Global Harmonization Initiative (GHI)
Goals and history

Huub Lelieveld

Global Harmonization Initiative
Advocating science-based food safety law and trade

Europe 2001

Destruction of fish containing minute amounts of chloramphenical.

Legally, there is a zero-tolerance for chloramphenical and other antibiotics in food.

How the Venture to Genetically Engineer Our Food Has Subverted Science, Corrupted Government, and Systematically Deceived the Public

Without GM food, millions of people would die of starvation. GM food is not more of less risky than normal food

People were denied available safe GM food because local governments believed the antis

Mass famine in Africa November 2002

Africa Renewal, Vol. 16 #4, Feb. 2003

Such **legal** actions continued to take place everywhere in the developed world

At that time 1.25 billion people lived on less than $ 1 per day.
Of these **840 million people** suffered from **under-nutrition or hunger**

During an IFT meeting in July 2004 with participants from EFFoST and the IFT International Division, the idea of the **Global Harmonization Initiative** was borne.

The first meeting with interested scientists took place in Lisle, USA, in April 2005

On 26 April the GHI Charter was drafted and published in: International Food Ingredients, Food Safety Europe and IUFoST Newsline

The charter included that:

GHI will operate in an open, transparent manner, to avoid bias or the appearance of bias, political or otherwise

This is a core value if GHI and the reason that GHI is respected in all countries

GHI started with a Supervisory Board who's task it is to guard the impartiality and integrity of GHI

In 2007 the Global Harmonization Initiative obtained legal status by transforming into the GHI Association, registered in Austria. The constitution is based the the GHI Charter and can be downloaded from the GHI website: **www.globalharmonization.net**

The goal of GHI is
Achieving consensus on the science of food regulations and legislations to ensure the global availability of safe and wholesome food products for all consumers

Key points

- GHI is impartial and therefore does not accept funding from industries or governments
- GHI is really global and this is made possible by free membership, there is no financial hurdle
- The membership requirement is being a motivated conscientious scientist in a field related to the safety and security of food and agreeing to GHI's goal
- The only income of GHI is donations from individuals and scientifically independent organisations, such as non-industrial scientific societies
- All positions in GHI are honorary, i.e., none of the officers is paid

That was the history of GHI and its goal

Now back to the issues GHI wants to address

Demanding total absence (= zero tolerance) of any chemical is absurd

No chemical is absent if the method of analysis is sensitive enough

In 1950 absence was **milli**grams per kg
in 2004 is was it was **nano**grams per kg

The food safety laws made the analytical technology determining what is allowed, NOT the safety of the product

Moreover, as published by Paracelsus about 500 years ago, substances that are toxic in a certain amount can be essential for people's health.

"Poison is in everything, and no thing is without poison. The dosage makes it either a poison or a remedy"

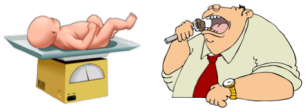
Absurd regulations - the antibiotic case

Judges are not toxicologists

Is a femtogram (10^{-15}) in a kilogram food "absence"?

Answer of an expert: No, but very, very little.

Hence NOT absence. Thus illegal.



20,000 kg/day 1,000,000 kg/day

Strictly following absurd regulations would leave us without food

Absurd regulations - the antibiotic case

Food is grown on soil

↓

Soil is produced by microbes

↓

All microbes produce antibiotics

↓

Food without traces of antibiotics do not exist

Consequently all food should be seized and estroyed

Strictly following absurd regulations would leave us without food

What applies to antibiotics applies to most chemicals

- Lectins (or hemaglutinins) **(pulses)**
- Enzyme inhibitors **(soy, peas, beet, cereals)**
- Piperidines **(black pepper)**
- Caffeine, theobromine, theophyline **(coffee, chocolate, tea)**
- Solanine **(potatoes, tomatoes, aubergines)**
- Tomatine **(tomatoes)**
- Oxalates **(rhubarb, spinach, parsley, chives, purslane, cassava, amaranth, chard, taro leaves, radish, kale, monstera fruit)**
- Coumarin **(cinnamon, peppermint, green tea, chicory, blueberries)**
- Glucosinolates such as sinigrin, progoitrin **(cabbage, broccoli, brussels sprouts, cauliflower, turnip, radish, horseradish, mustard, rapeseed)**
- Cyanogenic glycosides, such as amygdalin **(almond, laurel)** and linamarin **(cassave)**
- Saponins **(peanut, soy, spinach, broccoli, potato, apple)**

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To be forbidden?

INGREDIENTS: WATER (75%), **SUGARS (12%)** (GLUCOSE (48%), FRUCTOSE (40%), SUCROSE (2%), MALTOSE (<1%)), STARCH (5%), **FIBRE E460 (3%)**, **AMINO ACIDS** (GLUTAMIC ACID (19%), ASPARTIC ACID (16%), HISTIDINE (11%), LEUCINE (7%), LYSINE (5%), PHENYLALANINE (4%), ARGININE (4%), VALINE (4%), ALANINE (4%), SERINE (4%), GLYCINE (3%), THREONINE (3%), ISOLEUCINE (3%), PROLINE (3%), TRYPTOPHAN (1%), CYSTINE (1%), TYROSINE (1%), METHIONINE (1%)), **FATTY ACIDS (1%)** (PALMITIC ACID (30%), OMEGA-6 FATTY ACID: LINOLEIC ACID (14%), OMEGA-3 FATTY ACID: LINOLENIC ACID (8%), OLEIC ACID (7%), PALMITOLEIC ACID (3%), STEARIC ACID (2%), LAURIC ACID (1%), MYRISTIC ACID (1%), CAPRIC ACID (<1%)), ASH (<1%), PHYTOSTEROLS, E515, OXALIC ACID, E300, E306 (TOCOPHEROL), PHYLLOQUINONE, THIAMIN, **COLOURS** (YELLOW-ORANGE E101 (RIBOFLAVIN), YELLOW-BROWN E160a), **FLAVOURS** (3-METHYLBUT-1-YL ETHANOATE, 2-METHYLBUTYL ETHANOATE, 2-METHYLPROPAN-1-OL, 3-METHYLBUTYL-1-OL, 2-HYDROXY-3-METHYLETHYL BUTANOATE, 3-METHYLBUTANAL, ETHYL HEXANOATE, ETHYL BUTANOATE,, PENTYL ACETATE), 1510, NATURAL RIPENING AGENT (ETHENE GAS).

ALL-NATURAL BANANA

NOT SAFE TO EAT?

← AND MANY MORE

ALL-NATURAL BLUEBERRIES

NOT SAFE TO EAT?

AND → MANY MORE

INGREDIENTS: AQUA (84%), **SUGARS (10%)** (FRUCTOSE (48%), GLUCOSE (40%), SUCROSE (2%)), FIBRE E460 (2.4%), **AMINO ACIDS (<1%)** (GLUTAMIC ACID (23%), ASPARTIC ACID (18%), LEUCINE (17%), ARGININE (8%), ALANINE (4%), VALINE (4%), GLYCINE (4%), PROLINE (4%), ISOLEUCINE (3%), SERINE (3%), THREONINE (3%), PHENYLALANINE (2%), LYSINE (2%), METHIONINE (2%), TYROSINE (1%), HISTIDINE (1%), CYSTINE (1%), TRYPTOPHAN (<1%)), **FATTY ACIDS (<1%)** (OMEGA-6 FATTY ACID: LINOLEIC ACID (30%), OMEGA-3 FATTY ACID: LINOLENIC ACID (19%), OLEIC ACID (18%), PALMITIC ACID (6%), STEARIC ACID (2%), PALMITOLEIC ACID (<1%)), ASH (<1%), PHYTOSTEROLS, OXALIC ACID, E300, E306 (TOCOPHEROL), THIAMIN, **COLOURS** (E163a, E163b, E163e, E163f, E160a) **FLAVOURS** (ETHYL ETHANOATE, 3-METHYL BUTYRALDEHYDE, 2-METHYL BUTYRALDEHYDE, PENTANAL, METHYLBUTYRATE, OCTENE, HEXANAL, DECANAL, 3-CARENE, LIMONENE, STYRENE, NONANE, ETHYL-3-METHYLBUTANOATE, NON-1-ENE, HEXAN-2-ONE, HYDROXYLINALOOL, LINALOOL, TERPINYL ACETATE, CARYOPHYLLENE, ALPHA-TERPINEOL, ALPHA-TERPINENE, 1,8-CINEOLE, CITRAL, BENZALDEHYDE), METHYLPARABEN, 1510, E300, E440, E421 and **FRESH AIR** (E941, E948, E290).

What applies to antibiotics applies to most chemicals

Of all chemicals we are exposed to, 99.9% are of natural origin

Of all dietary pesticides we consume, 99.99% are of a natural origin

This amounts to daily intake of 1500 mg of natural pesticides and their breakdown products

Human exposure to synthetic pesticide residues amounts to about 0.09 mg per day

Laws and regulations are needed to define and promote food safety

Laws and regulations should not reduce the availability of **safe** food or lead to its destruction

The public often demand absurd regulations, based on misconceptions

Politicians want to keep their position or want to be elected by that same public and therefore tend to meet the demands, even absurd ones
also often because they are not aware of the absurdities

Public including politicians need education

Ignorance leading to absurd regulatory demands

Most people do not know that:

- everything is chemical, chemical ≠ toxin
- microbes are essential for life and only a few are harmful, humans have more bacterial cells than human cells and they are needed to stay healthy

Microbiological incident examples

2008-2009 USA

9 death
714 ill

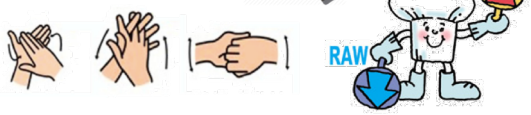
Salmonella in peanut butter distributed while known to be contaminated

Peanut Corporation of America

Education

Cross contamination – hygiene in food handling

Most microbes are healthy and needed for our health. A few regrettably are not.



Ignorance leading to absurd regulatory demands

Chemicals that are not allowed but nevertheless present in food ***are not necessarily additives***.

Most man-made chemicals occur in nature in concentrations that can be detected now, but not previously.
They are produced by

- animals
- microbes (bacteria, fungi, parasites)
- plants
- geochemical processes (e.g. volcanos)

This includes chlorinated organic compounds,
>5000 different organic halogens have been identified in nature

G.W. Gribble. Chemosphere 52 (2003) 289–297) and Heterocycles, 84 (1) (2011), pp. 157-207.

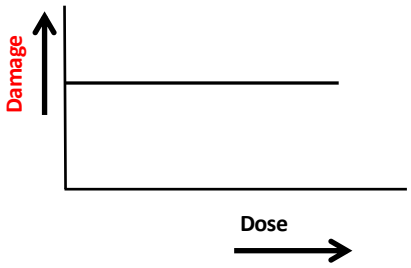
Acetaldehyde
Benzaldehyde
Benzene
Benzofuran
Benzo(a)pyrene
Caffeic Acid
Catechol
1,2,5,6-dibenzanthracene
Formaldehyde
Furan
Furfural
Hydroquinone
Isoprene
Limonene
Styrene
Toluene
Xylene
Etc.

All carcinogens

A Comprehensive Overview of the Risks and Benefits of Coffee Consumption *by L. Kirsty Pourshahidi, Luciano Navarini, Marino Petracco, and J.J. Strain*

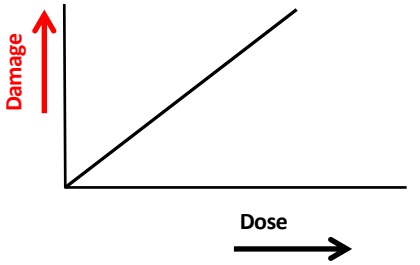
Investigation of 1277 studies (1970-2015) have shown that Health benefits clearly outweigh the risks of moderate coffee consumption in adults

Education



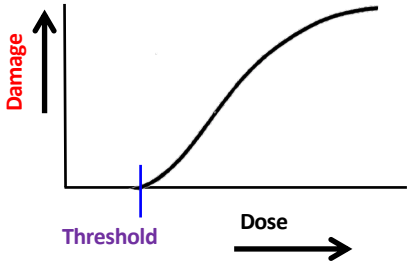
The perception of the general public

Education



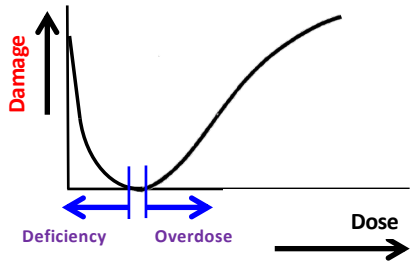
Understanding of most politicians and policy makers

Education



Toxicologists: there is a threshold of no concern (NOAEL, no adverse effect level). All food contains potential toxins.

Education



Many substances are harmless in the right amounts but harmful if **too much** or **not enough**

Evolution

Humans and their predecessors have been exposed to all those most scary chemicals for millions of years and developed a **biological system** (with liver, kidneys, etc.) to cope with them or even use them beneficially.

The system, however, can be overloaded and then the chemical becomes toxic.

Thank you for your attention
but
if there is still time ….

GHI Working Groups

1. WG Chemical Food Safety
2. WG Ethics in Food Safety Practices
3. WG Education and Training of Food Handlers
4. WG Food Laws & Regulations
5. WG Food Microbiology
6. WG Food Packaging Materials
7. WG Food Preservation Technologies
8. WG Genetic Toxicology and Genomics
9. WG Global Incident Alert Networks
10. WG GM based Plant Food
11. WG Mycotoxins
12. WG Nanotechnology and Food
13. WG Nomenclature of Food Safety and Quality
14. WG Nutrition
15. WG Reducing Post Harvest Losses
16. WG Food Safety in Relation to Religious Dietary Laws
17. WG Science Communication

WG Science Communication

Differences between regulations are in most cases not the result of differences in scientific opinions

- With respect to food safety there is largely consensus among scientists, globally
- If they do not agree, they have scientific methods to resolve the disagreement

Scientists, however, tend to talk to each other but fail to communicate effectively with the general public, opinion makers and politicians

WG Global Incident Alert Networks

WG Global Incident Alert Networks

It will be possible to report seriously harmful incidents without harming the reporter

WG Global Incident Alert Networks

Reporting will be made possible

anonymously

via a webpage in English and in local languages.

It will be made well known globally

- An online form will ask all that is known about the incident but nothing that might be used to identify the reporter
- Because of the anonymity of the reporter it will not be possible to ask question later, information must be as extensive as possible

The "general public" has difficulty in distincting **irradiated** from **radioactive**

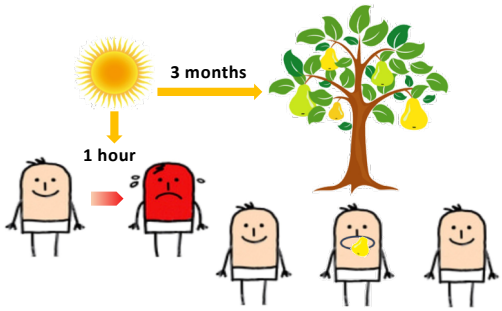
WARNING

IRRADIATED

SAFE

often perceived as warning

Radiation does **not** make irradiated food radioactive



WG Food Preservation Technologies

Global Harmonization Initiative (GHI)
Consensus Document on Food Irradiation

Authored by

Tatiana Koutchma, Larry Keener and Heidi Kotilainen

Publication date October 2018

In short there is global consensus that:
Irradiated food

- is safe to consume
- is nutritionally adequate
- has the same sensory properties as non-irradiated food

Can be downloaded from the library on the GHI website

Genetic modification

Nature does it
without permission and at random

Farmers do it
by selection, cross-breeding, mutation, trying and selecting improved traits – no permission needed

Scientists do it
under controlled conditions – CRISPR cas9; **not allowed** in **only** the EU without following the long and expensive GMO regulations

Gregor Mendel, 1866

Potential benefits of GMOs

- Herbicide tolerance (soy)
- Insect resistance (e.g. cotton bollworm)
- Disease resistance
  - bacteria
  - moulds (bananas modified to resist the Black Sigatoka fungus)
  - viruses (tomatoes, pumpkins, papayas)
  - ß-carotene (pro-vitamine A, 14 million children under 5 suffer from lack of vitamin A Golden Rice
- Environmental stress resistance
  - drought
  - heat
  - frost
  - acid soil
  - salty soil
  - flooding
- Delayed ripening

There is no evidence that GM food would be either more or less safe than "normal" food

A decade of EU-funded GMO research (2001 – 2010)
European Commission - EUR 24473
ISBN 978-92-79-16344-9
http://ec.europa.eu/research/biosociety/pdf/a_decade_of_eu-funded_gmo_research.pdf

Statement by the AAAS Board of Directors on Labelling of Genetically Modified Foods
American Association for the Advancement of Science
20 October 2012
http://www.aaas.org/news/releases/2012/media/AAAS_GM_statement.pdf

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2016
National Academies of Sciences, Engineering, and Medicine (NASEM)

Genetically Engineered Crops: Experiences and Prospects

20 experts, review of more than 1,000 studies, testimony from 80 experts and 700 comments submitted by the public.

No difference between genetically modified (GM) and conventionally grown crops
- to human health
- to the environment

National Academies of Sciences, Engineering, and Medicine. 2016. Genetically Engineered Crops: Experiences and Prospects. Washington, DC: The National Academies Press. doi: 10.17226/23395

29 June 2016

To the Leaders of Greenpeace, the United Nations and Governments around the world

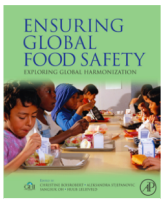
"Opposition based on emotion and dogma contradicted by data must be stopped.

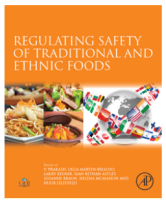
How many poor people in the world must die before we consider this a "crime against humanity"?

2016-06-29 Nobel Laureates in medicine, chemistry, physics and economics to Greenpeace, the UN and Governments around the world

Thank you for your attention
but again
if there is still time ….

GHI Books and Books written or edited by GHI members



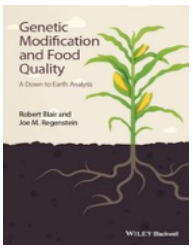


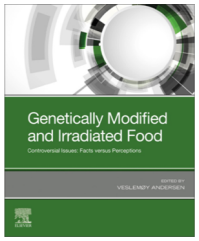
Ensuring Global Food Safety - Exploring Global Harmonization. Editors: Christine Boisrobert, Aleksandra Stjepanovic, Sangsuk Oh and Huub Lelieveld. **Elsevier**/Academic Press, 2009. ISBN: 9780080889306

Regulating Safety of Traditional and Ethnic Foods. Editors: V. Prakash, Olga Martin-Belloso, Larry Keener, Siân Astley, Susanne Braun, Helena McMahon and Huub Lelieveld. **Elsevier**/Academic Press, 2015. ISBN: 9780128006054

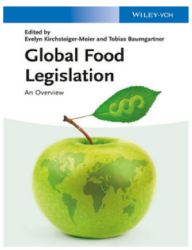
Nutritional and Health Aspects of Food in Nordic Countries. Editors: Veslemøy Andersen, Eirin Bar and Gun Wirtanen. **Elsevier**/Academic Press 2018. ISBN: 978-0-12-809456-3

Genetic Modification and Food Quality: A Down to Earth Analysis.
Robert Blair and Joe M. Regenstein.
Wiley, 2015. ISBN: 978-1-118-75641-6



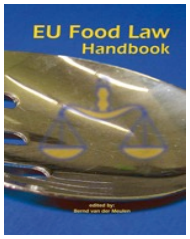


Genetically Modified and Irradiated Food
Controversial Issues: Facts *versus* Perceptions
Editor: Veslemøy Andersen
Elsevier, 2019 ISBN: 9780128172407



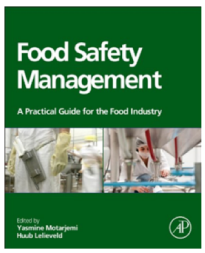
Global Food Legislation: An Overview. Editors: Evelyn Kirchsteiger-Meier and Tobias Baumgartner. Wiley, 2014. ISBN: 978-3-527-33555-8

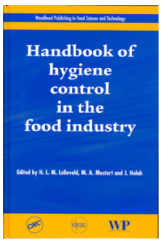
EU Food Law Handbook. Editor: Bernd van der Meulen. Wageningen University Press, 2014. ISBN: 978-90-8686-246-7

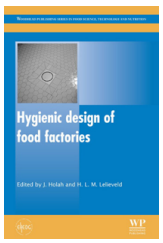


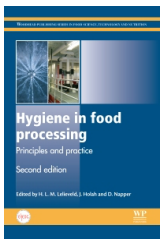
Food Safety Management – A Practical Guide for the Food Industry. Editors: Yasmine Motarjemi and Huub Lelieveld. Elsevier/Academic Press, 2013. ISBN: 9780123815057

To be published in 2021
2nd edition
Editors: Yasmine Motarjemi, Veslemøy Andersen and Huub Lelieveld





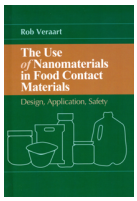




Handbook of Hygiene Control in the Food Industry. Editors: Huub Lelieveld, John Holah and Domagoj Gabrić. **Elsevier** / Woodhead Publishing, 2016. ISBN: 978-0-08-100155-4

Hygienic Design of Food Factories. Editors: John Holah and Huub Lelieveld. **Elsevier** / Woodhead Publishing, 2011. ISBN: 978-1-84569-564-4.

Hygiene in Food Processing. Editors: Huub Lelieveld, John Holah and David Napper. **Elsevier** / Woodhead Publishing, 2014. ISBN: 9780857094292



Global legislation for food contact materials. Editor: Joan Sylvain Baughan. **Elsevier** / Woodhead Publishing, 2015. ISBN 978-1-78242-014-9

The Use of Nanomaterials in Food Contact Materials - Design, Application, Safety - Editor: Rob Veraart. DEStechpublications, 2017. ISBN: 978-1-60595-136-2

Superfood and Functional Food - The Development of Superfoods and Their Roles as Medicine. Editors: Naofumi Shiomi and Viduranga Waisundara. InTech, 2017. ISBN 978-953-51-2942-4

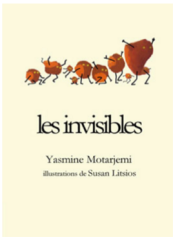
Superfood and Functional Food - An Overview of Their Processing and Utilization. Editors: Naofumi Shiomi and Viduranga Waisundara. InTech, 2017. ISBN: 978-953-51-2920-2

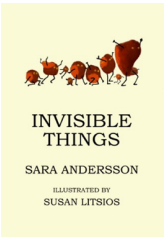
Cassava. Editor: Viduranga Waisundara. InTech, 2018. ISBN: 978-953-51-3741-2

Diabetes Food Plan. Editor: Viduranga Waisundara. InTech, 2018. ISBN: 978-1-78923-275-2

Palm Oil. Editor: Viduranga Waisundara. InTech 2018. ISBN: 978-1-78923-427-5

Note: All downloadable for free





CreateSpace Independent Publishing Platform (29 May 2012)
ISBN-10: 1469985713
ISBN-13: 978-1469985718

ELSEVIER

Use promo code GHI30 for 30% discount

Thank you for your attention!