Netherlands Food and Consumer Product Safety Authority
Ministry of Agriculture, Nature and Food Quality

PFAS IN FOOD

NVT Autumn symposium

November 5th 2020

Krista Bouma & Jacqueline Steenbergen - Biesterbos

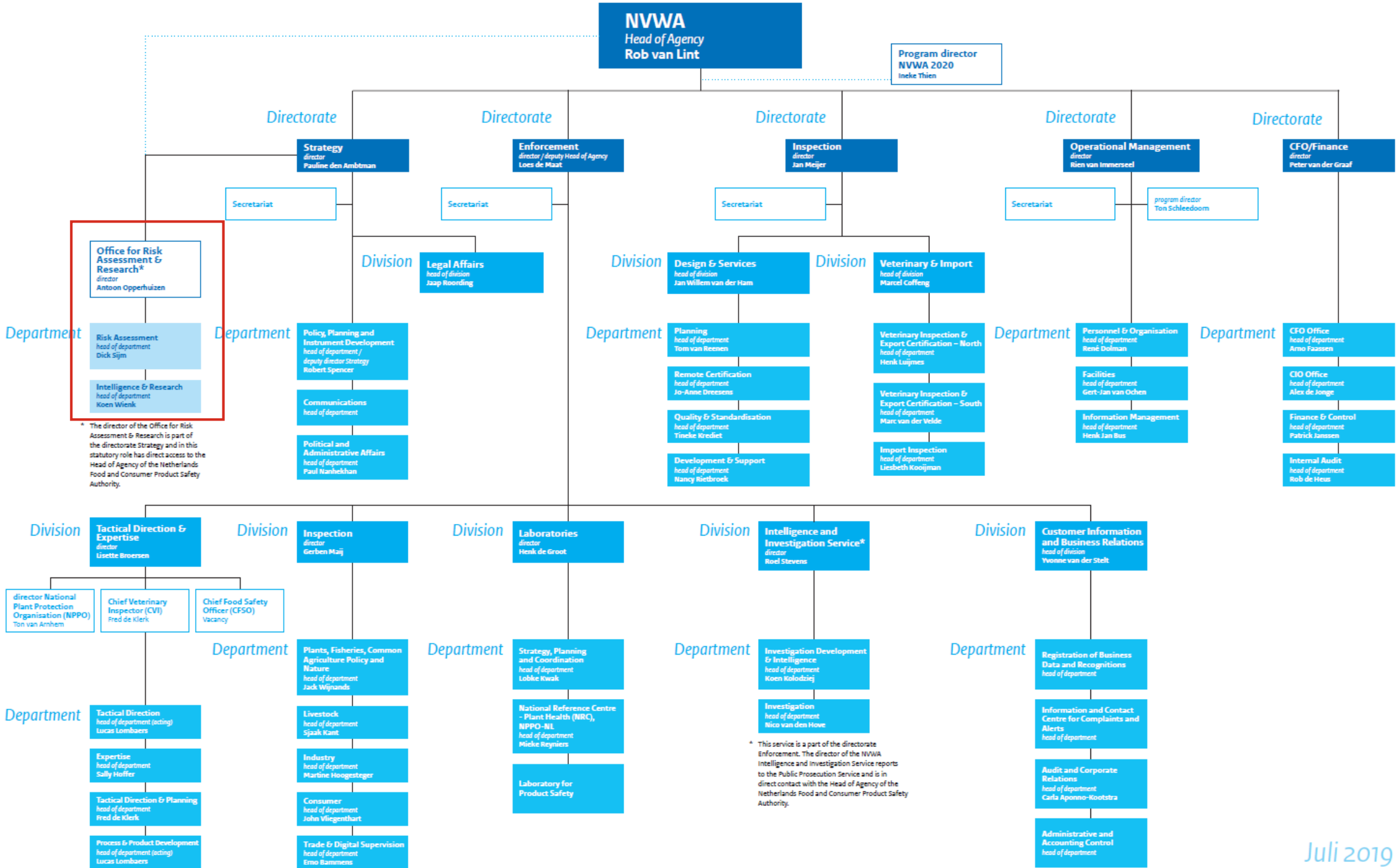
PFAS in Food

- NVWA
- PFAS in food of animal origin
- PFAS in food contact materials

NVWA

The Netherlands Food and Consumer Product Safety Authority (NVWA) because we stand for the safety of food and consumer products, animal welfare and nature

Office for Risk Assessment & Research


NVWA
Head of Agency
Rob van Lint
Program director
NVWA 2020
Ineke Thien
Directorate
Strategy
director
Pauline den Ambtman
Enforcement
director / deputy Head of Agency
Loes de Maat
Inspection
director
Jan Meijer
Operational Management
director
Rien van Immerseel
CFO/Finance
director
Peter van der Graaf
Secretariat
Secretariat
Secretariat
Secretariat
program director
Ton Schleedoorn
Office for Risk Assessment & Research*
director
Antoon Opperhuizen
Risk Assessment
head of department
Dick Sijm
Intelligence & Research
head of department
Koen Wienk
* The director of the Office for Risk Assessment & Research is part of the directorate Strategy and in this statutory role has direct access to the Head of Agency of the Netherlands Food and Consumer Product Safety Authority.
Division
Legal Affairs
head of division
Jaap Roording
Division
Design & Services
head of division
Jan Willem van der Ham
Division
Veterinary & Import
head of division
Marcel Coffeng
Department
Policy, Planning and Instrument Development
head of department / deputy director Strategy
Robert Spencer
Communications
head of department
Political and Administrative Affairs
head of department
Paul Nanhekhan
Department
Planning
head of department
Tom van Reenen
Remote Certification
head of department
Jo-Anne Dreesens
Quality & Standardisation
head of department
Tineke Krediet
Development & Support
head of department
Nancy Rietbroek
Department
Veterinary Inspection & Export Certification – North
head of department
Henk Luijmes
Veterinary Inspection & Export Certification – South
head of department
Marc van der Velde
Import Inspection
head of department
Liesbeth Kooijman
Department
Personnel & Organisation
head of department
René Dolman
Facilities
head of department
Gert-Jan van Ochen
Information Management
head of department
Henk Jan Bus
Department
CFO Office
head of department
Arno Faassen
CIO Office
head of department
Alex de Jonge
Finance & Control
head of department
Patrick Janssen
Internal Audit
head of department
Rob de Heus
Division
Tactical Direction & Expertise
director
Lisette Broersen
Division
Inspection
director
Gerben Maij
Division
Laboratories
director
Henk de Groot
Division
Intelligence and Investigation Service*
director
Roel Stevens
Division
Customer Information and Business Relations
head of division
Yvonne van der Stelt
director National Plant Protection Organisation (NPPO)
Ton van Arnhem
Chief Veterinary Inspector (CVI)
Fred de Klerk
Chief Food Safety Officer (CFSO)
Vacancy
Department
Tactical Direction
head of department (acting)
Lucas Lombaers
Expertise
head of department
Sally Hoffer
Tactical Direction & Planning
head of department
Fred de Klerk
Process & Product Development
head of department (acting)
Lucas Lombaers
Department
Plants, Fisheries, Common Agriculture Policy and Nature
head of department
Jack Wijnands
Livestock
head of department
Sjaak Kant
Industry
head of department
Martine Hoogesteger
Consumer
head of department
John Vliegenthart
Trade & Digital Supervision
head of department
Erno Bammens
Department
Strategy, Planning and Coordination
head of department
Lobke Kwak
National Reference Centre - Plant Health (NRC), NPPO-NL
head of department
Mieke Reyniers
Laboratory for Product Safety
Department
Investigation Development & Intelligence
head of department
Koen Kolodziej
Investigation
head of department
Nico van den Hove
* This service is a part of the directorate Enforcement. The director of the NVWA Intelligence and Investigation Service reports to the Public Prosecution Service and is in direct contact with the Head of Agency of the Netherlands Food and Consumer Product Safety Authority.
Department
Registration of Business Data and Recognitions
head of department
Information and Contact Centre for Complaints and Alerts
head of department
Audit and Corporate Relations
head of department
Carla Aponno-Kootstra
Administrative and Accounting Control
head of department
Juli 2019

PFAS in Food

NVWA

PFAS in food of animal origin

PFAS in food contact materials

Why PFOA and GenX in food of animal origin?

- Factories in Dordrecht and Helmond emitted PFOA and GenX into the air.
- In 2017 and 2018 PFOA and GenX were found in soil and water due to air deposition in Dordrecht and Helmond.
- PFOA and GenX may enter the food chain.

Research question

- Is there a possible risk for human health due to exposure to PFOA and GenX in food?

Approach

- Collection of egg, milk, cheese, yoghurt and silage at farms in the vicinity of the factories in Dordrecht and Helmond.
- Collection of fish from a fishing pond in the close vicinity of the factory in Helmond.
- Sample analysis by Wageningen Food Safety Research (WFSR).
- Risk assessment by Front Office Food and Product Safety (FO; RIVM).

Results

Location	Product	Concentration (ng/g)		
		N	PFOA	GenX
Dordrecht	Dairy products			
	Milk	15	<0.01	<0.10
	Cheese	1	<0.10	<0.10
	Yoghurt	1	<0.10	<0.10
	Egg	1	0.14	<0.25
Helmond	Dairy products			
	Milk	1	<0.01	<0.10
	Egg	1	<0.025	<0.25
	Fish			
	Eel (farmed)	1	<0.05	<0.10
	Carp	1	1.3	4.7

Health based guidance values 2019

- PFOA
  - TDI: 12.5 ng/kg body weight per day (RIVM, 2016) → hepatoxicity
  - TDI: 0.8 ng/kg body weight per day (EFSA, 2018) → increased serum cholesterol
- GenX
  - TDI: 21 ng/kg body weight per day (RIVM, 2016) → immunotoxicitiy

EFSA opinion on PFAS 2020

- Sum of PFOA, PFNA, PFHxS and PFOS
- TWI: 4.4 ng/kg body weight per week (≈ 0.63 ng/kg bw/day) → immunotoxicity

		Exposure (ng/kg bw per day)		%TDI		
	Product	**PFOA**	**GenX**	**PFOA***	**PFOA****	**GenX**
Children (1 – 18 years)	Milk (cow)	0.70	0.12	87	6	1
	Milk (cow)	0.12	1.16	14	1	6
	Milk (sheep)	2.32 – 8.11	0.46 – 1.62	**290 – 1014**	19 – 65	2 – 8
	Meat (cow)	0.11	0.02	14	1	0
	Meat (sheep)	0.08	0.02	10	1	0
	Cheese	0.11	0.11	14	1	1
	Yoghurt	0.36	0.36	45	3	2
	Egg	0.07	0.13	9	1	1
	Eel	0	0			
	Carp	0.87	3.15	**109**	7	15

- * TDI = 0.8 ng/kg bw per day
- ** TDI = 12.5 ng/kg bw per day

		Exposure (ng/kg bw per day)		%TDI		
	Product	**PFOA**	**GenX**	**PFOA***	**PFOA****	**GenX**
Adults (19 – 79 years)	Milk (cow)	0.27	0.04	33	2	0
	Milk (cow)	0.04	0.45	6	0	2
	Milk (sheep)	0.89 – 3.12	0.18 – 0.62	**111 – 390**	7 – 25	1 – 3
	Meat (cow)	0.10	0.02	13	1	0
	Meat (sheep)	0.07	0.01	9	1	0
	Cheese	0.08	0.08	10	1	0
	Yoghurt	0.23	0.23	29	2	1
	Egg	0.05	0.09	6	0	0
	Eel	0.18	0.37	23	1	2
	Carp	1.48	5.35	**185**	12	25

- * TDI = 0.8 ng/kg bw per day
- ** TDI = 12.5 ng/kg bw per day

Conclusion

- The exposure to PFOA via the consumption of sheep's milk and carp by children and adults exceeds the provisional EFSA-TDI (0.8 ng/kg body weight per day) for PFOA, indicating a possible risk for human health. But……
- Consumption of carp → short term exposure
- Transfer data for sheep (N=2) do not show the same kinetics

PFAS in Food

NVWA

PFAS in food of animal origin

PFAS in food contact materials

PFAS’s in Food Contact Materials

Literature review by RIVM:

Per- and polyfluoroalkyl substances in food contact materials
https://www.rivm.nl/en/bibcite/reference/321161

1. Inventarisation of the application of PFAS’s in FCM
2. Legislative aspects
3. Assessment of the health risk by migration of PFAS’s to food

1. PFAS's in Food Contact Materials

- Monomer for polymeric coatings (e.g. Teflon ®)
- Polymerisation aid (surfactant)
- Additive in paper and paperboard to increase water- and grease repellence

2. Legislative aspects: PFAS's in FCM

- Authorized as polymerization aid or monomer for plastic FCM

  (incl. PFOA, GenX, ADONA). Regulation EU nr. 10/2011

- National legislation for paper and paperboard:
  - Perfluoralkyl(C6-C12) phosphates of bis(2-hydroxyethyl)amine
  - Bis[2—[N-ethyl(perfluorooctane)sulfonamide]ethyl]phosphate
  - 2-(perfluoroctylsulfonyl aminomethyl)ethyl methacrylate **copolymer**
  - Diphosphoric acid **polymers** with ethoxylated methyl esters and oxidated tetrafluoroethylene

3. Risk assessment

- Paper and paperboard of main concern
- No data on migration into food, only into food simulants
- Based on worst-case assumptions, migration of PFOA may account to 35-175 ng PFOA (equivalents)/kg bodyweight/week.

  (EFSA TWI: 4.4 ng/kg bodyweight/week for sum of 4 PFAS)
- Conclusion: data is needed on real migration into food

Research by NVWA

Selection of 21 PFAS’s:

- Authorized non-polymeric PFAS’s for paper and paperboard
- PFOA, PFOS, GenX, ADONA, PFHxN, PFNA
- Fluorotelomers
- Perfluoralkyl carboxylic acids

Research by NVWA

- Development of a semi-quantitative analytic screening method (LC-MS-MS)
- Sampling (n=46) of coffee cups, baking paper, hamburger wraps, paper boxes for fried food, pizza boxes
- Methanol extraction of paper and paperboard samples

Results NVWA screening-1

- <u>Not detected:</u>

  PFOS; HFPO-DA (GenX); fluorotelomers; perfluoroalkyl carboxylic acids: C6, C7 and C10; perfluorohexane sulfonic acid (PFHxS)

- <u>Detected at LOD/LOQ:</u>

  PFOA (LOD 4 µg/kg paper), well below legal limit of 25 µg/kg

  ADONA (possible replacement of PFOA)

  Perfluoralkyl carboxylic acids: C4, C9 and C11

Results NVWA screening-2

- Perfluorododecanoic acid (C12) in 1 sample: 40 µg/kg paper
- Perfluorotridecanoic acid (C13) and perfluorotetradecanoic (C14) were detected in significant amounts:
  - C13 in 18 samples, up to 1400 µg/kg.
  - C14 in 7 samples, up to 134 µg/kg
  - Positive samples included coffee cups, plates, baking paper, wrap paper and pizza box

Legal developments

- New TWI EFSA: 4.4 ng/kg bw/week for the sum of PFOA, PFNA, PFHxS and PFOS
- GenX was included on the candidate list as substance of very high concern (SVHC) in 2019
- PFHxS: restriction proposal in POP regulation in preparation
- PFHxS: restriction proposal REACH regulation prepared by Norway
- PFHxA: restriction proposal REACH regulation submitted by Germany
- C9-C14 PFCA's: restriction proposal REACH regulation submitted by Germany and Sweden
- Wide-range PFAS restriction is being prepared by the Netherlands, Germany, Denmark, Norway and Sweden

Future research

- Research at WFSR:
  - PFAS content in easy & fast-food (n=50), packaged in paper and paperboard
  - If significant amounts are detected, the paper is also analysed
  - Report is expected in Q1 2021
- Depending on developments in legislation:
  - Further method development for paper and paperboard (content or migration)

Questions?

- More information via www.nvwa.nl

- Dr. Jacqueline Steenbergen – Biesterbos: j.w.h.biesterbos@nvwa.nl
- Dr. Krista Bouma: k.bouma@nvwa.nl