable.

General labelling provisions and definitions are contained in Directive 2000/13/EC of the European Parliament and of the Council of 20 March 2000 on the approximation of the laws of the Member States relating to the labelling, presentation and advertising of foodstuffs.

European Directive (Directive 1924/2006 of the European Parliament and of the Council of 20 December 2006) concerns nutrition and health claims made on foods, that applies to FS as they are assimilated with "food" by European regulation.

We could also underline that this regulation has made emerge critics and blur on its application, especially from the industry of food supplements. Let's for instance

underline the publication « Food industry's contribution to the list of claims according to Article 13 of the regulation 1924/2006 », aiming at compiling a list of health relationships for nutrients or substances to be evaluated by EFSA in accordance with Article 13 of this Regulation, with corresponding legal or scientific references[4].

According to the CIAA, and despite the consequent work undertaken by the European Food Safety Agency (EFSA) on regulation 1924/2006 guidance[5], *« there is still much uncertainty as to what is required by way of the scientific substantiation of such claims. The consequence of this is that there is still insufficient clarity for industry applicants and a need, therefore, to re-examine the process for dealing with claims in this and other areas of new and emerging science »* (CIAA, 2010).

The European Commission announced in a communication (27/09/2010) the delaying of health claims regarding « botanicals » from the procedure of the progressive review by EFSA of the huge quantity of health claims known as « Article 13 ». The reasons are insufficient time to evaluate all claims, but also divergences in opinions and conflicts about the way plants are « treated » in the regulation, and in « Traditional Herbal Medicine Products » (THMP) that have to be resolved first.

Regulation 1881/2006 of the European Commission of 19 December 2006, sets maximum concentrations or amounts of some contaminants in foodstuff.

Finally, let's quote Regulation (EC) 1925/2006 of the European Parliament and of the Council of 20 December 2006 concerning the addition of vitamins, minerals and some other substances to foodstuff.

Obviously, all horizontal and vertical legislation applying to food or to specific compounds also applies to food supplements when justified.

We can remark in this review cases of the European Court of Justice that show that the legislation surrounding "new health products", often qualified as "border" products, can be subject to divergent interpretations (see for instance cases C-140/07 and C-88/07).

Belgian regulation : In Belgium, regulation of FS is grounded on three Royal Decrees, and two Ministerial Orders, that have all been updated consequently to the enforcement of European Directives and recommendations listed above.

In the three Royal Decrees, FS are defined as "*pre-dosed foodstuffs containing one or several nutrients, plants or plant preparations, or any other substance having a physiological or nutritive effect and which goal is to supplement normal diet.*", whereas nutrients are "*nutritive substances needed by the human organism*". Since the human

4 This contribution is a joint initiative of the Confederation of the Food and Drink Industries of the EU (CIAA), European Responsible Nutrition Alliance (ERNA), European Federation of Health Products Manufacturers (EHPM) and European Botanical Forum (EBF). It should be considered as the first part of the total industry contribution on Article 13, covering the sections: vitamins, minerals, carbohydrates, protein, fats, fiber and probiotics, and contains 252 health relationships.

5 The EFSA has published a wide range of documents around health claims and corresponding regulation, such as a "Modus Operandi for Art. 13 health claims of regulation EC/1924/2006", four big consolidated lists grouping scientific references and opinions on health claims (more than 4500 references !), etc.

organism is unable to produce these nutrients, adequate uptakes have to rely on foodstuff consumption. They are namely vitamins, minerals, amino acids, and fatty acids. Different dose forms in which dietary supplements can be available are also cited.

These Royal Decrees mention the notification process through which a FS has to go in order to be marketed in Belgium. There are indeed three relatively similar notification processes for the three categories of products created through law (Nutrients (NUT), Plants (PL) and Other Substances(AS)) covered by each of the three Royal Decrees described here (the notification process will be detailed below).

In these three Decrees, it is mentioned that "*in the labelling, displaying and advertising for food supplements, it is banned : 1° to give the product preventive, curative or therapeutic properties or evoke similar properties ; and 2° to state or suggest that a balanced and diversified diet is not a sufficient source of Nutrients in general".*

All notified products are stated in a list updated regularly, published on SPF SPSCAE's website[6].

The first Royal Decree tackles the issue of Nutrients and their use into food supplements (AR 3/03/92).

The first Ministerial Order (AM 21/05/2003) determines which are the chemical forms of vitamins and minerals that can be used in FS.

The second Royal Decree concerns plants and plant preparations (AR 29/08/1997). In the appendix to this decree, there are three lists:

(1) a list of dangerous plants whose use for direct consumption or as ingredient of preparation is strictly prohibited unless a request for an exception has been positively evaluated. This list is applicable to all foods, including food supplements;
(2) a list of eatable mushrooms.
(3) a list of plants that may be used in food supplements which have to be notified. For some of those plants, maximum amounts are laid down per daily portion, for which a list of recommended analysis methods has been drawn up

The third Royal Decree (AR 12/02/2009) regards manufacturing and marketing of food supplements containing substances other than Nutrients and plants or plant preparations. Ministerial Order (AM 19/02/2009) relates to AR 12/02/2009 and also regards manufacturing and marketing of food supplements containing substances other than Nutrients and plants or plant preparations.

The label of FS shall bear all mandatory indications, as for ordinary foods[7]. Besides this, the labelling of food supplements shall bear a series of additional indications:

- the name "food supplement";
- the recommended daily intake (RDI/DRI);

6 http://www.health.belgium.be/filestore/839786_FR/website.pdf

7 See AR 8/01/1992 concerning nutritional labelling of foodstuff, and AR 13/09/1999 concerning pre-dosed foodstuff labelling.

- a warning not to exceed the recommended daily intake;
- a statement that the products should be stored out of the reach of young children;
- a statement that food supplements should not be used as a substitute for a varied diet;
- the amounts of nutrients present in the product per recommended daily portion (this may also be given in graphical form);
- the name of the plant(s) in the language of the region (when available), as well as the scientific name (for food supplements containing plants).

Maximal and minimal limits in terms of % of the Dietary Reference Intake (DRI) are fixed for different nutrients used in FS. Guidelines are detailing the labelling and the advertising of these FS. The DRI for vitamins and minerals, foodstuff consumption data and forbidden product are cited in three annexes accompanying the Decree.

Every notification file (falling in one of the three categories drawn) is examined by a specific federal service. In case of any breach of the foodstuffs legislation, the product will not receive a notification number (NUT), will not be allowed on the market, and thus can't be named "food supplement" but is a "non-notified product". Examples of a breach of the legislation are: excessive maximum amounts, too high doses or use of prohibited additives, or restricted health claims (for which European Directive 1924/2006 as well as Belgian regulation on advertising apply).

The notification file for FS shall contain, among others, the following items :

1. the nature of the product;
2. the complete list of the ingredients of the product (qualitative and quantitative);
3. if applicable, the nutritional composition (or analysis) of the product ;
4. the labelling of the product;
5. data required to appreciate the nutritional value of the product;
6. the commitment of producers to realize frequent analysis of the product, at various moments, and to let the results at the availability of the Service;
7. the evidence of payment of a fee to the public authorities for every notified product.

We can also underline the role in the Belgian legislation process of the Superior Council of Health (CSS), that expresses recommendation on specific matters (such as lately, recommendations on maximum concentration of lycopene and luteine in FS), and on general Belgian health and food security. For this second kind of recommendations, we can enlighten the reports « Nutritional recommendations for Belgium, where a (restricted) role for FS and FF is detailed : *« the administration of FS is proposed to compensate for deficiencies, or in particular physio-pathological situations »* (CSS, 2009 : 13)... what indeed corresponds to only a small part of FS consumers as we will see.

For another version of legislation review, we suggest the reader the guiding document published by the European Botanical Forum. This can be downloaded from EBF web site :

http://www.botanicalforum.eu/uploads/ebf_factsheets.pdf

2.2 Quantitative surveys on FS consumption practices and representations

2.2.1. Methodology

Two identical quantitative surveys of 20 questions (see Annex 1), both open and closed questions asked in face-to-dace meetings, were conducted by the teams of ULg (Socio Economy Environment and Development, Marc Mormont and co-workers) and CERVA-CODA (Luc Pussemier and co-workers). One held in Liège and Brussels (167 respondents) and one in Gent (276 respondents) *(Total=443)*. The Gent survey was performed by students of the Faculty of pharmacy of the University of Gent, under the supervision of Sarah Desaeger and Carlos Van Peteghem.

The objectives of these questionnaires were to get a better understanding of : (1) knowledges and perceptions of food supplements and functional foods, (2) the frequency of their consumption, (3) the budget allocated to their consumption, and (4) the perception of possible risks. [8]

This survey wasn't a "consumption survey" as such, as one can remark from the small size of our samples and the bias induced from the places of enquiry ; these surveys were intended to collect preliminary information on those practices of consumption, and to identify plant-based FS that were the more consumed to analyse in the WP2 of the FOODINTER project.

The first survey by questionnaire was intended for customers of supermarkets, food stores, pharmacies and specialized (organic) food stores from Brussels and Liège (Belgium). For the second wave, the same questionnaire was carried out by undergraduate pharmacists (apotheker-stagiair) into pharmacies of Gent, in the Flemish Region. For feasibility reasons, mail-order food supplements market (including Internet) and those consumers haven't been addressed.

We have to underline that the places were the surveys took place were different between Liège and Gent. While the first survey organised in Liège covered a various range of retail outlets, the second survey in Gent held only in pharmacies. This could therefore induce some kind of bias in the results, that we obviously took into account when analysing them.

Another important point to underline is the fact that as the survey took place on food supplements retail outlets and was addressed more specifically to FS consumers ; it consequently surely induced a strong effect on the mean knowledges of respondents about those products, as well as the percentage of FS consumers among respondents, when compared to the general Belgian population. The consequences that will be drawn should therefore also be linked to these remarks.

Comparing the results of the two surveys didn't appear to be of great interest, moreover regarding the rather small number of interviewees and the differences in

8 See questionnaire in Annex 1

methodology, i.e. the differences in the places where were handed out the questionnaires. Anyhow, when the difference between Liège and Gent surveys is strong, we will then make a comment about it ; (L) will be for Liège and (G) for Gent. In the same way, when the influence of the shop type which the survey took place (as monitored only in the Liège survey) is significant, it will be detailed.

But for the majority, the results of the two surveys have been compiled, treated as one only survey, or allowing to set minimal and maximal ranges. Results will be presented, discussed and analysed for each topic in turn. A summary of the whole surveys is presented at the end of this sub-chapter.

2.2.2. Results and analysis

The part of the survey ranging from questions 1 to 4 explored the **knowledge** of FS of customers of the shops or retail outlets mentioned above.

Between 88% (in Gent (G)) and 73% (in Liège (L)) of the interviewees appeared to have ever known about dietary (or "food") supplements[9]. Despite the rather low number of interviewees in Liège, we have observed that customers of supermarkets and those of pharmacies were under mean values, while customers of health food shops and biological groceries where above.

Out of them, 85% could gave a definition of food supplements, generally a literal and simple definition ("such as "food supplements complete feeding"). Therapeutic definition was often given by customers of health food stores, but was completely absent from customers of pharmacies.

The products that were the more often quoted as FS were : vitamins, minerals, Omega-3, some plants (artichoke, ginseng, gingko biloba, …), and some proteins.

Question four asked the interviewees to classify some products quoted (the majority of which were FS or FF) into four categories : food, drug, FS, and "Don't know". The main observation is that no FS has been as clearly classified in the right category other product quoted compared to medicine or food. In FS category, fish oil caps received the more right answers ; then comes soja-enriched tablets, ginseng, guarana and other plants caps, then hops caps and Omega-3-enriched caps.

For this last product, a detail of the results should be talkative : while between 70% (L) and 80% (G) of the respondents classified Omega-3-enriched caps in the "FS" category (5% thought it was "food", between 10% (G) and 19% (L) thought it was "medicine" , and between 6 and 9 % "didn't know"), Omega-3-enriched margarine was classified in the "food" category by around 80% of the interviewees (14% classified it in "FS" and around 5% "didn't know"), which is the opposite tendency for the same active principle ! But one sends to the product" margarine", the other to "caps".

Customers of health food or biological shops seemed to have a better knowledge of what FS were, and we could make the hypothesis that it's probably because a lot of consumers of these shops are from upper classes and/or have nutritional troubles (requiring specialised food, requiring specific attention and "knowledge accumulation").

On the other hand, customers from supermarkets and pharmacies seemed to have a rather more blurred representation of what FS were and how to classify them.

9 Let's remind that respondents were interviewed in places or shop shelves selling FS, and that consumers answered the survey more frequently than non-consumers.

There doesn't seem to be a major difference in knowledge between men and women...except that men were largely under-represented in our population samples[10], meaning that roughly more women consume food supplements than men.

Questions ranging from 5 to 16 explored **consumption practices** and habits of FS consumers, after the interviewer assured the interviewee a clear comprehension of what FS are by reading a precise, near legal definition and quoting FS products.

Between 80% (L) and 86% (G) of interviewees had already consumed FS, which are very high proportions[11]. From the results of Liège, 90% of the people interviewed in health food shops and in biological groceries had already consumed FS, 71% of the people interviewed in supermarkets, and 75% of the ones interviewed in pharmacies.

According to the results of the Liège survey, women were 87% to have ever consumed some, while 64% of men did[12].

Interviewed FS consumers are more than 37% to consume FS "frequently" (on a daily or weekly basis) ; more than 30% consume FS "regularly" (every year during one month at least) ; and finally around 35% consume FS "incidentally".

Customers of pharmacies are relatively more to "regularly" consume FS (54%), and less to do it "occasionally" (16%) ; customers of health food shops are more consume FS "frequently" (33%), what we can partly relate to chronic health problems (allergies or digestion illnesses, for example). Finally, customers of supermarkets and biological groceries are relatively more to consume FS "occasionally" (respectively 34% and 32%).

The differences in consumption frequency between Liège and Gent is slightly significant, for instance Gent consumers tend to consume FS more frequently (more on a daily basis than weekly) and less "occasionally" than Liège consumers.

When asked to the interviewees that had ever consumed FS to explain the "origin" or sequence of their decision to do so, between 56% (L) and 43% (G) said the decision to consume FS was from their own initiative[13]. 54% (both in (L) and (G)) said it was on the advice of a doctor (practitioner/psychologist/nutritionist/ … (medical body)). These two categories are thus the most important to consider.

Between 14% (L) and 24% (G) said it followed a relative's advice. Finally, between 1% (L) and 13% (G) said this decision was linked to an article, advertising or programme they read or watched about FS[14], which renders the influence of advertising very relative, and much more important in Gent.

10 In Liège : 167 interviewees ; 30% of which were men and 70% women.
In Gent : 276 interviewees ; 36% of which were men and 64% women.

11 Let's remind that we only interviewed customers of FS retail-outlets !

12 Results from now on until question 16 will only concern "consumers" of FS, so 80% (in Liège (L)) and 86% (in Gent (G)) of our total respondents.

13 Multiple answers possible.

14 This seems to indicate a greater influence of advertising on the decision to consume FS in the northern part of the country ; but as no deeper analysis can't be done, and as the FS markets, representations and practices shall be quite different between the two regions, we would suggest not to draw strong

In the Liège survey, the FS consumers interviewed in biological groceries show they tend to have more independent decisions than mean results (above 66% of this category took the decision on their own).

Detailing the reason of their consumption of FS, between 47% (L) and 56% (G) of the FS consumers said it was to improve their health in general ; this is a very important observation, showing that FS are more often consumed in a preventive way (like for the widespread autumn vitamin treatments, often including all family members), or in a "well-being" approach, for which we make the hypothesis that this mode is growing among the various models or "profiles" of FS consumption.

Then, between 30% (L) and 40% (G) said it was to improve a particular point. This is another important observation, showing that a lot of FS consumers do so because they are not satisfied with one (or more) aspects of their mind or body. This doesn't seem to come from any deficiency, but from a wish of "smartening up", and seems to be an increasing tendency in the population, preoccupied with beauty and health. We could do the same remark about "performance", inducing athletes or workers to want to surpass themselves, make *more*... or make the same with less effort or stress ! These, we could say, seems to be major trends in modern societies, where the pace of life and constraints always seems to increase, and where products are proposed as solutions to these growing wills, dissatisfactions or all kind of tensions.

Back to the results, between 18% (L) and 32% (G) answered it was to make up for a deficiency, for example iron or magnesium deficiencies. Then between 17% (L) and 13% (G) said it was to struggle against an illness. We can evoke the people taking artichoke extract because they are affected with "Gilbert's disease". Finally, 3% of the interviewees declared it was because of curiosity, to experiment the product.

Question 9 asked the interviewee to give more precisions on the particular aspects he wanted to improve or "cure", that justify his/her consumption of FS.

Some differences in the rankings appeared between Liège and Gent, for some of the scores under 25%, but they appeared surprisingly very close yet. To ease the reading, we have chosen to give the mean rankings, as we are supposed to show only trends here.

"Reinforcement of natural resistance" comes first, with more than 60% of total responses[15], which shows again the importance of the "preventive" form of consumption of FS. Next item in importance is "general fatigue" with more than 50% ; then "stress" (more than 27,5%). With get here close to the same conclusions than previous studies on FS (i.e. Touvier, 2003, conducted in France).

Then we find "digestion" (more than 20%) ; "blood circulation" (around 20%) ; "detoxification" and "delaying of ageing" (around 15% each) ; "sleeping disorders" (around 13%) ; "rheumatism and menopause" (around 10% each) ; "weight loss" (around 8%) ; and finally (but non-exhaustively) "depression" (around 6%).

The types of FS the more frequently consumed were : vitamins (around 75%) ; minerals (more than 65%) ; plant extracts (around 50%) ; Omega-3 fatty acid (more than 30%) ; fish oils (more than 20%) ; fruit extracts (around 10%) ; concentrated

conclusions about this difference. It should only underline the different "profiles" or "patterns" of consumption that we are confronted with.

15 Multiple answers possible.

algaes (around 5%) ; more than 10% of interviewees finally also declared to have ever consumed “other products”.

Each shop (or shop type) has of course a specific range of products, for instance more omega-3 fatty acids are more frequently bought in so called health food shops. Another analysis show that more plant extracts are sold in biological groceries or in pharmacies. We could also surprisingly remark that relatively more vitamins or minerals are sold in health food shops, in supermarkets or in biological groceries than in pharmacies. pharmacies neither don't seem to be a common retail outlet for fruit extracts or fish oils.

Let's now talk about the mean monthly expenses for FS : between 50% (G) and 63% (L) of consumers pay less than 20€ per month (which is quite normal for “occasional” consumers). Between 35% (L) and 44% (G) allow between 20 and 100€. Between 2% (L) and 4% (G) allow between 100 and 200€, and 1% (both in (L) and (G)) more than 200€.

Only in pharmacies and biological groceries do consumers expend more than 200€ per month (4% of customers of pharmacies, FS consumers ; 5,5% of biological groceries, FS consumers).

When asked to FS consumers whether they read the leaflet provided along with the products[16], between 46% (G) and 65% (L) answered they “always” read it ; around 18% (both in (L) and (G)) “often” read it ; between 14% (L) and 18% (G) “sometimes” read it ; and finally around 16% (both in (L) and (G)) “never” did.

These results, for comforting they can appear, mask the fact that a very large majority of FS on the market don't come with any leaflet (only some slight informations on the label).

Moreover, customers of health food shops and supermarkets are above mean values for answers “sometimes” and “never” : they are between 15 and 20% for each of these two answers, and related to each shop type and its total customers sample.

We then asked FS consumers if they felt globally better after taking FS. Between 28% (G) and 49% (L) declared they felt “clearly better” ; between 38% (L) and (55%) declared “yes, it seems”. Finally, Around between 15% (L) and 17% (G) declared they did not feel better.

Customers of pharmacies and biological groceries seems generally more convinced by these positive effects, while doubts are well balanced through the different retail outlet types.

To get a more precise comprehension of this consumer perception, we asked the interviewees (that answered “yes” or “probably” at previous question) if they observed the same effects as those mentioned on the packing of the FS. Around 53% answered “yes”, around 43% “partially”, and around 5% “no”.

Customers of pharmacies are clearly above man values for the answer “yes”, with 60% of the total sample of pharmacies' customers, while customers of supermarkets and biological groceries are under mean values. The “no” answers comes relatively more often from the customers of supermarkets and biological groceries (respectively 11% and 12%). Customers of health food shops are only 2,5% to declare “no”.

16 For the ones that do have one, as the presence of the leaflet is not a legal obligation.

Considering now the people that said they never have taken FS (so only 20% of the total 167 respondents in (L), and 14% of the 267 respondents in (G)), it was asked to them why they never consumed FS.

In first position, between 27% (L) and 53% (G) said they have never been advised to consume FS, would it be by a relative or a practitioner. Then between 25% (G) and 34% (L) said it was because of a lack of conviction in FS efficacy. Between 14% (G) and 31% (L) said they never consumed FS because of a lack of knowledge on those products. Finally, the hypothetical reason of an excessive price was surprisingly not chosen by any of the non-consumer.

The last set of questions (from question 17 to question 20) aimed at exploring **customers' representations** about FS[17].

Question 17 asked the interviewees to take position on the efficacy of FS. The large majority (50%) appeared to be "convinced, but not concerning all products available on the market" ; 26% were "sceptical" ; 18% were "convinced" ; and finally 5% were "extremely sceptical".

There were relatively much more "convinced" people among the customers of biological groceries and health food shops, with respectively 30% and 19% of the total interviewed customers of these shops. As well, among these same shops' customers, we find relatively much less "(very) sceptical" opinions.

We could argue that in these shops, much more products are labelled "bio" or have a guaranteed origin, traceability or certifications. This underlines the different framing for those customers than the ones of supermarkets or pharmacies (where the large majority of products isn't "bio", is made by large-scale economical groups, ...). Going on, we could also argue that the representation associated with "biological plant extracts" or "biological plant-based FS" is to some extent linked with the widespread shortcut : "*what is natural can't be that bad*".

This seems to be confirmed by the results of question 18, showing that 64% perceived FS as "natural products". Again, customers of health food shops and biological groceries are above mean values (respectively 70% and 75% of the total customers of these shops), while customers of supermarkets are far under, with 51% of the total customers of this category of shop.

The total 36% of respondents that perceived FS as "not natural products" said this was mainly because of all the transformation processes needed along the manufacturing of the FS, finally making the "natural extracts" appear under a form of pill, tablet, …

Next question aimed at verifying if the respondents thought there was any possible risk associated with FS consumption. The first result in importance is strikingly "no" with between 33% (L) and 52% (G) of the total answers. Then comes "yes", with between 30% (G) and 35% (L) ; between 10% (G) and 25% (L) for "probably", and between 6% (L) and 8% (G) for "do not know".

This result is very important for our research, as it shows a widespread lack of knowledge about risks associated with FS ; more, it may even not come to consumer's

17 From question 17 to 20, we stop focusing only on FS consumers, to include non-consumers' answers as well.

mind that any risk *could exist* (except the risk of "taking too much", mentioned and shared by a lot of respondents : "*excess is always a bad thing"*).

To conclude the survey, we finally asked if FS intake was always compatible with drug or medicine intake. This should give a sharper idea of the consumers' conception of risks, and in particular "systemic risks" which are central in FOODINTER.

First, around 42% of the interviewees think that "FS are not always compatible with medicine", which is reassuring ; then around 32% think that "FS do are always compatible with medicine" ; then 11% answered "probably yes" ; 14% "did not know". We can by then observe that 43% of total respondents don't imagine that there could be risks of incompatibility with medicines or medical treatments, revealing a poor public apprehension of or knowledge about "systemic risks".

2.3. Exploratory focus groups with FS consumers

2.3.1. Methodology

The main objectives of these focus groups were to examine social representations of food supplements.

The focus group survey was intended for both consumers and non-consumers, carried out in three meetings of two hours each. The number of participants varied between 6 and 12. These three meetings permitted the participants to discuss food supplements and functional foods. Four outside participants also contributed as experts to these discussions through presentations. The groups were heterogeneous in terms of age, social situation but most of the participants were woman more or less interested in the question.

The first meeting was intended to give them basic scientific information and to identify points to be explored and discussed. The second meeting allowed the participants to acquire information and the legal and administrative aspects and to receive information from a producer. The last meeting consisted in an open and extensive discussion and was intended to formulate some proposals for policy-making.

Within both the interviewees and the focus groups participants, both working class strata and men were under represented categories, probably for cultural reasons that goes beyond the scope of this research, but which could play an important role in communication strategies and should therefore be reminded.

2.3.2. Results and analysis

A large variety of topics have been raised by participants ; we have categorised them to facilitate their analysis and presentation.

2.3.2.1. Information and communication

During the focus group sessions, the problem of obtaining sufficient information was frequently raised, in a variety of different forms; the problems related not only to

publicity but to the presence, absence and content of the notices either enclosed within the packages or printed on the package itself, as well as the patient/physician dialogue.

– *Advertising*

FS advertising has often been put at the front of public or legislative disputes, for instance when criticising the *messages* it spreads. For participants, FS advertising is criticised to reinforce nutritional unbalance (often criticised as "*junkfood*" by participants) and a movement of "flee ahead" ; advertising explicitly states this unbalance, but instead of proposing a shift back to "normal", quality food, it tends barely to support or encourage FS and FF *demand*, which doesn't appear as an (satisfying) solution.

Following, it seems that advertising, far from the idea of giving an answer to a demand, indeed *creates* it, maintaining and sharpening unbalance. For some consumers, there is no more advertising now than a dozen years ago ; for others, there is a real change in frequency and in content of advertisement, for instance in pharmacies. Consequently, the present "buzz" one can observe or feel about FS appears to them as a fashion effect, with a (very) large commercial dimension. As Guillon states : "*health food marketing [shows] an upstream phase much more important than for a similar food, but also with an downstream phase heavily charged with communication costs*" (Guillon, 2003).

This poses the question of "*What is a balanced nutrition (or diet) ?*", central question for consumers, and as much fundamental for FS marketing since its legitimacy is rooted on this idea of unbalance. This can also send the question back to the whole industrial food production (agriculture and catering), transformation and distribution chains, whose methods and even inner principles are put in question by a lot of actors....but this question remains unaddressed (is even *hidden*) when FS are put at the front like it is now. Here, the attacks are addressed not only to firms, but also to politics and policy (in particular on SPF SPSCAE), which should ban this type of rhetoric. The politic is also the one who is pointed out as the privileged actor to handle this problem, since it's politic that defines what is a "balanced diet" through the National Plan "Nutrition Health", and since advertising is supposed to be regulated through the Royal Decree of 17 April 1980 of advertisement on foodstuff, as well as through European regulation (for instance Directive 1924/2006 on health and nutritional claims).

– *Notice of use (and risks)*

The absence of a notice accompanying FS has been raised. A lot wondered why there was never one with FS, while this is normal for medicine. More than only referring and creating a link with medicine, this notice appeared to consumer as a privileged, if not the best information support to give to consumers. This way, this could for instance give precise indications on possible secondary effects, possible interactions, counter-indications, quantities to ingest (with more detail according to each consumer). We also showed through the surveys than the notices are very generally read by consumers. Following the comparison with medicines, consumers thought this would be encouraged to make these notices compulsive for FS (even if some FS already come along with it).

– *Packaging*

If the notice of use seemed so important for participants, it's that the packaging can't bear as much information as the first. This appeared as several participants deplored the lack of (pertinent) information on the packaging, but also the lack of homogeneity in presentation of information...leading to confusion and the impossibility for consumers to make comparisons, or qualify clearly his consumption.

This lack of homogeneity regards : posology, concentrations, nutritional values or RDI. If comparisons can be made thanks to the reference of "*...for 100g of product*" (though it's not always the case, as some packaging can only show data for instance for 1 or 2 caps), the total weight of the product can only be... 42g, or 2 capsule of 1,6g... So do have consumers to systematically use a calculating machine, which isn't the most easy ?

The critic regarding RDI underlined the eventuality to induce on consumers a consumption attitude considered as "bad", that would be to allow thinking that FS intake can supplement food.

Health claims found on packaging and in advertisements have often been criticised for their "hypocrisy". Consumers found important to find clearer, non misleading terms, even with the explanation given by Mr Berthot (SPF SPSCAE), on the interdiction to make a reference to any therapeutic aspect.

The FS identification number ("NUT") was thought to be the key information to be shown on the packaging, in order to be sure of the *quality* of the product.

– *Trust in the actors of FS networks*

This sends mainly to the (lack of) trust that consumers can have in producers (and products, methods used), but also (and they were the more quoted) in doctors/practitioners, as well as in pharmacists. Indeed, when Mr Maghuin-Rogister presented the FOODINTER research, and spoke about risk analysis, some participants questioned the possible difference in quality and in control there can be between products sold in supermarkets and other prescribed by practitioners and bought in pharmacies.

– *Doctor/patient communication*

Over the question of trust was opened this question of the lack of communication between the patient (FS consumer) and the practitioner, a communication that is necessary and essential since it could allow a good, precise and diagnostic-based advice or information on interaction risks between FS and medicine. This topic was raised by Mr de Voghel. However, we will see during risk focus groups that this idea, for obvious and important it is (and we don't deny it's importance in a "good" risk communication strategy), can face some problems to say the least, for instance when "practitioners don't seem to listen to you" or when we know that practitioners aren't trained on nutrition and in complex interactions inquiry.

– *Auto-medication*

But we also noted than for a large part of participants, conventional, allopathic medicine has disappointed them, and that they tended to turn up to "parallel" or "alternative" medicines, but also to different kind of diets. They claim the right and the possibility to *choose* what is good for them, in order to keep a good health or to find it again. Has the surveys showed, FS consumption (or at least a half of FS consumers) seems to come from a personal consumption (personal information process, personal

"diagnosis", personal selection of products, …) that we can't prevent from linking with a form of auto-medication. The more active critics against conventional medicine came from consumers met in biological groceries or health food shops.

Therefore, these critics addressed to institutional actors, targeting mainly the *quality* (of advice, but also of products), can be seen as a demand for more assurance...a demand that don't guarantee practitioners and pharmacists any more (or at least integrally). As a result, auto-medication is seen as not really problematic, since the conventional system also shows clearly its limits ; consequent trust in auto-medication can also increase self-confidence, confidence in auto-diagnostics and in physical or psychological "feelings".

2.3.2.2. Economic lobbying

The topic of economic interests, strongly linked to that of advertising and trust in members of the health network, quickly made its appearance during the first meeting, and then became a recurrent topic throughout the following meetings as well. Thus, perception of the large-scale producers of food producers is clearly negative. The reasons for this poor image are, overall, said to be related to the notion that they are primarily seeking to make money, particularly, through advertising which is also a practice criticised for itself (frequency, content/message, …). In addition, according to the participants, food supplements which base their claim to legitimacy on the nutritional imbalance of our societies, don't encourage nutritional balance, but maintains the imbalance. This doesn't allow facing « root problems » of modern, post-industrial societies, such as massive transformations of food production (and transformation) systems, may it only be on dodgy food quality and effects of these on health (on the short as on the very long term).

Economic lobbying is considered as strong for FS than it is for medicine, and here are specifically put in questions commercial representatives of production/transformation firms and their direct lobbying aimed at practitioners and pharmacists ; they would thus tend to drive the practitioners' "choices", at the time of making the prescription more on personal advantages (which thus, denounces a perversion of the FS market towards profit), than on quality or other health principles. We also noticed than this consumer vision of a FS market driven by profit (and not health) was strengthened after explaining them the notification procedure.

This underlines than critics are less on the products themselves (the supplements) than on the actors of the production-distribution-advising networks, that are linked with FS. Through the critic addressed to producer firms, scientists were also criticised for their lack of neutrality (and even for some the instrumentation of science), since lots of them are members of those firms' councils of administration. The media were also a central target to these critics since they spread the same misleading visions about FS and stimulates inappropriate or *unnecessary* consumption. We shall finally notice than the critics never really aimed directly FS consumers, revealing a lack in symmetry (but which can be argued to be linked with an asymmetry in information (and its mastering), as well as in power of action).

2.3.2.3. Questioning on regulation

The demand for stricter regulation has been made very frequently. Despite the information provided on regulation (which was largely unknown from the participants) and on the work carried out by the SPF SPSCAE, several critical remarks were made about the public authorities. First of all, four criticisms were expressed with regards to the certification procedure : the first regards the small number of people (6) responsible for analysing correctly (but to analyse what in particular ?) the thousands of certification applications. Another criticism related to the absence of the certification number (NUT) on the packages, as a quality control guarantee. The third criticism related to the possibility, for producers, of placing on the market products that have not been notified. Though risks for firms are very dissuasive, and that it was explained to happen nearly never, a doubt grew in consumers minds. Finally, the apparent hypocrisy and absence of clarity in the regulations relating to "health claims" was underlined, though participants recognised the need to distinguish between health and nutritional claims.

We already noted the demand for more complete and accurate information on the packages and on the presence and contents of the labels. It should be noted that there was also a demand for compulsory information on the proven effectiveness of the products (explanation of testing, limits, nuances and objectivity). As to the consumer's perception regarding FS, it can be noticed that for some people, FS are a vital health care necessity and remedy for deficiencies whilst, for others, FS are well-being products which are not physiologically vital but important to people in their quest for good health and well-being.

2.3.2.4. Consumer perception(s) ?

Which perception, or representation of FS and FF can we isolate from discussions ? We should indeed talk of « representations » in a plural sense, because every consumer doesn't not put the same signification in the products and in its consumption : for some FS are a vital necessity, for other they are luxury or well-being products, not *vital*, but still important for their quest of a *good* health and a good balance, as also show the surveys. The "natural" dimension or properties of the products, emphasized by marketing, hasn't been developed much by participants, but we make the hypothesis this can constitute indeed an implicit reference for lots of actors to think that FS are not risky, such as is the fact that the FS industry uses high-tech technology and processes, often the same than for medicine and medicine industry.

What was interesting to notice was than FF were much more criticised or *feared* than FS. If the latter have a certain legitimacy, it was argued than the provocative picture of an omega-3 syringe spilling out in an egg was a good picture to illustrate (or explain) consumer fears or disagreements ; the idea to add to a product substances that are not "naturally" its own, constitutes a problem.

2.3.2.5. The FOODINTER research

One of the participants wanted to be sure he didn't spend his time on the benefit of some private company, and that this research was really independent from any economic lobby.

Participants formulated some opinions about the FOODINTER research : firstly, *in vitro* testings were considered as insufficient to know (and infer from experiments to human beings) interaction problems. Secondly, it appeared important to them to study each possible interaction ! Thirdly, they thought than the ideal strategy was to study first the substances that are the most frequently consumed, after vitamins and minerals. Finally, the communication of the results to the general public was thought to be of primary importance.

2.4. Semi-directive interviews with representatives of FS producers

2.4.1. Methodology

Consultation of producers is difficult in a collective discussion because producers and industrial companies usually do not want to exchange information that might be used by competitors. Therefore, consultation has been made through individual interviews with company officers. Four different producers' representatives were interviewed (semi-directive interviews) to explore the way producers manage the risk aspects of food in this specific context. Two of them were active in the "custom" trade.

The objectives of these interviews were to grasp :

(a) the level of information companies have about contaminants and problems of possible interactions (between the various active substances of the product, with contaminants, with foodstuffs, metabolism singularities, individuals' lifestyles, with other drugs, ...) ; the importance of "interaction risks" or "systemic risks" in the firms' research activities

(b) the importance of food safety in the company's strategies or research pools (traceability systems, contaminants and interaction-related risk management systems,opinions on product regulation, …) ;

(c) the place of consumer's preoccupations and practices in this strategy.

2.4.2. Results and analysis

Interviews of producers revealed a very cautious attitude concerning traceability and quality. They have been analysed along five topics : traceability of compounds, control, non-conformity, efficacy of FS, and interactions or systemic risks knowledge.

- Traceability : the four companies have a traceability system, covering the whole production process (from raw materials to the final product). Raw materials providers are based in Europe, South America or India, and they are trusted for their responsible attitudes. Every ordered batch comes with an certificate of analysis that shows which are the toxic substances present in the raw material and in which quantities. During all the transformation process, every batch used in the processing of a product is archived. Every batch of final product is given a unique identification number, that allows (in the eventuality of nonconformity) an efficient return procedure.

- Control : After batches reception, analysis are conducted to ensure (1) that the order corresponds to the received material, (2) validity of certificates of analysis, and (3) the concentration in active principles. Those analysis are conducted internally to the firm, but also by external, specialised laboratories. Firms use an auto-control system all along the production process, but all the initial analysis attests the final conformity of the product.

- Nonconformity : After the previously detailed precautions, and the set of analysis, the occurrence of nonconformity on intermediary products is quite rare. If it occurs on the final product, it isn't released on the market. If a nonconformity would occur anyway, crossing all these controls, the FASFC / AFSCA has to be informed, and the firm would recall all non-compliant batches. Some nonconformities can be due to the material composition (for instance too high lead levels), but also only to a label problem.

- Efficacy of FS : the efficacy concern has been a recurrent one, from the consumers and the producers as well. For the first, we saw that this efficacy is fairly legitimated. But for the second, for sure they can be satisfied with this legitimacy of efficacy from consumers, they tend to rely on a legislative definition of efficacy. Accordingly, they rely on the notion of "physiological effect", as stated in European Directive 2002/46. Effect isn't therapeutic, but physiological, what means it allows one to keep, in an "homoeostatic way", his health(y) condition. FS consumption would therefore be linked to a preventive medical practice, as opposed to curative. As Loux underlines it *"considering that prevention consists in the adoption of practices that could prevent from, or stop development or re-emergences of illness, it's obvious that there exists a lot of popular prevention practices"* (Loux, 1990 : 87, our translation). This preventive form of medicine rely more on "familial medicine", which is the *"hub of medical resorts"* (Loux, 1990 : 88), may it be to call a responsible practitioner or a "bone-setter". And FS belong to this set of medical resorts. We saw this for a lot of families, would it only be for the vitamins or minerals autumn treatments. But young parents could also, in a preventive logic, give their child omega-3 or advise their own parents to consume antioxidants.

Moreover, the FS itself seems to have to legitimate its own existence, and its own efficacy as well, through science. We could record this when we visited the "Life" exhibition[18], where there were few exhibition stands that didn't expose, stressed through charts, the results of numerous scientific studies that only a few visitors would certainly have understood. Like "totems", they were displayed in ostentatious ways, as if the goal was to calm down possible worries at work among possible customers : "Does it work ?". Indeed, it's not that easy to convince someone to ingest a product (food or medicine), that he doesn't know. It's even more difficult considering than those possible customers don't absolutely need it, and that a performance or promise is connected to the product and expected from consumption. When this promise comes from one's practitioner prescription, with whom he has a thrust-based relationship[19], this doesn't seem problematic. Why ? Because "*the prescription and then the medicine are metonymical extensions of the practitioner. We could say there is a dose of the practitioner in the medicine, because the curative hand of the doctor reaches the patient through the prescription and the medicine*" (Van der Sjaak and Whyte, 2003 : 103, our translation).

18 Salon Life, Palais 11 du Heysel, du 16 au 18 mars 2007.

19 Though this can be more and more difficult, as we found out when analysing the surveys.

However, as we noticed it, this "practitioner's curative hand" is often absent when considering FS consumption. Consequently, if the practitioner can be viewed as a metonymical extension of science, we can say the same about references and results of scientific publications displayed in the stands : they are symbols, that support or even guarantee the efficacy of the product.

- Interactions : excepted within future formations or traineeships underlined by representatives, during which some of these interactions will be presented, few of them seems to worry about this question. The reasons put forward are analytical certainties, partly proved through experimentation (and supported by the fact that three of the four representatives are graduated pharmacists), as well as through scientific literature, which would according to them always deal with the multiple possible interactions. We can here find one of the unaddressed, brushed under-the-carpet issues (interestingly shared by experts and "simple consumers"), that is the tendency to think that when no one says that there's a problem, this means there is no risk at all. This reasoning seems to protect producers' interests.

2.5. Intermediary conclusions from consumer surveys, exploratory focus groups and interviews with producers

2.5.1. Quantitative surveys ; conclusions

1) People do not exactly know what kind of preparations can be categorized as food supplements (a lot of hesitation for vitamins and plant extracts).

This, we can say, is to be linked with the « blurry status » of FS, between food and medicine ; so do FS make the beneficial effects of both without being any of these ? This « blurry vision » seems to be exacerbated as a lot of actors, from the producers to the private, family-member or relative advisor perpetrate this blur and try to convince with arguments crossing prevention, treatment, performances or well-being. The public actors (especially legislation) try to stabilize it, examining each product in turn, but this seems very complex and unknown of the public !

2) A large part of questioned people do consume food supplements from their own initiative (without any medical advice), while medical advice and relatives' advices are also main sources of « conviction ».

3) The main purpose of consuming food supplements is, according to consumers, to reinforce the immune system of the organism and to fight against tiredness (obviously for vitamins and mineral) and stress.

We could underline, though, that there is a lot of different « profiles » of food supplements consumers. This diversity (and diversity in the products used) can be based upon gender (women seeming to be more interested in « well-being », health, or diet ; men seem from their side to be more interested in the boosting of performances (especially true for sport or fitness), upon age or health situation (if one has chronicle diseases, insufficiencies, etc.), and upon other « subjective criteria » such as the degree of conviction in the products used, the mode of relation to a product regarded as

« natural », the compromises every one does between health, positive expectations, boosting or health improvement (based on the specific « promises » of FS and FF).

This diversity tends to underline that it would be very difficult to address in its globalism (moreover regarding the often very specific and contextualised nature of risks related to FS and FF), and that a « multiple » risk communication and risk management strategy would be a more suitable answer. This will be discussed more in detail in « risk focus groups » (Part 2.4) and in policy support (Part 3).

4) A lot of consumers are regular customers (daily, weekly, or every year) but the money spent for buying food supplements is globally less than 50€ per month.

5) Most of the consumers do read labels and are convinced of the beneficial effects of the products as they are described on its label.

6) The majority of the questioned people do believe that food supplements are "natural", not very risky, but should be used reasonably anyway, and let open important questions about the long term effects of those products. On the other hand, a large part of interviewees don't seem to be aware that simultaneous intake of drugs can pose a health risk ; we can thus say that there seems to be a kind of underestimation of risk concerns among our sample.

From interviews in the sales places, functional food and food supplements are not fully understood by consumers, but it is not ignorance at all ; it appears to us to be more as the results of « blurred » boundaries or categories, or in other words problems of definition. In general most of the consumers adequately distinguish between food, medicine and functional food or supplements. And knowledge is better when consumption is intensive or regular. Then it can be concluded that consumers are looking for information: actually they all read information if given by producers. More than one third of the consumers were given advices by doctors. One on four use supplements for preventive reason but the great majority consumes them for reason linked to chronic (real or supposed) deficiencies, for stress and tiredness. Most of them concede some kind of risks in this consumption but declare to make adequate use of them. These results, among others, confirm that consumption is not irrational and that it is information driven. So the role of information by practitioners or by other sources can play a crucial role. Most of them do not entirely trust either medicine or food supplements, but consumption can be related to some representation of nature since these products seem quite natural to them. It can be noticed that most of the FS consumers seem very cautious regarding food and health, probably more than non consumers on the average. There is a sort of ambiguity in these attitudes, or a sort of unveiling of the various compromises consumers do, since they are at the same time interested in « natural », healthy and well-balanced diet, seem aware of risk concerns and « money » or lobby pressures from industry, but are nevertheless users of (some of) these products.

2.5.2. Exploratory focus groups ; conclusions

The focus group methodology allowed consumers to explore more in depth and to discuss different aspects. First it appeared that consumption is not naïve for most of

them. It also indicates that individual attitudes are very diverse and deeply rooted in individual experience with health problems. Discussion between participants reveals that there is no contradiction between natural food and balanced diet (what they consider the ideal) and consumption of supplements since for them many people have health problems that can be alleviated by FS.

For most of them it is a reflexive practice. Consumers do not trust the commercial system to provide good products and they ask for more information from producers and form public authorities. They do not feel at risk but they regret what they perceive as weaknesses in the control. Concerning the research project (Foodinter) they feel dubious about the expected results of laboratory research and ask for a good communication of these results to the public. In general they trust scientists to improve this knowledge.

From the consumers' point of view, FS and FF are rather hard to comprehend. This is due to different factors, among which the « blurry » and hardly shared status of FS, see-sawing between food and medicine status, is certainly not the weakest. Indeed, even if the 1992 Royal Order consider FS as food, FS appear after this first part of the research much more close to medicine than to food ; as if the whole survey actually revolved on one word : « health ». But a two-faced health : one that is defaultive, having to be « fixed », and one that is present. A defaultive health than FS will « cure » ; and a present health that FS will preserve. In the first case, there is no doubt than confusion with medicine will be the strongest as, whatever we say, FS will treat dysfunctions like a medicine would do. In the second case, we will face more a form of preventive medicine, as the goal will be either to keep one's good health condition, either to improve it.

FS is consequently see-sawing unclearly between those two status, less from the point of view of the legislator than from the one of citizens.

Indeed, for consumers, FS (or assimilated products) consumption is neither a « cold definition », nor a mechanical act, but a living, a personal experience, rooted in his history, habits, thoughts, representations and values, and mixing the field of food or nutrition with the one of medicine or medical treatment. Food and medicine are possessed by a symbolic dimension that shouldn't be underestimated when assessing social representations of FS or FF. Now, food and medicine are two very different pools of images and representations that are both activated and mixed in complex, sometimes paradoxical ways when consumers are put in front of FS. We could finally argue that consequences, largely unknown, seem far from being only at the benefits of consumers' health and « well-being ».

From these results we can conclude on a hypothetical way that, even if FS consumption is growing, consumers do not entirely trust commercial food nor medicine. FS are rather clearly distinguished from drugs and from food, even if consumers don't seem to know clearly how to treat them (as medicine, as « complements » or « supplements », as convenient « boosters », ...). As far as consumers of supplements are concerned, they are suspicious and they try, with a good reflexivity, to find solutions to chronic health problems that seem to be linked with their way of life. They consider supplements as improvements, keeping in mind a good idea of well balanced diet. Information and better control are the main preoccupations they formulate, with an emphasis on independence of control, of research and of public information.

2.6. "Risk focus group sessions" with food supplements consumers

2.6.1. Methodology

Two sessions of three hours each were organised in Liège, each with the same group of participants (9 people)[20]. Most of them were FS consumers, and all wanted to know more about FS or give their opinion. They were all "simple, concerned citizen", and none represented any private or professional interest.

Following generalities about focus group methodology, the proposed approach doesn't aim at representing exhaustively citizens' opinions, but rather at exploring what would be an informed citizen's or consumer's framing of the central questions behind the FOODINTER project, that is in general risk issues regarding FS and FF. In order to do that, we propose a sequential process by which we intend to explore what could be the citizen's framing according to the information they get :

Sequence 1 : citizens are called to express shortly their preoccupations against food safety and risks in FS production, marketing or consumption.
Sequence 2 : citizens are provided with scientific information on the results of the FOODINTER research ; they are invited to formulate any questions or remarks, and discuss how this scientific communication helped them change their risk perception or perception about FS in general.
Sequence 3 : citizens are slightly provided with information, web links to food-chain security or risk management agencies, and collective reflections on what are risk communication actions stakeholders implement nowadays about FS (consumerist associations, industry, health professionals, etc.), what could be their practices and strategies or attitudes towards risk.
Sequence 4 : (4a) Citizens are called to formulate remarks or concerns regarding risks associated with FS, discuss those remarks altogether, and then (4b) formulate proposals or recommendations on the communication of the results, as well as extensively on general risk communication, and/or risk management regarding FS.

This process will induce a "progressive informed framing" that will help researchers to shape the scientific recommendations on risk communication.

2.6.2. Results of first risk focus group session (9th December 2010)

2.6.2.1. Introduction and short self-presentation of participants' FS consumption concerns

20 Unfortunately, we couldn't get the participants that attended WP1 exploratory focus group sessions for WP3 "risk focus groups" ; this was balanced by allowing more time during "risk focus groups" for questions and discussion about FS management system, about bio-chemical or medical aspects, about personal habits or experiences, etc. A mailing list of official health agencies or FS management portals shared with participants also helped them to consolidate their knowledge and to deepen their questioning, before being asked to formulate and discuss risk communication and/or risk management proposals.

After a short introduction on the participative methodology in risk communication research (and more specifically in Foodinter research), it was asked to the participants to introduce themselves and the main questions, interests or matter of concern they had about FS or FF.

A apparently recurrent concern of the consumers was about the long term effects of FS or FF (in 15 years, 20, 30, lifetime...), that doesn't appear to be known nor handled by anyone, even by science or medicine. The best one can expect actually is very contextualised, product-, situation- or interaction-based knowledge of risks, mostly on the short term, and often coming from "a relative".

Another concern, that could have been given rise by the Foodinter research itself, and its objectives (explained to the FG participants), is the drug-interaction risks related to FS and FF consumption.

It was remarkable (though it can not be over-generalised) that the three male participants were consumers of FS for sport and to improve their performance, tonus or muscle building. Women were more preoccupied or wanted to know more about "natural FS" or "alternative medicine", (wild) plants and herbs, aromatherapy, phytotherapy, gemmotherapy, or homoeopathy, in preventive or curative approaches.[21]

2.6.2.2. Presentation of the Foodinter research results

This presentation of 45 minutes took the form of a simplified and teaching summary of some of the Foodinter research results, addressed to consumers[22], and during which they could ask question to the scientific team[23] attending the focus group.

2.6.2.3. Questions, remarks, misunderstanding

A first set of remarks concerned the number of notified products among the overall FS present on the Belgian market, which participants wouldn't have thought to be so low (excepted maybe for the products bought on internet). The practical signification then, of **what is a "notified product"**, what this "notification" tests and

21 We have to remind that when organising our groups, rather small, we weren't aiming them to be representative of the overall Belgian FS consumers, as our goal was to regroup among the participants of these discussion groups different framings, different consumption purposes or "patterns", different visions, opinions and concerns about risks, risk communication and risk management.
We have to formulate two remarks : the first is that the number of participants was lower than expected due to snowy conditions (9 instead of 12 for first session, and 6 instead of 9 for second session), and the second is that we regret we couldn't have more "neutral", "passive" or "mainstream" consumers, that we can decently suppose haven't been interested in participating our discussion groups (extensively, this should be a general problem with the method of focus groups). This participation seemed to be conditioned by a high motivation to increase their knowledge and getting informations on FS (linked for three participants to professional or training interests). This balances then the generalisation and the exhaustivity of the conclusions we will draw from the collective discussions.

22 The visuals of this presentation are available on the FOODINTER website.

23 Marie-Louise SCIPPO, Luc PUSSEMIER, Marc MORMONT, Delphine BONIVER (presenting) and Bastien DANNEVOYE.

assesses, seems then not to be well understood, as some "notified" products may not be exempted from any risk, for example some notified products even contain more environmental contaminants than the legal levels. [24] They wondered why, though the notification procedure was in place, one could find in shops or pharmacies both "notified" FS and "non-notified products" (or in forms that don't make those products under the FS definition).

Moreover, even if they didn't know it, consumers understood than every product on the market couldn't systematically be tested, may it by producers (self-control) or by public agencies (standard tests or auto-control from producers). Even if this wasn't obvious to them, they also admitted that those tests can hardly be exhaustive, moreover regarding on one hand the limited capacities of administration and on the other hand that there are a lot of gaps in this legislation or management scheme (let's only think about FS assimilated products bought on the internet).

Another concern a consumer gave rise to was that she wanted to know if there were any producers in which one could have total confidence, for which risk concerns were totally handled. It was answered that this was hard, first to tell this as no tests or controls are exhaustive about risk (sending back to the question of "complex risks" assessment), secondly to know this without having an answer from any research activity on this question for the Belgian market. What is sure is that total risk absence seems illusory (due to "risks nature" and the position of science (the "deficit model" (Brown, 2009), and that practices or processes that are related to the various risk sources underlined in Foodinter risk assessment can vary a lot from producers. One good way to decrease these risks linked to production would be to question the practices of the firm itself, and analyse the answers it should give (its degree of knowledge about risks, …). This would certainly have to be run in close cooperation with bio-chemical analysis and controls of its processes and products, and this would be an interesting question to be explored through future research.

Finally, consumers were surprised that there didn't seem to have a lot of cooperation between the various national health or risk management agencies, or health, FS-related research institutes to assess and communicate on FS-related risks...especially if there are controversial risks or effects (at the scientific or medical level) around the suspect product or interactions. It was poorly understood why a FS could be legal in a country and considered illegal in another one, as even if each country has his own management schemes, every risks are anyway supposed to be relatively similar between countries when regarding a specific substance, product or a family of FS (according to the nature of risk concern).

Another misunderstood aspect in the Belgian FS notification procedure (sending back to EU legislation) is the category-building, separating "health products" between medicine, "notified products" (NP – so called FS), "medicinal products" (MP), and "herbs" or "traditional herbal products" (such as essential oils, that can be ingested among other uses), if not only "others". This set of categories, sometimes appearing as arbitrary ones to the participants, seems to add blur to already "**unclear boundaries**",

24 It was answered to the participants that an evolutive list of "notified products" existed at the level of Belgian food safety and public health authorities (*SPF Santé publique, Sécurité de la Chaîne alimentaire et Environnement, DG Animaux, Végétaux et Alimentation, Service Denrées alimentaires, Aliments pour animaux et Autres produits de consommation*), but it wasn't known by any participants and didn't seem to sweep away all of the consumers' doubts and lack of understanding, as explained further.

that are the ones trying to define and isolate "food supplements" themselves. For instance, this was unclear why a specific product such as omega-3 pills is considered as FS, while essential oils for instance are not. In the same idea, why is omega-3-enriched margarine not considered as FS, even if it could contain more active components than the product sold under the form of pills or tabs ? Vitamin-enriched drinks were also quoted. Participants did not know whether it was considered a FS or not, as it's proven that some of these drinks can contain sometimes more (relative or absolute) active components doses than so-called "FS", sold under the form of caps, pills or tablets. We propose to sum this set of remarks as "FS definition and categorisation concerns".

This is to be linked with previous observations we made during the surveys analysis, that revealed the consumers misunderstanding of the various nuances in the official or marketing definitions of what is a food supplement, compared to other "symbolic categories" such as food, functional food, medicine or other "unclassified" products such as herbal preparations, oils, etc. For them, these categories appear to be closer, not clearly divided ("food is the first medicine"), what asks the question of great divide between nutritional and medicinal properties (properties dissociated by law and management schemes). However, this "overwhelming category" isn't necessarily a mess in consumers' minds, as it can be divided along dimensions such as : the "natural" qualities of the product, it's concentration or "power"[25], it's degree of control or certifications, the purpose of the consumption (curative, preventive, improvement, …), etc. These dimensions, even if they seem sometimes "socially shared" as central issues to know when choosing to consume a product, are at the same time very personal or subjective, each consumer having his own certitudes or beliefs, or again his "organisational principles". So, rather than trying to force every actor to learn by heart the list of officially-recognised FS and the evolution of the "administrative border" between similar products, categories should be made explicit and deconstructed in a risk communication process, to ease consumers' comprehension in a context where complexity is growing, digging a gap between them and the risk management actors.

Another remark during the presentation of the results was about the **non-existence of an exhaustive "list" or a notice attached to each FS**, that could detail all the possible interactions of a particular FS (or through "FS families" when possible).

Even if the list of notified products exists, it isn't known by anyone and doesn't appear to be very clear, explicit nor completely comforting to them. Moreover, attaching a notice to a FS when released on the market isn't a compulsory practice (yet), when it comes on the market as "notified food supplement" and not as "medical product" ; this is also true for other requirements, such as the various, expensive and complex analysis that would be needed to assess the potentially infinite interactions and risks related to a specific product. No need to say that the FS industry mostly "cannot afford these tests", and prefer conform to legal practices at minimum ; this should indeed justify the existence of a "two-speed" FS management, one level being handled on the model of medicine/drugs management, and the other in a lighter, cheaper form. We can add a third "speed", if we add to notified FS and medical products the non-notified and

25 Consumers didn't understand why the concentration of active principles wasn't a condition or criteria to distinguish between a "FS", or "FF", or any other name, or even for the notification procedure, as for them concentration is a significant factor regarding their conception of risks (apparently, mainly the risk of overdose). Moreover, labelling and standardization in concentration isn't an obligation for FS producers.

"unclassified FS", for instance those sold as "herbal products" or "plant preparations" (such as ginseng tea, oils, ...), or those sold on the internet from abroad countries, mostly escaping national control schemes and, in absentia, let at the free appreciation of consumers themselves.

Anyway, consumers seemed to be aware that "knowing and mastering everything", "managing any bit of this complex "risk enterprise"" (talking about risk assessment and management) was quite a long-term task, if not a delusive one. First it appeared that decomposing the active principles in small parts sounded strange for one participants, whose vision was more that the effect comes from "a whole", and that "decomposition" isn't a realistic practice. For others, it appeared as understood and legitimated practice (or had nothing to say about scientific models and methods), but the global risk knowledge or risk assessment task (every risk, every interaction, every product on the market, every profile of consumer (habits, regime, drug intake, metabolism, …) seems colossal and to carry a lot of doubts. We could also add that participants are clearly in demand for simple/clear, practical tips or rules regarding FS risks, but at the same time realising (when explained) the complexity of the risk issues, from scientific risk assessment to administrative management, and at the same time the limits of such expectations. There is a kind of paradox in this, as consumers seem in fact convinced that all the risks should be assessed (and call for this), when at the same time realising it's potential infiniteness. This can underline a default in conceptualising uncertainty (that in our societies is to be elucidated through scientific progress), or more precisely in knowing how to "act in an uncertain world" (Callon, Lascoumes and Barthe, 2001).. what is obviously also a major challenge for public authorities as the "world" of FS, FF or other "alternative health products" seems quite close of what the authors describe as uncertainty and complexity.

To answer this set of remarks, it was discussed the idea of an **interactive public platform (a website)**, that would sum and centralize for the Belgian consumers all the risk-related informations about all FS, FF or other herbal preparations. This list, as ideally imagined by the participants, would be much more than a list of notified or non-notified products (which, more than unknown, doesn't seem very explicit nor teaching for them), as it would regroup every FS or assimilated product (so including food, some medicine, other herbal preparations, ...), detailing and summarizing at once all information about possible risks or hazards for each of them.

This platform could centralise, explain, translate and make objective/unbiased a lot of concerns, from foreign products warnings (coming from foreign health or food safety agencies) to scientific controversies and progresses in risk assessment, making explicit the various legal categories or definitions, as well as the various risk management strategies and risk assessment controversies.

One participant added that the risk assessment and risk communication systems or procedures, that is to say the various links and mediators connecting science, public authorities and the public, were like a "black-box" for her. Making these links and procedures explicit should accordingly also help the consumers to make clearer his opinion about FS risk management and risk communication, rather than making these procedures and links incomprehensible to them, unveiling the risk that consumers don't take legal procedures into consideration in the re-framing processes of their compromises, or in the modification of their consumption patterns regarding possible risks. Lacks of knowledge or of control in the FS risk management system shouldn't be turned mute, unaddressed, but be explained and even publicly discussed (what would

require other "participative" methods, that we will explore more in detail during the 2nd focus group session).

In the same direction, another participant asked what was under the terms "risk", "risk assessment" and "risk management", as it was often perceived by her to be the quest of the "zero-risk". It was answered to her that risk was defined through three dimensions : (1) the probability of hazard occurrence (and its characteristics or "nature"), (2) its degree of importance, and (3) its degree of acceptability (covering from social preoccupations to possible and realistic answers or management strategies of these risks). As a result, it appeared that risk management was much more the result of compromises and evolution of scientific knowledge, progressively narrowing the range of uncertainties (and so increasing acceptability of risks), than "total and pure control". This ideal would correspond more to "hazard" management of the risk management model operating in First Modernity as described by Ulrich Beck (Ulbig et al., 2010 ; Beck et Kropp, 2010), than the reality of "new", systemic and complex interactions-based health risks that we are to manage nowadays (even if this First Modernity model may still be the perception one could have of the ideal or guiding vision at work behind ongoing science's and public authorities' practices).

To come back to the internet tool, it appeared obvious to the participants that this internet platform should be independent and scientifically controlled, to prevent from any attempt of manipulation or propaganda. This is another major challenge surrounding this hypothetical tool, in the context of economic or industrial lobbying we experience with health products. We can underline, that the complexity one is about to face when addressing FS risk management seems more to give breath to ambiguity, manipulation and strategic play than allow "optimal self informed choice" on the market, and that these numerous "sensitive uncertainty zones" regarding FS status, properties or risks should be enlightened to consumers that seems too lack keys in a context where too much of a "black-box-design" is drawn (by legislation, industry, various social framings). This task could seem huge, but first it should address its own lack of knowledge and uncertainties, and second we hope we aren't the only ones that would find this tool useful and would want to improve it as well, for example discuss controversies on the effects, the risks, ... These actors would be mainly health professionals (from various disciplines, including nutrition, physiology and medicine), researchers (biology, bio-chemistry), but also consumers through representative channels.

As a result, if the independence of this communication tool can be guaranteed and if it fits to consumers expectations, questions and practices, this information tool could help a lot the empowerment of consumers when asked to make "right decisions" and have "good practices" in an uncertain world. This uncertainties make these "right" or "good" attitudes rather uncertain too, appearing more as the result of reframed compromises and choices, not always in the right direction, than the illusion about the rise of pure, completely safe attitudes that would emerge spontaneously. Finally, these "pure safe attitudes" are rather hard to define, and to apply as well (in the extreme position that would mean not to consume FS at all[26], or only "if necessary"... what remains largely subjective).

26 But we could also open the debate to food, medicine, lifestyles, … and the quest of purity will certainly quickly become discouraging or chimeric.

One participant made another original remark : considering that there are interactions between FS, food and medicine, and that in some case an aliment or a medicine can increase the effect or efficiency of a FS, wouldn't it be possible to try to use strategically **these interactions,** in a way that it serves one's interests (for instance boosting one's physical performances for sport) ? Considering that the effects of this kind of FS "self-chemistry" are largely unknown and that it could consequently increase the potential health risks, it's clear that no one should or would defend this kind of attitude towards FS without any scientific or medical basis. However, that a lot of consumers can make their own idea about "treatment", the nature and use of mixtures or elaborate consumption schemes, and discuss about it to friends or to sport partners (as explained during the FG), seems to be a potentially widespread attitude regarding FS consumption patterns. This observation is strengthened as we found out through the surveys that about 40% of FS consumers chose to consume FS on their own initiative or on a friend's advice, without any medical reference. "Intuitive knowledge", "feelings" or "unverified advices" are therefore major mechanisms to address when talking about FS' risk management. This underlines then that consumers shouldn't be talked to "as kids" anyway, as if they were "irrational" or didn't matter about risk concerns, a communication attitude that carries the risk in our view to be challenged or "brushed under the carpet" by consumers . They do have a comprehension of how FS work (certainly lacking scientific or medical rooting), as well as detached, critical judgement, but this judgement shall according to us be activated on his own, rather than thinking that it can be "telegraphed" through a kind of paternalistic, simplistic communication campaign (aiming for instance only practitioners, "mainstream" consumers, and/or pharmacists or other retailers).

What arose also from the surveys and confirms during the first FG session is the fact that there are **very different profiles of consumers** ; this was previously evoked, but it became clearer when discussing about FS that this variety in "profiles" is in fact very deeply rooted. Variety in profiles doesn't come only from the type of product consumed or its particular purpose or "reason" (e.g. deficiency, prevention/reinforcement of "natural defences", tiredness, etc.) ; it's also driven by strong, challenging particular reasoning schemes about FS consumption, particular relations each consumer has with illness, performance, well-being, serenity or a "balanced life", their past experiences with conventional medicine or all "alternative" ones that would have oriented their present FS consumption, the choice of "natural", over-the-counter products. This very strong experience is just making them become a legitimate reference or "self-made expert", as they know the best what's good for them, as they "listen to their bodies" for sometimes a very long time. We could also add that this seems even more true (and so a little more challenging) as some doctors can support this reasoning a lot, and that the edge of the knowledge of many (generalists) is often reached when talking about nutrition, food supplements, complex interactions (requiring long-term analysis), functional or novel food, etc. This is also according to us an increasing tendency, as more and more people manage to get informations on internet websites or "forums". Those "informations" are mainly unverified and would hardly correspond to each reader's case, a risk that consumers seem aware of, but that could nevertheless "make his way" through their minds. "What if I tried ?" "He did it, I

could too..." "or simply "Seems nice !" or "Seems to correspond to what I want/need..." "He takes this from years on, and he's still nice" …

This very important remark came from a participants, that said that as a FS consumer had the impression to know his body and how it reacts, as well for sort-term effects of consumed FS. But the question remains open for the long term effects, as our intuitive and very close knowledge of our bodies could on a 20 or 30 years-term could turn out to have been betrayal. So he was aware of this risk of betrayal (what could not be the case for anyone), but didn't know how to equip himself to protect from it other than by stopping FS consumption (or other food similarly concerned), as *"we live a time where we don't even know what "eating well" or "balanced diet" means"*. Another participant added that this was *"true that we often tell to ourselves than without any risk notice, there should not be any risk, but... it's of course false. (…) The problem is that we just don't care enough, and we apply the logic "until now, everything's fine", so..."*

2.6.3. Results of second risk focus group session (16th December 2010)

2.6.3.1. Brainstorming about risk concerns surrounding FS and FF consumption, and discussion of the issues raised by consumers *(see Annex 2, Fig.1)*

After having slightly resumed the tasks to be done, we asked the participants to express their various concerns regarding FS security or risks associated with FS consumption. Those concerns will be detailed here as they were expressed by consumers, regrouped by issue.

- Quality of FS (and of "health products" in general) :

First concern was to know how can one have confidence in the quality of the products sold (their composition, concentrations in active substances, pollutants, etc.), as well as in the quality, efficiency and independence of quality controls ? (This remark was aiming auto-control from producers as well as controls realised by governmental health or food safety agencies).

Another participant raised the idea of commanding FS or other "health products" analysis on her own, as a consumer. If this is not too expensive, it would be "the" reassuring solution for three consumers, regarding independence of controls.

However, for other consumers, this was a manifestation of a confusion between the roles and responsibilities of producers, public authorities and consumers. Why would these tests be paid by consumers, instead of by producers or public administration (if the product is present on the Belgian market) ?

Moreover, other problems were underlined by participants that disagreed with this option, underlining the lack of competences from consumers (even well-informed) : "What would the consumers make analyse ?" "Which questions will they ask, what will they want to know ?" "How will they interpret results if they appear to be complex ?" What about unasked and unanswered questions of risk assessments, all the uncertainties surrounding effects of products and mechanisms of action, interactions, …, that are challenges for scientists themselves ?

Another consumer wanted to know about the quality of the gelatin isolating the product (which is often under the form of powder in this case) : which colourants are

used ? How can the quality of the different compounds be globally stated, on the basis of individual or specific assessments that don't take possible interactions into account ?

The participant that raised the issue of "FS quality" wanted to know if there was a "blacklist" of products, brand or companies that don't respect elementary quality and safety rules. Other participants agreed on the idea of a label that could attest the quality of the products, and that consumers could easily distinguish agreed products. "Farmaplus" label was quoted, as well as "GMP" norm ("Good Manufacturing Practices"), but it appeared that consumers didn't mainly have even heard of these labels, and secondly that the ones that heard about these hardly knew what they meant, what they assessed.

Finally, it appeared that *"risks are to be still there despite controls !"* Do public authorities have to strengthen controls ? Increase independent controls on the basis of existing norms and regulations ? Strengthen or modify norms, methods of testing and analysis to be respected by producers ? All those questions just swirled around, as appears obvious for them that everything can't be regulated or controlled. But no one seemed to really know what was best.

- Resource-actors, advisers and advice on FS consumption :

It was then discussed the fact that, presently, no actor appeared to be a completely trustful, reliable nor infallible resource-person for giving advice on FS consumption … though they all could (or should) be, to some extent.

Practitioners, first : they generally don't have basic training, education, or don't have any interest in nutritional aspects, food supplements, "alternative therapies" or "soft therapies" (such as plant-therapies, homoeopathy, …) which they tend to advise against and/or discredit. This critic was developed by other participants :in the context (1) of a quickly increasing FS consumption, (2) of worrying nutritional concerns about food qualities eroding with saturation and pernicious effects of mass consumption and production systems, and (3) of critics and bad reactions or visions against conventional medication, practitioners just can't ignore FS and FF, nutritional and behavioural or practices aspects, nor alternative, "soft" therapies any more.

They (generalists, in particular) aren't moreover familiar with complex, highly contextual interactions analysis (including interactions with food, FS or "alternative therapies", lifestyles, ...). To summarize it, practitioners aren't recognized at good spokesperson for risk concerns of FS. All these concerns seem to render consequently null and void the idea raised by another participant to make FS prescription compulsory, unless practitioners follow specific training on those matters.

Practitioners were also criticised not to listen to patients, not to ask them to detail their regimes (excluding the opportunity to analyse food and FS interactions), etc. It was stunning that all participants declared having had problems finding a practitioner that suited their needs...or it needed long-time research !

"If someone wants a real, sound advice, he should go to a specialist's, but he's expensive and isn't refunded by mutual insurances companies (…) Everyone can't afford a specialist ! ".

Pharmacists : they have on the other hand followed a training on FS. Some of them are more specialised in “alternative therapies”, naturopathy or homoeopathy, even manufacturing their own “FS” or preparations.

With their reassuring medical and products knowledge, they can often allow to prevent from seeing a doctor (and save 30€) by giving simple advice (especially for FS or other products that are sold over-the-counter).

Asking medical advices to pharmacists is also encouraged by the fact that, beyond the apparently often problematic doctor-patient relationship, the doctor's advice itself is sometimes criticised or challenged by patients : *“they prescribe only strong, devastating medication”* ; *“drugs is the easy way, but in the long term it weakens you more than the opposite”*, ...

Pharmacists were thought to have a potentially great role regarding FS consumption, consumer advising and risk communication. We could though wonder whether they will have the time or will to endorse this role, but this is a way to explore.

Herbalists : as some have a specific training on nutrition and on FS or plant preparations, they can be reassuring advisers too. However, they appeared less reliable or convincing than pharmacists, probably for training reasons.

Administration and governmental agencies were surprisingly not quoted by consumers, their action being seen to be more at the level of production and market control (interacting with each category of health actor) than at the level of consumers or consumer advice.

Scientists' roles were neither much discussed. These roles depend obviously on the structures scientists work into : industries, professional health sectors, private companies or private laboratories, governmental agencies, universities, etc. However, for our participants, the importance of the roles of science (namely development of products, their quality and risks assessments, and assure their reliability, exhaustivity and accuracy) was underlined and was seen as insufficiently sustained (or lacking independence from interests groups).

Sport trainers or coaches were also quoted as resource people for sportsmen, having also training in physical concerns and often interested in FS used for sport (often the boosting of performances, the optimising of protein assimilation, muscle-building, ...).

Internet was also quoted, as the first, more diversified, always available and cheapest source of “knowledge” and “advice”. The point with Internet lies mainly in its lack of control. We will come back to Internet shortly in the following paragraph.

Other advisers are friends (sport-friends, for example, that can have a lot of authority for some), family, advertisement, folders or leaflets, articles, etc.

- The Internet : flood of advice on FS consumption, and uncontrolled purchase of FS :

Internet was described as a very used, useful and interesting tool by participants, that all used it quite frequently to gather information about FS, or by some participants

for purchasing FS. *"Internet is the largest database on products, advice or simply information, and it's free and always open (…) everyone uses it".*

However, the first remark in this topic addressed the reliability (quality, accuracy and objectivity) of the information, "tips" or "advice" one can find on the Internet. This may concern : products themselves, their purposes or ways of use, some promises about their usefulness, or on the probable risks, etc. Those information are often unverified sayings or only opinions (especially on public health-related forums), un-assessed by health professionals or scientists, can contain misleading and even dangerous information, and therefore have to be taken very carefully. *"Internet use requires critical mind, all the time ! (...) education from the users should be trained, because everything is possible and uncontrolled on the Internet"*... *"even ordering drug"*.

Moreover, scientific, objective information related to FS or other products is generally too complex to be understood by consumers, and would therefore need to be summarised or "translated" by intermediary actors if we don't want to create more confusion through floods of "information", as it is now. Even if this was not underlined by consumers, it appears to us that it would be important to balance the conclusions that would come from such scientific assessments, and put them in perspective or warn against eventual controversies.

Let's now move to Internet purchase of FS : this was described positively by the participants that had already bought FS or health products on the Internet. "*This is cheaper", (talking about AZMA) "you have a much larger choice in products, as often one retailer sells only one or two products in per type or purpose*", "*you get access to products sold abroad, that are not on the Belgian market (though I don't want to infringe the law), products that you may have heard of, that you want to try but that you can't find in shops*", what offers larger perspectives to consumers. "*New products, or other producers or type of processes can have sometimes better reviews*", or display other "*promises*".

The counterpart, underlined by the participants that already did the step of Internet purchase, as well as by every others, was that this practice required also a lot of critical mind and of education from users, and even more than information gathering as purchasing FS is the last step before consumption ! The problem is still the same : how can consumers build a strong, objective and efficient critical mind ? Can it only take the form of more "radical" positions, for example like this participant's : *"I don't thrust products that come from abroad, especially Asia (…) I shouldn't buy nor eat something coming from nowhere"*. Where can they find reliable and verified information, unlinked to marketing lobbies ? Information that empowers them more than increases blur and misunderstandings, as it seems to be the case by now ?

This question on how to train "critical mind" is capital to Internet concerns. It should make consumers aware of dangerous mechanisms, such as : the tendency "not to listen well to his body", or to "be misunderstood" by his body" (linked to the placebo effect) ; the tendency to always think that something is going wrong (that is tendency to hypochondria) ; the tendency to take assumptions or advice for granted, or to think they are transposable between consumers ; etc.

Indeed, the various attitudes and concerns of participants also appeared to us as a kind of "fatalist" attitude. The overall pernicious effects of Internet, even if criticised by some, were rather took for granted by the majority of consumers : it was judged very difficult to regulate Internet directly (addressing especially foreign web-masters or

internet-based enterprises), and to prevent consumers from going on some "dangerous" sites.

However, it seemed obvious that "some things should be done better" : for example, to improve assessment and control of information and advice found on the web, or generally to empower or guide users in face of all these risks of manipulation in a context of apparent growing complexity.

- The absence of notice of use of FS (unlike medicine or drugs) :

Consumers found rather strange that there was no obligation for producers to sell FS along with a notice. This was seen as a problem for a lot of participants, as they tend to see FS on the mode of medicine or drugs (even is FS are seen as "soft" or partly "natural" products). Consumers would then want to know which tests have been done on products, which interaction risks (with medicine, especially) are consumers exposed to, and other informations about products.

A more precise notice would attest the realization by producers of testing and analysis of the effects or risks associated with products, and would then be a good solution for consumers that have a lot of unanswered questions. The problem, that didn't appear to consumers, lies in the fact that the vast majority of producers would certainly be opposed to heavier constraints and procedures as well as implementing expensive, long-lasting testing schemes that risks to be economically harmful to them. In fact, that is a part of the explanation in the increase of FS market-shares, as FS are (1) non-medical products[27], and therefore assessing effects and risks, through in vivo experimentation and pharmaceutical or toxicological studies isn't compulsive ; this allows producers to save huge costs and other constraints ; and (2) as FS are sold over-the-counter, they don't have to be prescribed by a doctor, which allow self-prescription and allow patients to move away from practitioners. These, we have seen, are often criticised, themselves, and their binge of *"chemical crap"* (that is conventional medicine and medication). Or simply, they are also some consumers that challenge their practitioners 'advice (as the latter systematically disagrees on FS consumption or "alternative medicine"), and thrust their opinions, body feelings, readings or informal advice.

- Differences in consumption patterns of "health products" or "FS" :

27 ...even if FS seem to be at first sight generally treated by consumers on a similar model than the one of "medical products", for example using systematically the appellations of "health products" (or only "product", not "food") and "alternative medicine" or "therapies". But this FS-consumption model appears to be multiple, and emerging one (accordingly to the hypothesis we emitted in the analysis of first risk focus group), as these "alternative health products" that are FS and assimilated are not well defined and are associated with various representations, purposes and modes of use among very diverse consumers. This model appeared partly as a mix of the "food consumption" and "medicine intake" models, but has new dimensions and appears to be much more diversified along consumption patterns, more based on self-made opinions, personal history and past experiences of FS consumers with conventional medicine, personal feelings, etc. Finally, this new model appears much more built on widespread uncertainties and lack of information than the one of medicine, which relied mainly on doctors and health professionals' prescriptions. This new, emerging multi-model should not however not be seen as completely incomprehensible, nor completely "unleashed" or "uncontrolled", as the majority of consumers don't do anything completely insane or risky but do and re-evaluate compromises, trying for example to gather knowledge and capitalise experience or competences in health or in the products they use : *"We make experimentation, we share our readings, experiences and discoveries*".

This topic, already discussed in the analysis of first risk focus group, was again raised by consumers, that underlined that there were very diverse "philosophies", purposes or modes of consumption, linked to various "types" of products (FS or so-called "health product") and to various representations consumers had about them.

This heterogeneity in product types that are named FS (or that consumers didn't really know how to name, other than "alternative medicine", realising that FS can also be products that are perceived by some as "doping" for sport) seems to be a challenge for consumer understanding of the health products market, or simply to be able to make a clear statement of "what we talk about when talking about FS".

These differences render obvious that there are different advisers for FS consumption, according to consumer's use and patterns of FS consumption. Moreover, we could add that there is a diversity in consumers' relations with the body (confidence in feelings or physical sensations, …), a diversity in one's confidence in auto-prescription, or in the definition, recognition and acceptance one has of "risks". This can quickly become really complicated, as there are also a lot of schools of thought in "alternative medicine" or alternative, "soft" therapies.

- Complexity of risk issues surrounding FS and other "health products" :

Some participants, if not every of them, declared to have been "shaken" by the presentation of the results of the Foodinter research, that they found fairly interesting : they didn't know that risk concerns regarding FS could be so numerous (even if some participants were already well documented) and not well understood at the same time, even by scientists. They did neither thought that there were so many interaction risks, and that they could be also so significant for products sold as "soft", non harmful products.

They learned that there were a lot of contaminants and toxic compounds that have to be monitored. They also learned that there were a lot of active compounds (even for one specific product), an that those active principles can sometimes be unknown (for example for Maca) or controversial between scientists and experts (for example for Sint-John's wort), while the product can nevertheless be allowed on the market. In the same direction, they underlined the huge number of products (used for a lot of purposes, by many different consumer profiles or history, or along various consumption patterns, ...). They also stressed that there can be big difference between products that are similar in appearance, or in main active principle : differences in quality and controls, in active principles concentration, in production processes (which part of plants or raw materials is used ? How is it transformed ? Where does it come from ? …), in taste or aspect of products, etc.

This made many of them realise that there were a lot of unanswered questions and uncertainties around FS (even for scientists!), such as long-term effects of frequent FS consumption, or potentially infinite interactions effects, and that scientific progress is very slow in complex interactions contexts, having to move "brick by brick" and elucidate controversies.

This is also to be linked with the differences in definitions or categories building of extensive "health-products" ; "What is a FS , what is a health product ?" For consumers, this distinction and "border-building" between FS, other "alternative health

products", medicine, and food is not clear nor socially shared at all. They moreover wonder how these categories could be clear for the public administration itself.

Finally, this complexity or diversity appears very challenging for consumers, that really need more information on products, what there is inside, what they do, how to use them, which precautions should consumers take, etc. These are minimal conditions for consumers in order to know which product to choose, among a very large range. By now, it appears very hard (if not impossible) for them to easily comprehend these subtle differences, to distinguish without fail between two similar products and finally choose the safer one, or the one with the more concentration, with no allergenic compounds, etc. They accordingly expressed the need for reliable informations (on labels, through certification, …), underlining a lack of (good) information that appears as a paradox in a context of growing complexity (we can also associate "technicity" with complexity), in which the decision or risk management is often let at the appreciation of "destitute" consumers. *(This will be developed in next paragraph).*

We can reflect upon this assumption, linking it to a remark we made in section 2.1, regarding disagreements around Regulation 2004/24/EC : our discussion groups showed that consumers can at the same moment ask for more information, more risk assessment, more analysis and experimentation of products by consumers or public agencies, and still defend handmade, "traditional", plant-based treatments. We could add that they are also often criticising large pharmaceutical companies... that are however the only ones that could afford the required testing in the present legislative and economic context !

- Important need for "good information" ; but what *is*, and how to develop "good information" ?

The definition or qualities of "good" information would be : true and verified, scientifically proved and uncontroversial ; objective, unbiased ; reflexive, educative, allow consumers' "empowerment" mainly through critical mind training (which is was described by a participant as a pillar of "good information" and responsible behaviour).

"Good information" should also allow the building of practical knowledge for consumers : allow "informed choice" of products, be easily recognisable even if assessing complex and partly uncertain risks, inform on content, effects (including potential interactions or side-effects), etc.

However, this ideal vision was challenged by another participant, who asked whether this was possible to have information that is exhaustive and infallible, considering (1) the complexity of risk issues and what we could name "systemic lack of information" ; (2) the difficulties of risk assessment, and uncertainties or controversies surrounding them (even from experts' standpoint) ; (3) the rate of evolution of products, but also of the legislation, of the market (especially on the internet), but also the multiplication of unproven and untrusted advice, information and "platforms" one can find on the internet.

It was said that these challenges, that seem to be hard to overtook in the current paradigm of risk management, should rather be acknowledged and explained through a communication process, rather then be "brushed them under the carpet". This would

decrease misunderstandings, or unproven convictions (among consumers, but also among health professionals!), allowing to face in an objective way "the truth" of complex risk knowledge and risk assessment for the one who wants to, rather than make up for its comprehension through silence, or with bare opinions, "personal convictions", simplistic reasoning or unproven sayings.

- Misunderstandings on the notification procedure :

The notification procedure (as well as the list of notified food, FS and FF), as well as the obligation for pharmacists to sell only notified FS, wasn't known by the vast majority of participants. After giving them a piece of information on this, they wondered how one could treat and act with all the "health products" that (1) have still not been notified ; (2) have been rejected (the "non-notified products") ; (3) are "other products", or "traditional herbal medicinal products".

Following, they did not really seemed to comprehend administrative classifications and categories, not understanding clearly the differences between those. Moreover, there is a lot of ambiguity around "herbal medicinal products" and obviously "other products".

They deplored that notification procedure does not assess for "long term risks", based on frequent, long term FS consumption, and makes complete silence on interactions, uncertainties, or controversial issues such as efficiency (issues that have all to be assessed through complex, large-scale and expensive experimentation schemes.

Finally, participants also deplored weak control and products analysis capacities from administration : only a few people work in this federal public service that has to examine every one of the thousands of products, they don't systematically test the products on their own nor conduct deeper analysis, etc.

- Lobbying from industry, marketing practices and "marketing plays" :

Participants finally expressed concerns about lobbying, mainly from pharmaceutical industries, that was a major challenge for the objectivity of all the informations consumers could find, from those found on the Internet until even the ones they could be given from practitioners or pharmacists themselves. Suspicion seems then to be widespread, even though interest in FS and "alternative health products", as well as their consumption are still growing.

Lobbying from large interest groups was also suspected of pushing regulation, or official documents such as the Belgian Nutrition Plan) so that it doesn't harm big companies (in other words, in order to protect or increase their interests), as they can have much more influencing power than small or middle-size firms.

We could also add the remark of participants that "modern system" tended to privatise plants or "natural treatments" that have been used for centuries on, putting a product name on it and isolating active principles or mixing compounds in whatever new or original way. But by doing this, they also will tend to defend and propagate the view that their product is better than those "at natural", and can defend and prove it through scientific assessment that gives them the right to defend such claims...while on the other side other qualities of such "as natural" products are at the same time

misunderstood[28] and undefended by an representative of Nature and "pure objectivity" (or only by small groups of scientists or militants, too often disconnected from the centres of decision, that are *"the realm of economic and other power plays"*).

2.6.3.2. Recommendations and priorities setting in risk communication and management, as discussed by consumers *(see Annex 2, Fig.2)*

- Publish videos, short TV spots or programmes, internet capsules, ...

The first proposition, in order to enhance and stimulate critical mind, the need to be informed, to confront opposite advices, was to publish videos or TV spots or programmes about FS risks, or consumption advices. *"Because we can hear anything and it's opposite about so-called health products !"*

These videos could warn against products with unknown origin, or unknown composition. They should be educative, serious, but not too paternalistic nor too moralizing. They should also display clear messages, such as "overconsumption is always a bad thing", "don't take too many different products at once / don't mix too many products", or "don't buy from the Internet".

A remarks though is, such as leaflets that may simply not be read or not well understood, videos might also not be seen. Therefore, the communication process should ideally reach every consumer and draw their attention, through multiple channels, from higly publicised to more tailored ones, and activate consumers' interest and implication. "Implication", or "participation", means that concerned, serious consumers should be sometimes given more voice (in the range of their honestly self-assessed competencies, and for matters engaging their representations, practices or behaviour) ...like it is for risks concerns in Foodinter project.

- Development of an integrated website or "portal"

As discussed in the focus group, a website could be a potentially very powerful tool to stimulate critical mind too, as well as to provide simple, trusted information or tips.

Information should be clear (and allowing to be deepened while allowing the web user to stay on the same web platform, for the ones that are interested to know more) ; exhaustive (or be a platform for other websites, as well as for a critical opinion on them) ; objective and independent, saying "the truth" and serving consumers' health interests ; regularly updated, and providing "thematic discussions" or "articles" (as in reviews) ; allowing to ask more information if needed (or provide with contacts of health advisers or experts of FS management).

This was pictured by another participant as a "Wikipedia-like" for food supplements, that is a widely shared reference. The website is pictured as a platform, database on FS and health products, providing consumers (and other actors) with

28 And even more and more misunderstood as we lose along the knowledge that is related to those "traditional" substances and their uses, as consumers may as well : loose credibility in face of marketing (and the global system of modern, capitalist societies) ; get drawn into the complexity stimulated around proper ways of therapy (and rather directly serving the industry's interests (food and FS or "health products")) ; or simply obviously die like anyone else, beeing then replaced by tenants of "business as usual". The list could be indeed very long.

references ordered along products (ordered along categories of consumers : by commercial name, "purpose" of use or consumption pattern)[29], and giving a lot of verified, objective information for each product or product family. Following such remarks and expectancies, we thought about the idea of a "risk barometer", ranging from green to red, displaying red if different combinations of factors are observed (for instance, the presence of a certain substance in the product ; a precise origin that is known to be risky ; a product bought from a certain website or supplier ; a product used in combination with other food or drugs (and which ones) ; ...). This would of course be simplistic, but would present the advantage of clarity ; moreover, this could be detailed and nuanced for each specific factor.

Such a platform could eventually create educative exchanges, cooperation (and *be improved by* high cooperation) between health professionals or other FS specialists, consumers and public agencies (why not from different countries), and other actors around the assessment, communication and management of risks surrounding FS and other health products. This could also be a resource portal for trainings on FS addressed to professionals of the "extended health sector".

Another idea was to publish a blacklist of suspicious products for consumers, provided with references and medical validation, or oppositely a list of trusted and verified Internet retailers or products that can be found on the web.

Following the same idea, why not publishing a list or "phone book" of health specialists (specialised in nutrition, alternative medicines, homoeopathy, naturopathy or plant-based therapies, …) that attended (and succeeded!) trainings on FS or nutrition ? Those could be very important advisers (if objective), but are very hard to find and to afford.

This rises however two problems : the first is the problem of "humbuggers", and of how to attest professionals' experience and competences, as well as independence of advice ? ; the second lies in the originality of such a procedure, that might be instrumentalised or simply challenged by some in its legitimacy.

Then was discussed the proposition of creating a public forum (like for instance "*Doctissimo*"), allowing as in every forum consumers to ask questions, share preoccupations, exchange experiences, … However, the envisaged forum should be more than that, as it should be mastered and moderated by scientists or health specialists, to assess objectivity of sayings, and prevent from saying anything unproven (unlike it is for the vast majority of public, "health" forums).

There could be multiple sub-sections : one for health professionals, one for researchers, one for consumers, one for producers, ... Interactions between those sections should been made when useful, but the goal is to help consumers simply and directly found the discussions they want, that those discussions be of good quality, and make their way easier through the various links and possible repetitions (or nuances) one can find in forums.

One positive point of this idea was that such an ideally described forum could be the basis for the development of databases on consumers experiences, practices and

29 Indeed, the platform should also help consumers to find their way among scientific names of active principles, administrative classification, products or product-families names (and their differences), purposes and users categories (unclearly defined), etc.

opinions with related products or therapies, and always framed by scientists' or doctors' advices. If well managed, this could even allow "nearly-scientific" knowledge building, "unitiated" *in vivo* knowledge accumulation. *"I deplore that in forums, we all share experiences, some trying to do it very honestly and giving very good, safe advice, but there is no sharing of them at a higher level, a level closer to scientific or medical knowledge progress, or the level of management of products. (…) All we say can be useful for the some readers of the message post, but there is when you sum all these a lot of energy, unitiated experiences that could be useful if used in other ways". "Moreover, that means we could potentially be a lot to be interested in participating to in vivo experimentation, in a scientific frame, as we do experiences anyway in our daily consumption".*

Moreover, such a forum, even if it would remain a form of "cheap consumer counselling", answers a need from consumers (that else would go on regular, uncontrolled forums), and would be better than wrong advice or no advice at all.

Another advantage that might be created through the web site is a centralisation of demands for consumers that would want to order FS analysis on their own (composition or risks analysis). It would allow people sharing the same concerns (or on the same products) to regroup demands, and have a secure, informed advised frame around (the web site), that should guarantee the quality of the analysis and of their interpretation(s).

Negative aspects were underlined : (1) that it seemed very challenging to prevent from the influence of industrial nor professional lobbies (that can be invisible) ; (2) that creating such a website seems a huge and long task (considering number of products on (and off) the market, the number of informations to assess or deconstruct, the redaction of different types of information (videos, simple consumption tips or concrete examples, but also theoretical, "reflexive" information). .. moreover if we add to this the need to keep the platform up-to-date and allow answering to questions. Cooperation between various co-moderators could therefore be a nice solution (as the task would need the cooperation of tens of specialists), but specific protocols have to be developed (to select them, to assess their competencies and objectivity, for retribution, etc.) ; (3) that it appears hard to make this platform quickly and clearly become a widely shared reference for FS consumers, when one compares it with the popularity of *Doctissimo* for instance. This underlines that this would need advertising strategies too, or "Google ad-words referencing" ; and (4) that increasing the availability and quality (assessed, independent) of free advice about "alternative health products" is a good thing, but that it could also consequently increase the risk of maladapted, blind self-medication...what should bewared.

- Improve/consolidate the roles and responsibilities of health professionals in risk communication and management (including advice)

The importance to better train health professionals and doctors (in particular general practitioners) was firstly underlined. This lack of training, or unsatisfied need from patients, as discussed in during brainstorming, concerns food and nutrition as well

as FS and "alternative health products" or "alternative therapies"[30], and complexity inquiring : "*[...] doctors don't really have a culture of complexity, [...] they prescribe pills that fit a specific function, that's it, simple !*").

For pharmacists, it was thought that their advising role should be improved and encouraged, especially regarding the status of FS (that don't require prescription, and are seen are "safe" products) and the fact that consumers want cheap advice, cannot afford for "the specialist".

Then, as discussed for the Internet platform, it should be made easier for consumers to find good, experienced practitioners that would suit their needs...why not through the publication of a list of "quality-certified" professionals ?

Finally, for situations of consumption to be defined, the health system (i.e. mutual insurances companies) should allow patients have tailored medical advice even if a consumer can't afford a specialist (who is not refunded).

- Certification

As discussed, certification systems are not very numerous (or not known by consumers) on the FS and "alternative health products" markets. Therefore, certification appears as a (way of) solution for consumers who want to see more assessed informations appear clearly on labels. This would enhance and encourage the will from consumers to choose certified products (for instance, *Farmaplus* label was quoted). However, as discussed for Farmaplus label, it was not clear what tests were assessed by this label ; it assesses "more quality", "through the verification of legal and analytical aspects" (Farmaplus website). But which aspects precisely ? Making explicit what certifications precisely mean is therefore very important, if we want them to be really useful and trusted by consumers : which tests and experimentations have been done (sending back to the "medicine model") ? In which conditions and under which hypothesis ? To what extent can conclusions be generalised ?

Some problems have been underline in this set of recommendations : first is that certification (such as quality norms, analysis and tests to be realised to assess risks, …) generally benefit to larger producers, in the sense that they represent relatively heavier costs for small manufacturers. Theses "small manufacturers" have to remain on the market, as their products may be found better, or as some consumers "won't buy anything from large pharmaceutical groups, that would finally be the only actors in the markets of health products and "alternative health as well. What would then mean "alternative" ?". This could underline the need for new types of certifications.

Second problem is that certification remains a voluntary practice from producers, until either this becomes enforced trough a new law, or either consumers don't buy anything that isn't certified and trusted (which isn't really about to happen).

Last problem lies in the usefulness of such a label (expensive for producers) for products that have to be sold by pharmacists or other specialists (who know the products they sell, know their suppliers and their modes of production, assess their conformity to legal requirements, can answer questions from and give advice to consumers (assuming they have been well trained and admit the limits of their knowledges (even if this can become counter-productive regarding marketing)), etc.).

30 Even if they may disagree with these "alternative therapies", they could give advice that can be based on patients' views and practices ("listen to them"), so not necessarily prescribe "conventional medication", to finally try not to break the precious doctor-patient relationship.

- Make the notices of use of FS and "alternative health products" compulsory and more complete than current labels

A notice of use could assess the various interaction-risks (assessing the realisation of sufficient *in vivo* or *in vitro* experimentation, and strengthened constraints on producers before a product can be released on the market), or other risks. It could then regroup recommendations for more sensitive populations (children, pregnant women, …), or for consumption in association with other products (food, medicine, …). However, such an obligation would completely make FS management switch on the "medicine management model", and lead to the same problems than stated above regarding certification, mainly that it is hardly bearable by small producers.

Distinctions could then be made between products, for example regarding the past consumption problems (reported and documented, scientifically assessed), the proportion of doubts or uncertainties about (undesired) effects (that can be inexistent for some products, or related to very specific populations), the concentrations, the active principles and other compounds (that can for example be the origin of an allergic reaction),...

- More information on labels

More information is needed on labels, to inform and ease consumer choice, encourage consumers to choose safer products, with identified compounds, their proportions (explained and standardised, to ease comparisons between products) and concentrations (or minimal and maximal ranges of concentration).

There lies also, behind this call for more information, a need to better identify what "safer" means, what is a "safer product" ; even though remarks were made about the notification process, the notification number should be made compulsory, as well as the country of origin (raw material, manufacturing, conditioning, …) ; in the same idea, certifications should be displayed on labels to assess various qualities of products.

- Improve the efficiency of the public service managing FS quality and risks concerns

How could the efficiency of public services about FS risk management be improved ? Wouldn't the service be more efficient with more people working in it ? Couldn't the efficiency of the service be improved if it made only one or two types of assessments, such as quality controls or analysis of FS-compounds, rather than trying to analyse everything ? Couldn't different team work together (one on the quality, one on the composition, one on the label, …) ?

Another original idea was raised : as it appears that national agencies may be overtaken by the extent of the task, lacking capacities to do the huge notification job, or more deeply to recast and improve procedures, why not thinking about implementing an international notification scheme (European, for instance, or based on international cooperation), to increase the capacities and efficiency of the various national agencies through cooperation ?

- Centralization of FS and "health products" retailing

It was finally discussed the proposition of increasing regulation and control of retailing of FS and other so-called "health products". Why not centralising FS retailing, only allowing it from two or three kinds of shops : from pharmacies (pharmacists having had a specific training on FS and medicine-interactions) for conventional FS such as vitamins, minerals, … and other products aiming at curing a specific ache or chronic diseases (on the mode of medicine)[31] ; Herbalist's shops for "alternative plant-based health products" or "traditional herbal medicinal products" (assuming they are given a specific training on substances, their qualities, interaction risks, …) ; "health food shops" for what concerns nutritional allergies, chronic nutritional deficiencies, … ; specific shops for "sport profile", that is FS consumption in order to boost one's performances ; … ?

This strategy would allow more control of the market, by creating distinct management schemes and distinct patterns of advice, according to product types and classification as is (though this is a controversial task) and also according to its purposes of use or "consumption pattern" (what seems less controversial, but has to be experienced).

2.7. Synthesis and reflections on the results of surveys and risk focus groups

2.7.1. Unclear definition of "food supplements" and low understanding of the management system of food supplements from FS consumers

Respondents to surveys do not exactly know what kind of preparations can be categorized as food supplements, showing for example a lot of hesitation for vitamins and plant extracts or oils.

This is to be linked with the "blurry" and hardly shared status of FS – be it among consumers or between them and the law, networks of scientists or experts, professionals, … . This status (and even legal definitions) is see-sawing between food and medicine, making the "category" of FS appear as a very heterogeneous one, even for some a "non-category" or a marketing invention (as the products sold under this appellation existed far before their large scale marketing, and often in different forms or processed differently).

So do FS give the beneficial effects of both medicinal products and food without being any, *stricto sensu* ? Moreover, how could the product be more precisely defined than by a literal definition, such as "FS complete nutrition" , which is the definition given by the vast majority of interviewees ? We can argue that this indeed doesn't mean anything as we are supposed to feed well – why couldn't a banana be envisaged as a FS, then ? In the same sense, to what products sends the expression "alternative health

31 Was raised again the idea of making FS prescription compulsory, but this wasn't agreed by every participant as a realisable/good evolution (due to lack of knowledge, competencies and/or will from practitioners, but also due to the increase of expenses this would require), nor desirable one (as some consumers want to keep their freedom, going on evolving in a "liberalised" market of health products and not being forced to stop or change their FS consumption if they don't feel the inner need to do so).

products" ? How do we qualify "health" ? How can we make a frontier between the "conventional" and the "alternative" ? Where are the marks ?

This "blurry vision" seems to be exacerbated since a lot of actors, from the producers, media and advertisements to the advice given by a relative, perpetrate this blur and "convince" with arguments crossing the fields of prevention, treatment, performances or well-being, where positive aspects can always be put at the front.

The way that regulation and administration have chosen is to try to stabilize categories, and to examine each product in turn. Products are to be sorted in "FS" category (regulated as food) or medicinal product ; but this seems very complex and unknown or misunderstood by the public ! Consumers didn't understand well the categories of law ("medical product", "food supplement", "herbal medicinal product", "other", "non-notified product", ...)[32] and what they trustfully assess, while the same seems true for quality controls. This unveils the important question of the trust in production and risk management actors, as well as in the risk management system and procedures themselves. It is hard to believe that consumers frame or define these "categories" similarly than regulation, when stating that *"food is the first medicine".* They then surely don't frame similarly the interconnections of these categories following their naming : if we nourish always properly, will we need medicine or FS any more ? This raises also the question of the globally degrading quality of food in "modern" societies, that we fail to address when compensating with FS...but which represents at the same time an important motivation for some consumers to take FS !

Indeed, for consumers, FS consumption (or assimilated products) isn't rooted in a cold and closed definition, and is neither a mechanical act, but a living, a personal experience, rooted in their history, habits, thoughts, representations and values, and mixing the field of nutrition with the one of medicine. Citizens seem sometimes to loose their marks in the "societal myst" surrounding medicine nowadays (and extensively any form of therapy) and health risks (for instance linked with food quality), our relation with those "schools of therapy", with the products, …

For instance, we can underline two paradoxes, the first being that consumers can at the same time being aware of the existence of risks (health risks, the risk of uselessness of products (or "manipulation"), of the fact that producers or professionals can be criticized for lobbying, are not always entirely reliable or neutral, as built their activity, products or services range mainly to make profit, …)... and yet users of these products ! The second paradox we noticed is a gap between a will from some consumers to move away from conventional medicine, dismissed by some as functional, purpose-oriented, … while perpetuating indeed the same paradigm with other, whatever "new", "alternative", "natural", "soft" products that are in particular food supplements. Those are seen positively as long as they hold the promise to cope with deficiencies, tiredness, are presented as "natural" (whatever that means), etc. We can therefore say that food supplements are envisaged by consumers as solutions to other, greater risks, such as the

32 The differences between a medicine and a food supplement (defined as food in legislation) is not even clearly established in the regulation ; this is striking in the legal definitions of those products (see Directive 2001/83 for medicine (Article 1, §1, 2 and 3), and Directive 2002/46 for food supplements (Article 2)). Ambiguity seems well present, what can make the interpretation work from the SPF SCAE very hard (De Gryse P., personal communication). We can notice than plant-based products are problematic, since they are no "nutrients" nor "vitamins" and so are no "conventional" food supplements.

eroding quality of modern, industrial food, a perception that could minimize the risk awareness.

Food and medicine are possessed by a symbolic dimension that shouldn't be underestimated when assessing social representations of FS or FF. Food and medicine represent two very different pools of images and representations that are both activated and mixed in complex, sometimes paradoxical ways when consumers are put in front of FS, which we can define as "hybrids".

2.7.2. A high heterogeneity in consumer "profiles" and consumption patterns

This heterogeneity can be detailed through the following dimensions : we could first observe a high heterogeneity in consumer motivations or in objectives they pursue through FS consumption. This diversity doesn't necessarily cross legislation categories (nutrients, vitamins and minerals, plant-based FS), and this is especially true for plant-based FS which indeed send back to a very heterogeneous range of applications, uses or "purposes of consumption".

This was slightly noticeable through the surveys, but was verified through focus groups with consumers. This first level of heterogeneity is according to us the most prominent to understand consumers practices and to design a suited communication strategy. Thus, other levels of heterogeneity detailed afterwards should be linked to this first heterogeneity in consumer profiles or consumption patterns.

This diversity (and diversity in the products used) can also be based upon gender : women seem to be relatively more interested in "well-being", alternative health and therapies, or diet ; male consumers seem from their side to be more interested in the boosting of performances (especially true for sport or fitness). But this shouldn't be envisaged dogmatically ; FS consumption depends of course on a lot of other factors, such as age or health situation (if one has chronicle diseases, deficiencies, etc.), and on other "subjective" criteria such as the degree of conviction in the products used and its effects, the mode of relation to a product regarded as "natural", the values, knowledge or tips transmitted from relatives (as well as practitioners, articles, ...), ...

Let's present the profiles or patterns we identified, presented here as ideal-types :

"Performance" profile (sport, studying/working), where FS consumption is motivated by (or "makes possible") the improvement of one's physical or mental capacities and performance. Performance seems rooted in a kind of functional "problem-solution" approach (the problem being to be not powerful enough, or to perceive that its physical or mental limits are too low compared to what is expected or "possible" thanks to new substances).
We could also widen the range of this "*performance*" category to include products used to *improve* anything, be it appearance, aesthetic, outline, hair or nails resistance, etc.
The link to "natural" or "health" seems to be the weakest in this profile, but would tends to reinforce when including aesthetic or outline purposes.

"Well-being" profile (or "smartening up", "healthy life", ... profiles), where FS consumption is motivated by the reach of balanced nutrition, long-lasting and "healthy" life (assuming that one could define these (1) differently than "the absence of troubles" and (2) in an objective way (as troubles are always "perceived" and are to be assessed through medicine)).
In this profile, "natural" qualities (though unclearly defined or assessed) of the product are central for consumers and even makes FS prevail on conventional medicine, which seems often perceived as very criticized and untrusted "chemical crap", that they want to avoid as much as possible. This relation to the "natural" in this profile is also central as unhealthy or "unnatural" diets and *"modern lifestyles [are] threatening and should be challenged"*. This appears again rather paradoxical, as for other consumers, FS consumption isn't considered as a solution as it can inherently give breath to "unnecessary" health products consumption, containing the risk to ingest "(chemical) crap" as well, when the look for a balanced and more healthy food would be required at the root. But FS, we can say, hold more promises than "normal food", may it be healthy, organic one : they are sold as acting quickly, being relatively cheap, not very harmful (thought sometime encouraged by relatives, articles, or the for the "reason" that FS are sold over-the-counter and can allow "self-treatment"), etc. … arguments that some consumers would want to be banned or dismantled by public health authorities as it stimulates FS consumption, and particularly unnecessary FS consumption.
For important this challenge of "having a healthy life" can be nowadays (what we don't judge here), we can ask where would the limits be, talking about ideals such as "well-being" or "harmony" ? How could it be defined ? How could this reasoning be empowered in face of manipulation or propaganda risks from the industry, pushing too far this ideal or "purity" model to boost consumption ?

"Deficiency" profile ; consumers are here more "forced to" take FS, as they may have a chronic illness (for instance digestion troubles) or particular deficiencies (for instance a mineral deficiency or temporary blood circulation troubles). We could therefore draw two sub-categories in the deficiency profile, or more likely continuum based on the length or frequency of the treatment, and its character of necessity towards the trouble.
The "curative", "problem-solving" dimension in this consumption profile is central, and could obviously hardly be addressed in the same manner the "performance" or "well-being" categories. Problems have to be objectified through medical assessment. What will also differ from those profiles is that this call for performance or "well-being" is virtually unlimited, and comes from a mix of psychological and social pressures, from society's increasing pace as well as from one's personal wills, myths and "dreams" about his body (pushing the limits further, reach "physical harmony", cope with tiredness, ...).
We could add that it can be sometimes very difficult to judge if one's troubles are "real" or perceived/exaggerated. They could also be caused by multiple and sustained auto-treatments consumers can do on their own, as some could also be some kind of "hypochondriac" ; in a lot of cases, it's also hard to say if the perceived "treatment" doesn't give breath to problems, or at least to their ongoing perception. Anyway, our role couldn't be to judge consumers on this very sensitive issue, and this would be more dependent on the competence of doctors and nutrition specialists.

But don't they sometimes lack competences, professional conscience, or simply time to overcome this task (such as interdisciplinary, long-term, complex and deep studies, interrelations between "the body" and the "mind", patient's relation to illness, …) ? We could also underline the concern of competition (or compromise to do) between cheap, but poor advice everyone can find on internet, and costly (to very costly for specialists) but good advice one has to ask his practitioner (and engage those complex, expensive, long-term analysis). Moreover, it can be sometimes very difficult to find a "good" practitioner, one who "gives real, useful tips", "is objective and doesn't look to manipulate you", or simply "one who listens to you", "one that takes the time to".

"Prevention" profile ; typical examples would be the autumn vitamins and minerals treatment, or omega-3 and -6 consumption. We have to warn that it can be sometimes hard to distinguish between "performance" and "prevention" profiles, as they may both be rooted in the same "improvement" logic, that insists for instance on the strengthening of natural defences and of "tonus" as well to remain healthy.
It's important to underline that this pattern is the more widespread among FS consumers, as shown through the surveys (about half of the respondents). They want to reinforce their immune system and fight against tiredness (what obviously corresponds to the vitamins and mineral cures) and stress. This consumption is recommended by practitioners for a long time on, and is rooted in "traditional" or "familial" medical practices.

… **(other profiles ?** (open model)**)**

This heterogeneity is also to be connected to a diversity in networks of advice, and of advisers or "mediators", that are people or information sources that influence FS consumption, links between the products and the consumers. Those links can be formal networks, such as for practitioners or specialists, but also more informal ones, such as private web sites (often partial or uncontrolled), but also sport trainers or "natural therapists", friends or relatives and their experiences ("uninitiated" knowledge), …

Labels and description of products are also important sources of information, as most of the interviewed consumers read labels and are convinced of the beneficial effects of the products as they are described by producers.

We can also point out various levels of information of consumers (or of "access to information") ; some are real "information-hunter" (and deplore huge lacks in "good information), while others will never look for any. This is also to be linked with different degrees in perception of risk by consumers.

A large part of questioned people (around 50%) do consume food supplements from their own initiative (without any medical advice), while around 50% took the decision on medical advice and 30% following relatives' advices (multiple answers). Consumers don't share the same relation with their practitioner or specialists (or extensively with medicine) : some can be disappointed by conventional medicine and its

range of questionable products, some won't, … It's another dimension that should be studied more in detail when designing the risk communication.

The frequency of consumption and the budget allocated to them is also variable ; a lot of consumers are regular customers (daily, weekly, or once/twice every year) but the monthly expense on FS is generally less than 40-50€ per month.

In order to better understand how FS consumption is qualified and defined by consumers, we propose to analyse those patterns of consumption with two models : the "medicine-intake model", and the "food-consumption model". Those are completely different in terms of practices of consumers, collective norms and representations, motivations, knowledge-building and networks of advice or "prescription" chains, etc.

Going on building the models, we could then break down the various patterns of consumption of "alternative health products" (FS or assimilated), that fall in those two categories, "medicine" and "food", along three dimensions :

(1) The relation with the body :

- For medicine-view, it cures a sickness or an ache (that has to be previously felt by the ill person, through physical or physiological manifestations)
- For food-view, it nourishes a body that feels hunger, and that also has specific tastes and preferences, that adapts to activities (work, sport and leisure, …)

(2) The prescription :

- Strong and imperative for medicine, assessed by practitioners
- Weak for food, let at personal appreciation

(3) The relation with knowledge :

- Expert knowledge for medicine
- Common or unitiated knowledge for food (i.e. situated in natural categories or references such as family and personal history, traditions, etc.)

The notification process, as well as concerns in risk managememnt among the scientific team of the Foodinter project, seem to treat implicitly FS consumption and risk management along the "medicine" model, with the consequence (among others) of fearing risky auto-medication of consumers, their potentially challenging attitude against scientific recommendations, or their lack of will to listen to scientific advice. In other words, the underlying model or reference is ordered on expert knowledge, that has to define, teach and enforce "good practice"...so to change the "bad" practices of the "uninformed consumers", or worse of "consumers that aren't able to understand the complexity and paradoxical aspects of the risk issues".

On the other hand, we find the model (implicit as well) of food consumption, that we suppose is based on taste and "spontaneous appreciation" from consumers, of what fits them or what is a "healthy food".

For consumers, the vision of FS along either "medicine" or "food" doesn't seem as clear nor socially shared, even if the reference to "health" or physiological effects is omnipresent in discussions (indeed, reference to health is also strong in the "food

model"). Indeed, we can see that FS consumers, depending on their "profile" or "pattern of consumption", make original combinations of the three compounds detailed above.

These new, emerging combinations (depicting new models of consumption) seem then to escape the management schemes, both of food and of medicine. The example of the consumer that can be prescribed FS by his practitioner is at the opposite of the consumer who wants to improve his sport performances, after a sport-friend suggested him to do so. What is more complicated, is the example of a patient taking FS as medicine, that chooses to consume FS to cure a disease despite advice from his doctor, that may for instance follow advices of other patients that have the same symptoms.

PROFILES	Body	Prescription	Knowledge
Prevention	strengthening of defenses	medium	expert and „traditional"
Insufficiency / curative	treatment / supplement	relatively strong	expert
Well-being	harmony, long life, ...	weak (or coming from „alternative practitioners")	very large ; (pseudo-)expert, but also common sense
Performance	push the limits further	very weak	pseudo-expert

We could consequently make two hypothesis :

one on the heterogeneity of mode of consumption, or "consumption patterns", which justifies different policies adapted to them.

the second on the emergence of a new type of consumption, that can't be qualified in a precise way, mixing compounds of the two models drawn. Examples of "the most emergent profiles" are according to us the "performance" and "well-being" profiles, were the role of the prescription is the weakest and the active roles of consumers (for instance, self documentation, self experimentation, …) could be the highest.

This is of course to be linked to the blurred, unshared definition and categorization of "health products" in general (may they be qualified as "alternative" or not), and what we could call a loss of marks for consumers. This would also justify the elaboration of specific, "clarifying" policies.

A consequence of this is that it seems less important for risk management to distinguish between product types (or definitions) – distinctions that are hardly understood and not shared by consumers –, than between modes and patterns of consumption. (This will be discussed in Section 4.1).

2.7.3. Low risk awareness from consumers, but who want to be better informed

It can be noticed that most of the FS consumers seem very cautious regarding food and health, probably more than non consumers on the average. There is a sort of ambiguity in these attitudes, or a sort of unveiling of the various compromises consumers do, since they are at the same time interested in "natural", healthy and well-balanced diet, seem aware of risk concerns and "money" or interest groups pressures, but as already evoked are nevertheless users of these products since they can alleviate problems they experience.

Risks associated with FS consumption don't seem to be spontaneously evoked by consumers, what lets us think that they are largely not aware that there simply *are* risks, but deplore what they perceive as weaknesses in the controls. Some consumers seem to treat FS as "natural" products, that aren't seen very risky ; we can say, from the results of the surveys, that risks of FS consumption are generally underestimated, unknown or even thought to be non-existent. We could also argue that even if a short majority of respondents think there are risks, they don't necessarily know how to identify them (which risks in particular ?), nor how to act in face of them.

Then, a large part of interviewees don't seem to be aware that simultaneous intake of drugs or food can pose a health risk (around one out of four think that FS are always compatible with drug intake).

FS are generally described positively, for example as "healthy" products or products that allow smartening up or improvement of one's performances ; they are sold over-the-counter, without prescription (can even be ordered on the Internet), allowing "self management" and allowing to save seeing the doctor ; etc. The main risk mentioned by consumers is overuse ("*excess is always bad*").

About FS, people can trust relatives or sports friends as much as general practitioners or information provided by producers. We observed in the results of the survey that the majority of consumers read the notice of products (when present!).

During focus groups, consumers deplored a lack of (quality) information on FS, the lack of knowledge on the long-term side-effects of FS, revealing lacks in risk management and call for scientific research or expert assessment on those questions.

Though there doesn't really appear to be a strong demand for more control or direct protection (excepted from more "active" consumers), the demand for trusted, "independent" expert assessment and information on risk is quite strong and seems better accepted than formulation of "good practice" or bans. This demand for more information regards concentrations in active compounds, precise composition, quality tests passed (certification, …), notice of use, origin of raw materials and place of manufacture, other tests passed (on the efficacy, on risks, ...), …

Concerning the Foodinter research project, they felt rather dubious about the expected results of laboratory research and asked for a good communication of these results to the public.

From these results we can conclude on a hypothetical way that, even if FS consumption is growing, consumers do not entirely trust commercial food nor medicine. FS are rather clearly distinguished from drugs and from food, even if consumers don't seem to know clearly how to treat them (as medicine, as "complements" or "supplements", as convenient "boosters", ...). As far as consumers of supplements are concerned, they are suspicious and they try, sometimes with a good reflexivity, to find solutions to chronic health problems that seem to be linked with their way of life. They consider supplements as improvements, arguing they keep in mind a good idea of what is a "well balanced diet". Better information and better control are the main preoccupations they formulate, with an emphasis on independence of control, of research and of public information.

2.7.4. Which status to give to consumers in face of risk ?

What should be discussed by the public authorities is the status of consumers in face of risks. Are they only "passive receptors", to inform or "educate" through expert advice ? (like in Brown's deficit model (Brown, 2009)). This model and presuppositions, such as the idea of direct change from the "targets" (even if the message comes from a trusted and independent source), appears to be invalidated through our discussion groups : *"even if there are risks, I don't know if I will stop directly, I can still choose..."*

...Or shall we take their practices, representations and reflexivity (opinion, recommendations, …) into account, in a risk governance regime that is more symmetric (as opposed to the unilateralism of Brown's "deficit" and "new deficit" models) ?

Consumers don't just have perceptions and passive reactions ; they make reorganizations and arrangements. Their active roles shouldn't be underestimated.

Consequently, what about thinking on this "adaptive risk governance regime", that Brown pointed out ? How to realize a transition towards a regime built on the features of risks of "Second Modernity", rather than overtaken by them ?

This of course doesn't exclude the need for expert assessment and recommendations, but the limits of this assessment should be made explicit and communicated, while the modalities of interactions between consumers and experts should be redefined in order to rebuild trust and avoid gaps between them.

Moreover, we think that such an "ideal" communication process (which, to caricature, supposes exhaustive and uncontroversial assessment, ideal and clear message, ideal comprehension and application from the "public", leading directly to behaviour change) could hardly find grip on consumers as long as they are seen as "mean consumers", or "consumers to educate", "whose practices are wrong and to be changed". In other words, a "negative communication" strategy, pointing out the negative thus risks to remain a pious hope. Moreover, this struggle is supposed to occur every time a new risk concern will appear, what is clearly impractical and increases each time the importance of the challenge and the risk of defiance !

Consumers are not "mean", nor "passive", nor stupid ! They mostly have a reflexivity on their FS consumption, which can sometimes take them a lot of their daily time. They want to "master their consumption", and can not blindly trust any one (who ever it can be, even the practitioner himself !)...excepted maybe their own body and feelings. They can have an active attitude, or a critical attitude against a communication

that would target "mean" consumers in which they would not recognize themselves, would feel stereotyped or would feel superior, "out of danger".

We can also formulate the hypothesis that FS consumers have a "culture of health" superior to the average, as they can be more reflexive and critical, are active and accumulate knowledge, are getting used to listen to their bodies, draw and exchange observations from the products they consume, … If this happened to be proven, it would imply that a simplistic or paternalist communication strategy would be very quickly dismissed by those consumers !

All this call for taking consumers' specificity into account is globally positive for science, as consumers don't show a global mistrust in science (this is indeed the opposite, as scientists were given a lot of credit during our focus groups), but the main question behind this trust is to know in whose name they speak ! This raises the important need for more independent, quality assessment and advice.

2.7.5. Which type of risk management could fit the complexity of FS risk issues ?

Presently, risks associated with FS are managed by a system derived from the model of "external control", inherited from quality and standards systems of past industrial era. This model is based on scientific expertise and assessment, that sets rules for management and control.

From the review of literature we conducted (especially Beck and Kropp, 2010 ; Renn and Klinke, 2004 ; and Brown, 2009), we can reasonably think that this model is hardly sustainable in face of the nature of risks associated with FS, namely complex, "systemic" and interaction risks underlined in Foodinter. To these characteristics, we could add the omnipresent uncertainties, associated with high pace of evolution of products and risks.

These considerations are also perceptible from the discussion groups conducted with consumers, which showed they were far from being all dupe of the inherent limits of the actual risk management model...and they can even become more aware of these limits when science or public actors try to present only certitudes to them... making silence on everything that remains unknown, unclear or controversial.

Moreover, we can add to these the following facts : first is that FS are sold over-the-counter, and that this status seems hardly modifiable ; secondly, there is absolutely no control of the Internet (advice and sale), and it is clearly unpractical to prevent consumers from buying FS on this platform that offers them numerous advantages ; and thirdly, the evolution we perceive in the "new health products market" is a tendency towards more liberalism, so towards consumers' full autonomy. But how would look an "autonomy" for which the vast majority of consumers don't have the knowledge and capacities to handle ?

What seems to become unavoidable is that we have to reconsider the ideal model of "total risk control", which clearly shows its limits in the era of "Second Modernity" (Beck, 1986) and in face of corresponding characteristics of risks. We can't however say that we have to definitely turn away from it (it's not our responsibility, and would mean that everything can be thrown away in it, which is not the case, control remaining one important part of a wider risk management strategy).

The question of *trust* is a central point to consider when we make the assumption for the need of an adaptive, symmetrical risk governance regime, as it seems that critics from consumers, aiming at the actual risk management system, can only go growing with future occurrences of unanticipated risks.

But trust is also the trust in the speakers in the communication strategy : is the industry speaking ? The administration ? Is the communication positive towards food supplements, or does it present them in a negative way (risky, unnecessary, marketing invention, …) ?

For consumers, even if food supplements raise questions of risks, they nevertheless choose to consume those since they do bring benefits, since they answer *needs* and are embraced with *positive a prioris* (they are seen as "natural", "healthy", "plant-based", "traditional", showing shortcuts between "natural" and "safe", ...).

And after our enquiries, it seems unavoidable that consumers will always want to satisfy those needs, whatever the "warnings" messages from the risk communication could be. Moreover, since food supplements consumers can be very confident in their own perceptions of health problems, in the absence of risks (traducing in an underestimation, or in a kind of fatalism) or in what they need to achieve their goal concerning health. A trusted message should therefore recognise and be built on these attitudes displayed by consumers, not to necessarily comfort them (let's think to dangerous shortcuts between "natural" and "safe") but to avoid the creation of a new, wider gap between communicators' and consumers' views .

To rebuild this trust, we propose a risk management approach that makes its limits explicit, such as management strategies, results from controls, products to ban, etc. We also underline the very importance to imply citizens and consumers in the elaboration of the communication strategy and in its ongoing process and actions.

This can be done in different ways : consultation, discussion sessions, but we think that discussing with them renewed roles could lead to much more legitimacy and even efficacy. The place of each category of actor concerned by risks associated with FS (consumers, but also health professionals, producers, and scientists as well) could be redefined in face of the new characteristics of risks having to be managed (allowing to define which risks are or not "socially acceptable") and facing the importance of finding new forms of cooperation between representatives of all those praticians (which consumers are also) around the objective of risk management.

The communication associated with this system shouldn't aim one "mean" target, but specific profiles, and should also be done at various levels, in various ways to meet the expectancies of very different consumers. It should be multiple, quite complete, deep and simple at the same time ; it should allow consumer empowerment, by allowing them to put risk in perspective and to increase their reflexivity (on risks as well as on risk management system), but also give them simple, conventional practical tips or examples ; ...

3. Policy support ; discussion of recommendations for risk communication from the sociological tasks

3.1. Differentiate communication strategies processes according to the heterogeneity in consumer profiles and FS consumption patterns

When presenting the results of sociological tasks, we underlined the diversity one is to face when analysing FS consumption and FS consumers. If one wants to diminish the risks associated with FS consumption, then it's thought that consumers have to be helped to put themselves or their consumption in perspective, and to wonder whether FS are a solution to the "problems" they face. In order to do that, we have to admit that it requires to touch consumers at the centre of their practices and framings, at the centre of what they consider a problem, a risk or a lack in their lifestyle, that justifies their consumption. Therefore, the rhetoric at work behind the assessment by consumers themselves that they "have a problem" (or could avoid some) should also be addressed ; not the product itself, but the discourses and societal evolutions that give them a grip on consumers : "I could be stronger" ; "I could be less stressed" ; "I could reinforce my immune system" ; and so on.

We underlined that it would be very difficult to address FS consumers in their globalism (moreover regarding the often very specific and contextual nature of risks related to FS and FF), and that a multifaceted, tailored risk communication and risk management strategy would be a more suitable answer. This would be much more talkative to consumers, and would suit their framings of these diverse "patterns" or "models" we identified in part 2.1.3. of this report, by reinserting in its "context" (or with shared references) the message that is to be heard (and analysed) by consumers. This messages should take into account the fact that there are indeed a lot of objectives that consumers pursue through FS consumption, each having to be addressed in its specificity.

For instance, consumers using FS on the "preventive" mode (that is more rooted in familial references and "traditional" categories) seem "educated" to reason in terms of purpose, and are not familiar at all with categories of legal status or of active substances ; this would expose them to too much complexity and blur their knowledge-building process. We could give another example of a sportsman, that consumes FS in order to boost some of his performances, and that has undertaken a lot of research to manage to understand the working principles of products, their composition, their long term effect, etc., for whom a more "expert" communication could be suited, or a communication that would be relayed by its sport trainer (or sport centre), or sport-FS retailer.

This also raises the need for the communication strategy to be tailored to the various networks of advice that appeared from the focus groups and surveys (corresponding to the "profiles" discussed in the results) : these can be informal channels (friends, family, web sites, sport trainers, advertising and articles in reviews, …), as well as formal channels (practitioners, pharmacists, "alternative therapists" (whose status should be clarified), …). No hierarchy or dismiss should be done between them, as consumers don't do hierarchy between those channels neither, except on the basis of trust. This is why they can give more weigh to trusted relatives, or their self-judgment and feelings, than to the advice of practitioners, even if they don't have the competence.

3.2. Recommendations addressed to health professionals (and in a general way to the healthcare system)

Conventional practitioners (generalists) are criticized to generally show a lack of knowledge, will and time to consider seriously FS consumption (considering all the available products and moreover potential interactions). It was remarkable to notice that every of the consumers that attended the focus groups have had problems to talk of their FS consumption with their practitioner, what raised the difficulty to find a competent specialist that is at the same time open to those "alternative health products".

Consumers pointed out the lack of knowledge from general practitioners on nutrition and "alternative health products" or "alternative therapies", as well as interactions between all those compounds.

This lack of knowledge from practitioners could also be a lack of will or interest in alternative therapies, or even a strategy of defence of professional interests, as these alternatives to conventional medicine are often dismissed by doctors.

But this could also be a lack of time or capacities, as we can't expect from practitioners to know everything on every products or interactions. Moreover, the conventional form of medical consultation, driving the approach of practitioners, is rooted in a "problem-solution" approach, often simplified or routinised, to which should correspond a specific drug. When patients would want to analyse complex interactions, then practitioners show generally a lack of will or knowledge to inquire complex interactions, and send them back to specialists'. This sends to another problem, which is that consumers can't always afford these specialists, and will assuredly often prefer cheap self-research and auto-medication in this case.

This underlines the need to improve the basic training and formation of practitioners (but also of herbalists or other therapists or advisers) on nutritional aspects, on "alternative health products" and on interaction risks. All these have become a widespread reality they can't ignore nor dismiss any more.

They have to be pushed to study complexity in its depth (and ask a large amount of questions, on food, FS consumption, habits, …), to take time to formulate precise, tailored advice, without necessarily being sent to specialists (or else consultation of specialists should be partly refunded by the healthcare system).

This is crucial in a system when FS consumers hardly find (if not barely *don't* find) suited advisers or mediators to help them guiding their consumption, "managing" their health.

3.3. Increase the objectivity, quantity and quality of the information displayed by producers

This call for more and better information aimed at better labels (more information on contents, concentrations, origin of compounds, …) and obligation of notices of use (detailing interaction risks, but also the tests having been conducted and their limits), certification schemes passed (and what they assess), …

For certification, a clear sign should be displayed on the label so that the product could be quickly identified by consumers when buying the product somewhere else than

in pharmacies. We could also imagine a training to be followed and passed by producers on risks associated with FS ; like for certification, a picture could easily assess that these trainings have been passed.

3.4. Improve the clarity, transparency and efficacy of FS management (risks, controls from the AFSCA, ...)

As risk assessment and management procedures weren't not well understood by consumers, they formulated a call for clarification and transparency of these... what can also be interpreted as a lack of trust in those procedures. In the same sense, uncertainty that is a major component in risk assessments surrounding food supplements shouldn't be hidden or "brushed under the carpet", but acknowledged (made explicit) and framed (depending on the extent of the state of scientific knowledge).

Here are some questions raised by consumers :

What does "notification" assess ? (Does it include controls of compounds ? Additional tests ?) ; Why not making systematic experimentations of every products, if we want this procedure to be really safe and not only a *"procedure for the pleasure of procedure"* ?

What cover the various categories of products created by law ("MP", NP", "NNP", "herbal products/plants", "other products", ...), what do they correspond to, what differentiate them for instance in a shop alley ? What do they mean, what are the differences between them, and to what does it correspond in the whole health products range ? Is it not a way to make different constraints on producers or networks of retailing (especially the concern of herbal products, which are about to be banished from herbalists') ?

Is the control efficient and trustful, as only very few people work on it at the federal agency and are supposed to control every product on the market ?

Moreover than criticizing an unclear, opaque and insufficient risk assessment and management procedures (underlining the need for making those transparent, even in high uncertainty, making uncertainty transparent as well), it was criticized by consumers that some non-notified products could rather easily be found on the Belgian market, raising the important question of the efficacy of the procedures, and the consequent (lack of) trust consumers can have in them. But more than solely "adding more control" – a model whose limits are obvious in our era of complexity and uncertainty, combined with high expectancies from the public –, shouldn't we also find new paradigms and procedures to both define and manage risks, including the (still) unknown ? Those procedures and their design should be more opened up to discussion and co-elaboration with the public and professionals, as well as be more adaptive and reflexive...what is especially challenging in a context both of high industrial or professional lobbying, and of relatively important loss of "medical marks" from citizens.

3.5. Internet-based risk communication, risk deliberation, and risk governance platform

It was discussed with consumers about the idea of a web site that could give them "good information" on FS products and associated risks. We imagined a multi-level communication tool or "multi-purpose, multi-actors platform", with different parts accessible according to consumers' and other actors' demands or needs surrounding risk information, and generally risk governance concerning food supplements (and products assimilated with by certain consumers). Some parts or features could also be restricted to certain specialists or health professionals, as we will discuss further.

The first level of information could be a traditional form of risk communication, where consumers could find good practice rules (tips and recommendations, like "don't buy this brand/product", "don't buy on this website", "don't use this FS wit this food", ...), or general assessed information classified by products, and designed to suit their framings or "profiles". We can also imagine presenting precise examples of the risks that are warned against, which are generally very striking to consumers.

The need for "good information" was strongly underlined by consumers, who get often drown into the ocean of (mainly unverified) information they can find. "Good" information was defined as clear, independent/impartial/unbiased, complete or making its limits explicit. This leads to the importance of the second level of information that should be developed on the web site : more than only tips or advice, we think that this tool could allow consumers' empowerment, that is giving them the keys to identify and understand the risks associated with FS and FF[33], the way they are managed, and their place or roles in face of these risks. Accordingly, consumers should be given neutral, realist and critical information, in order to make their own opinion and judge if they should adapt their consumption practices. The result of this could take the form of a database, a kind of "Wikipedia" for food supplements, linked with public action and management procedures[34].

If one wants consumers to take their responsibility in face of the risks associated with a consumption they *chose*, then they should be given the means, knowledge and critical distance to take this responsibility... in other words to make a real choice ! This is particularly true in a system where prescription vanishes, and where liberalisation of markets (facing the challenges of controls in a "perforated net") is the rule.

A third dimension of this web site should allow discussion with consumers. We already mentioned that it's important to consider the variation in consumers' profiles and patterns of consumption[35], what is a first step towards a two-way communication process, but the idea of implementing a discussion platform (an Internet "forum") would

33 And extensively with other "alternative health products", unclearly distinguished from FS by consumers

34 See for instance the internet portal of the federal agency of Health, Canada (Health Canada)
http://www.hc-sc.gc.ca/dhp-mps/pubs/complement/interaction_drug-medicament_11-01/index-fra.php
http://www.hc-sc.gc.ca/dhp-mps/prodnatur/index-fra.php

35 Accordingly, the web site should aim at one, "mean" target, but different ones ; also, communication should be done on various level of complexity, to adapt to the various expectancies and capacities of understanding of consumers.

be a much more radical step towards real dialogue, and towards more recognition of the active roles and competencies consumers can have. Moreover, this would be an initiative that would respond to consumers' expectancies, as existing forums are very popular (but on which the quality and independence of information is a huge problem – with some respects, we often can talk about disinformation !).

Let's recall that the exigence of trust from consumers in the developed tools or in actors should never be underestimated, especially in the FS market where "self-medication" is the rule !

This forum could be subdivided in different parts :

one where consumers could discuss with other consumers or consumers associations (like it happens on the majority of Internet forums, like for instance "*Doctissimo*") ; but the forum we imagine should be different that the one we can find presently, as we plead for its explicit moderation by scientists, therapists and risk or products experts. This would be great importance, as aiming at preventing from giving unproven or partial advice. However, the idea would be that experts shouldn't need to answer in person to each question, as other members of the forum (consumers) could give suited answers too ; these would only have to be monitored and verified or balanced. These discussions, like what happens on forums, could become references for other consumers having similar questionings

one where consumers could ask questions directly to specialists (from the discipline they look for : formal medical disciplines, "alternative medicines", risk experts, regulation or management experts, …)

another where consumers could formulate remarks or recommendations on products and risks management, as well as on risk communication (what they don't understand, what they don't agree with, …) ; this could be very helpful for the designers of communication or management strategies, assuming that every remark couldn't be taken into account but that the designers (experts) should be open to the idea that "simple" citizen directly voice out concerns to them...and of course have the will to listen and give answers to these concerns.[36]

another for the experimentation of new methods of "participative design", such as the elaboration of "risk cartographies"[37], or other "massive" deliberation tools

...certainly other sections...

A fourth part of the website would detail and explain the basis of the risk management system, in a way that makes explicit the presuppositions and limits of this system (namely uncertainty (i.e. long term effects of products), complexity (due to huge number of products, high pace of evolution, and large scope of risks (depending on potentially unlimited factors and interactions). This would allow consumers to increase their knowledge on the reality of risk management, and put back the "myths" or ideals behind risk management in perspective. To sum, this would increase the reflexivity of consumers and allow them to better understand what are the real challenges in risk management and which behaviour they have to adopt in face of them.

36 See for instance the website of the Canadian Ministry of Health, allowing web-visitors to post comments (though not displayed on the webpage) or to ask questions

37 Like Beck, and Kropp's (& al.) (in Beck & Kropp, 2010) ; see http://www.risk-cartography.org/en_index.html

A fifth part could allow discussion and sharing of knowledge on risks, between scientists/experts and between health professionals on (on the mode of scientific reviews, but also on a "simplified" mode, giving summaries or analysing controversial issues). This would be a platform for the state of knowledge on risks associated with FS consumption substances, environmental contaminants, interactions, …). We can also imagine a kind of "forum" dedicated to risk experts, scientists and health professionals, where they could ask questions or share ideas and knowledge on FS.

In addition, it could give precious information to those experts and health professionals on consumers' practices or opinions, perceptions of risks, reactions to or incomprehension of risk communication

At least (but not at last, as this tool should be open and in constant evolution), a sixth part would be dedicated to social sciences research on risk communication and risk management surrounding "new health products". Indeed, the totality of information published by the members of the forums (consumers or experts) could constitute numerous and precious material to analyse, in order to help increase the reflexivity of the whole risk governance system, that has to be adaptive !

From a linear approach that seems outdated regarding present risks and evolutions of our societies' relation with them, we plead or an more reflexive approach, that would integrate communication even at the stage of risk assessment. Such a sole scientific design of categories of risks or "problems" should evolve to more cooperation and symmetry. The "communication" that is described should also evolve from the model of a simple, unilateral transmission of ideal knowledge to a model where communication is more systemic (integrated at various stages of risk assessment and management, and not only at the very end of the process), allowing to put in question scientists, managers and professionals themselves, and evolving from feedbacks from concerned citizens (FS consumers).

In order to reflect on this, we hope our research could constitute a interesting basis.

Briefly (and this will conclude our detailed report), we finally identified some limits of this idea of an Internet tool :

- every consumer may not have Internet, or may not know about the website ; accordingly, other media should be used, such as folders to let in "hot spots" (pharmacies, at therapists', in sport centres, …), publication of articles in popular reviews, of advertisements, TV spots (on the mode of documentaries rather than only (too) short spots, even if both would have advantages and disadvantages), … Accordingly, the second level of information we identified should also aim the media and resources (reviews, web sites, advertisements, ...) that presently touches consumers, that they can be using to guide their FS consumption
- a task force should be dedicated to the management of the website, what requires political support and the design of work, management and collaboration procedures ; we can imagine implying experts (doctors, nutritionists, risk experts, scientists, …) on a low work-time per day basis, for the management of the forum, answering periodically to questions from consumers or moderating discussions. This could be done remotely, from home or office. But full-time work

will certainly have to be done, for vulgarization, for the writing of resumes or dossiers, for “near real time” moderation, …

- this website would have to become popular, which would take time and means from public actors (Minister of Health), as well as from the experts responsible of the web site management ; it won't become a widely shared reference in only a couple of years, which underlines the need for good alignment with consumers' needs or preoccupations (for instance by analysing what they look for in conventional forums, what we unfortunately didn't have the time to do in this research), good publicity, and linkage with consumer associations.
- if it becomes popular, the site would certainly become subject to attacks from interest groups and lobbies (not only from industrials, obviously), for whom consumers' reflexivity, critical mind and empowerment is seldom encouraged.

4. DISSEMINATION AND VALORISATION

Along the sociological tasks conducted in FOODINTER, we have experimented procedures and protocols of consultation of consumers intended to discuss and reframe food quality and food safety. These procedures are interactive, relatively cheap, easy and quick (with an exception maybe for recruiting the focus groups participants), and can help scientists to adjust their objectives to socially shared preoccupations, making them take into account social dimensions often neglected in the usual linear, top-down, expert-based communication strategies.

This could also give breath to more implication from consumers or consumers' association in the risk discussion or governance process.

Complementarity with other research projects and clusters :

One of the other roles of the sociological team, more than the study of consumers' practices, representations and reactions or risk management propositions, is to establish communication between stakeholders and scientists. This work is therefore an extension of the following projects concerning consumption and "sustainability", especially :

- *La durabilité des systèmes de production certifiés : le cas des labels dans le secteur agro-alimentaire, PADD2, MA/19/304 (2003-2005)*
- *Agriculture durable : une approche intégrée de la communication entre chercheurs et stakeholders, Cluster OA/00/12.*
- *Consommation durable, quel rôle pour les consommateurs, Cluster OA/00/20 (2004-2005)*
- *Faisabilité d'un processus de modélisation de l'analyse du risque lié aux pesticides, PADD2 Cluster OA/00/27*
- *Collectifs de Consommateurs et Consommation Durable, ANR-05-PADD-006-02 (2005-2008)*

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Web sites

EUROPEAN COMMUNITY

http://www.efsa.europa.eu/
http://www.efsa.europa.eu/en/aboutefsa.htm

http://ec.europa.eu/food/food/biotechnology/novelfood/index_en.htm

http://www.botanicalforum.eu/ - European Botanical Forum (scientists from the FS industry sector)

BELGIUM

SPF Santé publique, sécurité de la chaîne alimentaire et environnement (SPF SPSCAE)
http://www.belgium.be/fr/sante/vie_saine/alimentation/securite_alimentaire/complements_alimentaires/
http://www.belgium.be/fr/sante/medicaments/achat_sur_internet/index.jsp
http://www.belgium.be/fr/sante/vie_saine/alimentation/publicite/

http://www.health.belgium.be/eportal/foodsafety/foodstuffs/foodsupplements/index.htm#Etiquet

AFSCA
"La sécurité alimentaire, à quel prix ?"
http://www.afsca.be/publicationsthematiques/securite-alim-a-quel-prix.asp

Naredi - Fédération de l'industrie et du commerce des compléments alimentaires de Belgique
http://www.naredi.be/frans/home.htm

INTERNATIONAL

Institut Fédéral Allemand pour l'établissement des risques
(German Federal Institute for Risk Assessment)

http://www.bfr.bund.de/cd/736
http://www.bfr.bund.de/cd/1809
http://www.bfr.bund.de/cd/8273
http://www.bfr.bund.de/cm/255/eu_food_safety_almanac.pdf

Risiko Kartierung - MACOSPOL (Mapping Controversies in Science for Politics)
http://riskcart1.wzu.uni-augsburg.de/index.php

Santé Canada
http://www.hc-sc.gc.ca/dhp-mps/prodnatur/index-fra.php
http://www.hc-sc.gc.ca/dhp-mps/prodnatur/applications/licen-prod/lnhpd-bdpsnh-fra.php

http://www.hc-sc.gc.ca/dhp-mps/pubs/complement/interaction_drug-medicament_11-01/index-fra.php

http://www.hc-sc.gc.ca/sr-sr/finance/nhprp-prpsn/index-fra.php
http://www.hc-sc.gc.ca/fn-an/intactivit/codex/activit/vit_min_sup-fra.php

US Food and Drug Administration
http://www.fda.gov/Food/DietarySupplements/default.htm
http://www.fda.gov/Food/DietarySupplements/ConsumerInformation/ucm110417.htm#getinfo

7. ANNEXES

ANNEX.1.a. Questionnaire of the quantitative surveys on food supplements consumption and representations *(traduction from the french version)*

Introduction :
"In the context of a scientific project lead by several Belgian universities and financed by the Federal Science Policy, a study has been launched on the topic of food supplements.
Scientific, legislative and human aspects are explored in order to better understand this field in Belgium." (sidev@var.fgov.be)

Date : Place : Gender : Age : <19 20-29 30-39 40-49 50-59 60<

1. Do you know about food supplements? Yes - No (→***Q4***)

2. If "Yes", could you give me a definition of the term "food supplement" ?

3. Could you quote me some ?

4. In the following list, for each term (substance or product), precise if you think it's a : food ; a medicine, a food supplement or none of the propositions.

	Food	Medicine	Food supplement	Do not know
Ginseng, Guarana, Ginger caps or pills				
Vitamin tabs (A,B,C, ...)				
Homoeopathic granules				
Mineral tabs (iron,...)				
Aspirins				
Margarine enriched with omega-3				
Tabs enriched with omega-3				
Plant extracts				
Banana				
Hop-based caps				

Tabs containing Q10 Coenzym				
Selenium-based tabs				
Gingerbread				
Fish oil caps				
Soja-enriched tabs				

=> Definition : What are food supplements ?

Food (or *dietary*) supplements are food constituted with one or more active substances. Those active substances can be nutrients (vitamins, minerals, or fatty acids), plant extracts or other substances with a nutritional or physiological effect. Food supplements are available on the market in pre-dosed format (caps, tabs, pills, liquid solutions, …) and constitute a complement to normal diet.

Examples of dietary supplements
Pills containing vitamins (A, B, C, D, E) and/or minerals (iron, magnesium, potassium, calcium, selenium,…), herbs infusion, tabs enriched with omega-3, margarine enriched with omega-3, fish oil caps, plant extracts, fruit-based thinning-pills, fruit-based plant preparations, coenzym food supplements, tabs containing sulphur, Gingko biloba extracts, preparations containing polyphenols, ...

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5. Have you ever consumed some ? Yes - No (→***Q16***)

6. If "Yes", which ones ?

7. You consume those food supplements :
- o on your own enterprise ?
- o following the advice of a doctor/practitioner/nutritionist/psychologist ?
- o following the advice of a relative ?
- o after reading an article/watching a TV programme ?

8. For which reasons ?
- o improve general health
- o to face a disease
- o to improve a particular point
- o to make up for a deficiency
- o by curiosity

9. So, in a more precise way, which domain(s) of your health do you want to improve through food supplement consumption ?
- o Digestion / bowels
- o Sleeping disorders
- o Blood circulation (cholesterol)
- o Weight loss
- o Depression
- o Rheumatisms
- o Menopause
- o Delaying of ageing

o General fatigue
o Stress
o Strengthening of natural defences
o Toxin purification

10. Which are the compounds present in the food supplement(s) you consume ?

o omega-3 fatty acids
o vitamins
o minerals
o fish oils
o plant extracts
o fruit extracts
o concentré d'algues
o other…

11. At which frequency do you consume food supplements ?

o Occasionally
o Regularly (every year during one month)
o Frequently (every week)

12. What is the mean monthly budget for buying your food supplements (in the periods when you consume some)

o Less than 20 euros
o Between 20 and 100 euros
o Between 100 and 200 euros
o More than 200 euros

13. Do you read the notices of use coming along with food supplements ?

o Always
o Often
o Sometimes
o Never

14. Do you feel generally better after taking food supplements ?

o Yes, clearly **o** Yes, I think so **o** No

15. If "Yes" (***Q14***), **do the positive effects you feel match to those described on the package of the consumed food supplements ?**

o Yes **o** Partly **o** No

16. Why have you never consumed food supplements ?

o By lack of knowledge
o By lack of conviction in efficacy
o Because of the excessive price
o Not recommended by a doctor nor by relatives

17. Concerning food supplements and functional food, you are :

o Convinced
o Convinced, but not for all the products present on the market
o Sceptical
o Very sceptical

18. Are food supplements natural products ? Yes - No
And why ?

19. Do you think that a natural product, present in a dietary supplement, can have deleterious effects on health ?

o Yes **o** It's probable **o** No **o** I don't know

20. Do you think that dietary supplements are always compatible with the consumption of medicines ? de médicaments ?

o Yes **o** It's probable **o** No **o** I don't know

ANNEX.2. Notes of consumer discussions from "risk focus groups" (9/12/2010)

Fig. 1. : General risk concerns about food

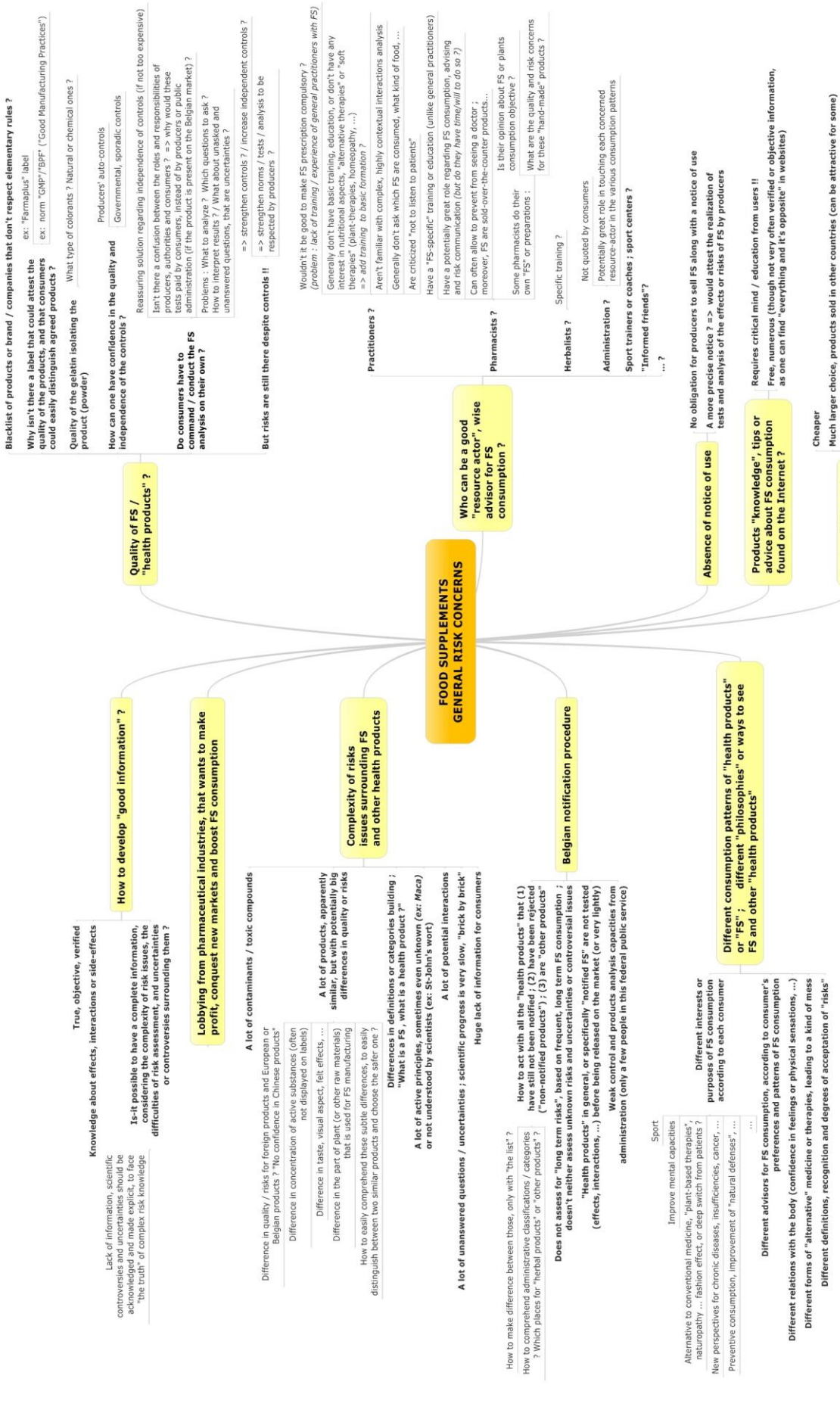

Fig. 2. : Remarks and recommendations for FS risk communication and