



CHEMICAL FOOTPRINTS  **IN BLOOD**

THE EVIDENCE

GREENPEACE

CHEMICAL FOOTPRINTS IN BLOOD

THE EVIDENCE

CONTENTS

INTRODUCTION	5
HOW CONTAMINATED IS <i>MY</i> BLOOD?	6
Participants in the blood test project	
THE BLOOD SAMPLES AND THE CHEMICALS	9
The results of the blood tests	
'POLLUTING CHEMICALS FOUND IN ALL BLOOD SAMPLES'	20
Conclusions from Prof. Dr. P.J.J. Sauer	
DEMAND A TOXIC FREE BODY!	22
COMPANIES LEADING THE WAY	24
Hennes & Mauritz, Samsung, Nokia, Sony and Unilever	

BD Vacutainer
Z

TOEGEVOEGD MEDICAMENT

patient
volume
naar tot

Bart

toegevoegd door
tijd

het MOET
waaraan
toegevoegd

INTRODUCTION

Televisions, computers, toys, perfume, shampoos and T-shirts with plastisol prints: virtually every product contains hazardous chemicals. Yet these hazardous substances are not chemically bound to the products; they 'leak' from them and sooner or later end up in the environment.

Traces of hazardous chemicals have already been found in the bodies of countless animals: whales, polar bears, cormorants and eels. Their health and that of their descendants may already be showing the resulting effects. One dramatic example is that of polar bears with both male and female sex organs found by researchers in the North Pole, a phenomenon that may well be a consequence of toxic chemical exposure.

BLOOD TESTING: THE PARTICIPANTS

- more than 1,300 applications
- 91 people tested
- 48 males
- 43 females
- age range 18-79 years old
- born before 1960: 50%
- born after 1960: 50%

Greenpeace found hazardous chemicals in house dust (2001) and in rainwater (2003). The logical question that follows is: could hazardous chemicals also end up in our bodies? Researchers in Sweden, Germany and the USA say yes. In 2004, Greenpeace Netherlands decided to carry out a unique blood testing project in humans.

BLOOD TESTING: THE RESULTS

- 91 participants
- 10 regions
- 6 groups of chemicals
- 46 chemicals

During the Dutch radio show 'Early Birds' on April 4th, 2004 Greenpeace asked for 100 volunteers to have their blood tested. More than 1,300 people responded immediately.

HOW CONTAMINATED IS MY BLOOD?

Eighty men and woman of varying ages and from different regions were selected. Eleven well-known Dutch personalities also decided to take part in the blood tests.



GP/Deiman

Patricia Janssen sells jewellery.

'I don't dwell on this on a daily basis but such a research project certainly puts the facts right under your nose. To think that these chemicals are in mobile phones, TV's and perfume which are things we use on a daily basis. I even read recently that they are also found in kids' clothing and that's when I thought, 'Just hold on a minute!' So I certainly want to take part in this.'



GP/Jansen

Prof. Dr Martin van den Berg is Director of the Toxicology Division of IRAS, University of Utrecht.

'I personally took part in the Greenpeace blood testing project because the Dutch government has carried out far too little research in the past ten years about the actual exposure to so-called hormone disrupting chemicals, such as phthalates and flame retardants.

It is a pitiful state of affairs that an environmental organisation such as Greenpeace is now going to assemble details for a responsible risk management of these chemicals.'



Henny Huisman is a television presenter.

‘Of course we all like to sit in front of the television, take a shower on a daily basis and make calls with a mobile phone but you don’t convince me that we need to use hazardous chemicals to be able to do these things. Surely all those clever people who work in the laboratories are able to think up something better? That’s the reason I am allowing my blood to be tested.’

Mrs Tan owns a Chinese restaurant.

‘Ordinary people don’t realise these things. If I tell people about the report *‘The Poison Link’* then they are very shocked. They had no idea for instance that hazardous chemicals are used in deodorant. I notice in the restaurant that more children than ever have an allergy, they have all sorts of things wrong with them. It’s going to get out of hand and that is the reason why I’m taking part in these blood tests.’



Jules Maaten is vice-president of the Liberal Group in the European Parliament

‘I am supporting this initiative. It makes the new European legislation on chemicals a lot more vivid for people. With results from this type of project, I feel better informed about exactly what decisions to make.’







GP/Schlijper

THE BLOOD SAMPLES & THE CHEMICALS

By July all the blood samples were collected. The research institute TNO-MEP analysed the blood carefully for six groups of hazardous chemicals. TNO sent the results to P.J.J. Sauer, M.D. Professor of Pediatrics, Beatrix Children's Hospital, University Hospital Groningen who led the blood research project. Professor Sauer processed the results (keeping the names of the participants anonymous) drawing up his conclusions in a scientific report.

ALKYLPHENOLS & BISPHENOL-A

MEASURED CONCENTRATIONS

SUBSTANCE	N	LOWEST	HIGHEST
OP	2	2,0	2,3
NP	16	0,58	16
BPA	36	0,57	16

ALL RESULTS ARE STATED IN NG/G SERUM

*N: number of bloodsamples containing chemicals
Stated are only the concentrations above detection limit*

ANP



Alkylphenols are notorious hormone disruptors. Exposure to these chemicals has led to sex changes in fish and to effects on the male sex organs and the quality of sperm in rats.



GP/Pattipeelohy

Alkylphenols are found in (industrial) cleaning agents, textiles, leather and cosmetics. Alkylphenols can be found in sediment from sewage purification plants. Yet these chemicals can also be found in food products ranging from butter to apples. Bisphenol-A can be found in countless products such as plastic, pesticides, nail varnish and compact discs.



GP/Pattipeelohy



TNO found alkylphenols in the blood of eighteen people. Alkylphenol ethoxylates were not detected. Bisphenol-A appeared in 40% of the blood samples.

BROMINATED FLAME RETARDANTS

MEASURED CONCENTRATIONS

SUBSTANCE	N	LOWEST	HIGHEST
BDE-153	76	1,9	253
HBCD	11	96	356
TBBPA	32	56	787

ALL RESULTS ARE STATED IN PG/G SERUM

*N: number of bloodsamples containing chemicals
Stated are only the concentrations above detection limit*

Guether/Mauritius



Brominated flame retardants are hazardous chemicals that can disrupt hormones and disturb development. Scientists suspect that exposure in the womb can affect the later development of behaviour of unborn children.

These flame retardants prevent products from easily catching fire. They can be found in most electronic products, in synthetic products and textiles. Researchers have found traces of these chemicals in cormorants, whales, mountain trout and breast milk.



TNO found one of the older types of brominated flame retardants (PBDE's), that have been used in products for many years, in the blood of 76 people. In one person the concentration was as much as six times higher than the average. Two newer types of flame retardants were also found in the blood of 32 (TBBPA) and 11 (HBCD) people respectively.



Consumentenbond



Consumentenbond



Consumentenbond

PHTHALATES

MEASURED CONCENTRATIONS

SUBSTANCE	N	LOWEST	HIGHEST
DEHP	84	28	5863
DEP	21	2,2	14
DBP	68	2,6	136

ALL RESULTS ARE STATED IN NG/G SERUM

*N: number of bloodsamples containing chemicals
Stated are only the concentrations above detection limit*

GP/Horneman



Phthalates can cause damage to the liver and kidneys. Some, including DEHP, can interfere with reproductive development. Researchers have shown a correlation between premature breast development in girls and the concentrations of phthalates in their blood.

Phthalates are used to make PVC soft and malleable. They are contained in countless products in daily use from toys and vinyl coverings to rainwear and electricity cables. They are also used as solvents or fixing agents in perfume, body lotion and other cosmetics. In September 2004, the EU banned the use of three phthalates (DEHP, DBP and BBP) in toys and childcare products. The phthalates DINP, DIDP and DNOP are no longer allowed to be used in toys designed for children up to three years.



The phthalate DEHP was found in nearly all the blood samples. This is hardly surprising because this softener is



Plechal/GP



GP/Homeman



GP/Pattipeiothy

used in countless products. Sometimes the concentrations were very high without it being possible to make a definite link to the occupation of the participant. The other phthalates were also found in many blood samples.

ARTIFICIAL MUSKS

MEASURED CONCENTRATIONS

SUBSTANCE	N	LOWEST	HIGHEST
AHTN	88	0,1	11
HHCB	91	0,2	9,2
MA	48	0,10	4,0

ALL RESULTS ARE STATED IN NG/G SERUM

*N: number of bloodsamples containing chemicals
Stated are only the concentrations above detection limit*

Image Source



Some artificial musks can interfere with hormone systems, others can be carcinogenic. Researchers have found musks in fish, mussels, breast milk and human blood.

These chemicals are used to mimic natural aromas: they make soap, cleaning products and cosmetics smell nice. Musk ambrette has been banned in the European Union since 1995 but in 2003, Greenpeace found this chemical in Dutch rainwater. In 2010, musk ketone and musk xylene will also be banned.



TNO found two musks in the blood of most of the participants: tonalide (AHTN, in 88 samples) and galaxolide (HHCB, in 91 samples). A further unpleasant shock was the discovery of musk ambrette in half of the blood samples.



GP/Pattipeilohy



GP/Pattipeilohy



GP/Horneman

ORGANOTINS

MEASURED CONCENTRATIONS

SUBSTANCE	N	LOWEST	HIGHEST
DOT	13	0,2	2,4
MOT	12	0,1	0,5
TBT	3	0,1	0,1

ALL RESULTS ARE STATED IN NG/G SERUM

*N: number of bloodsamples containing chemicals
Stated are only the concentrations above detection limit*

ANP/Kraak



Organotins can affect the immune system and influence development processes. They can seriously disrupt the hormone system. Almost the entire whelk population in the Dutch Wadden Sea is now extinct, after becoming infertile as a result of the organotin TBT leaching from ships' paint.

This substance was banned in ships' paint as of 2003 but can still appear in small amounts in other products. Organotins have been used in lorry and tent covers to protect against mould growth. In plastics such as PVC they act as stabilisers, slowing down the degradation of the plastic. Researchers have found these chemicals in T-shirts, sport shoes, beach balls and nappies.



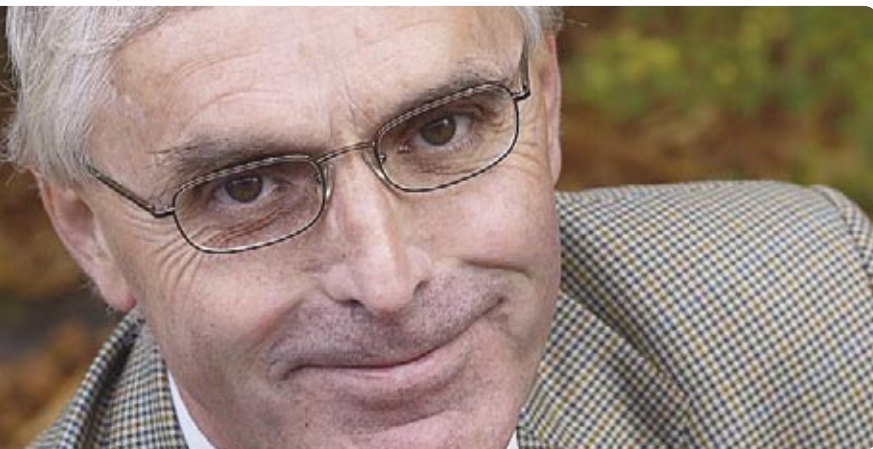
TBT was only found in three samples. Two other organotins (MOT and DOT) were found more frequently (in 12 and 13 samples respectively). They are often used in products such as T-shirts with plastisol prints, plasters and nappies.





Prof. Dr. P.J.J. Sauer from the University Hospital Groningen led the blood research project. What are the most important conclusions in his report 'Man-made Chemicals in Human Blood'?

'POLLUTING CHEMICALS WERE FOUND IN ALL THE BLOOD SAMPLES'



'Three conclusions are important. Firstly, there are chemicals present in the blood of all participants. It does not matter where they live, how old they are or what job they have. Secondly, the amounts found vary from very low to very high. Some people are obviously more exposed than others. Thirdly, if a new chemical is introduced into the environment then we almost certainly find it in the human body straightaway.

What is remarkable is that there is seldom a relation between a person's occupation and the levels of chemicals found in their blood. It is however obvious

that a lot of people have no idea about their body burdens of chemicals. Each participant filled in a questionnaire that posed the question of possible contamination. From the answers, it seemed that they had absolutely no idea that they were being exposed even though we were finding high concentrations.

Are these chemicals hazardous for human health? The big problem is that we know so little about so many chemicals. If a new chemical comes onto the market now, industry is sometimes required to carry

'As a paediatrician myself, this is an area I am particularly worried about'

out tests. Yet that research is very limited and the long-term consequences are certainly not examined. As a paediatrician myself, this is an area I am particularly worried about. We all know that unborn or newly born children are the most vulnerable to exposure.

What happens to children who are exposed to environmentally polluting chemicals at a very young age when they grow older?

'A lot of people have no idea about their body burdens of chemicals'

You shouldn't be too quick in saying that there isn't anything wrong here. I think that if a chemical can be traced back to the blood and you see hazardous effects in animals, where is the proof that such a chemical is not dangerous? You can only know that if you have examined a chemical very thoroughly and that includes examining the long-term effects. Without a decent toxicological report a chemical should not be allowed onto the market.

I think it is important that legislation is introduced which makes it mandatory for companies to research a chemical before they use it. I wouldn't ban existing products but would demand that the manufacturers quickly come up with a sound toxicological report about its long-term effects. If they don't do this, then I would withdraw the product from the market. As far as new products are concerned, such a report should certainly be a condition for allowing it on the market.'



DEMAND A TOXIC FREE BODY!

The results of this blood research project show nothing to be cheerful about. We all have hazardous chemicals in our blood. Chemicals that are contained in normal consumer products and that we therefore come into contact with on a daily basis.

Of course we certainly don't want this to be the case. Furthermore, it surely can't be the intention of the chemical industry to saddle ourselves or our children with such a poisonous legacy. Aren't there any possible alternatives?

There certainly are. Large companies such as furniture retailer IKEA and clothing chain Hennes & Mauritz have been using alternatives for years and they have certainly profited from it too. Yet many manufacturers still choose to use hazardous chemicals because it's easier, out of ignorance, or simply because they believe it is cheaper.

While Greenpeace believes that companies should voluntarily change to safer alternatives, few companies are jumping at the prospect. For this reason, governments must make it mandatory for manufacturers to use alternatives or to develop them if no safer alternative is currently available. The proposed legislation within the European Union that would make mandatory the substitution of hazardous chemicals with safer alternatives, is known as REACH.



HENNES & MAURITZ

- Net sales 2003 € 56.6 billion
- Net profit 2003 € 700 million
- Number of branches 1,006
- Number of countries 20
- Number of employees 40,000

HENNES & MAURITZ

In the mid-1990s, Hennes & Mauritz took a decision in favour of the environment and people's health. The hip clothing chain no longer wanted hazardous chemicals in its clothes, handbags, footwear or hair brushes. Together with its suppliers, H&M went in search of alternatives to brominated flame retardants, alkylphenols, phthalates and carcinogenic dyes.

CLOTHING LINE

H&M's decision was based on the precautionary principle: if you suspect that a chemical is hazardous then you don't use it in order to be completely

certain. If it is not possible to find a safe alternative, then a complete clothing line will be removed from sale, if necessary.

CREATIVE

However, it is often possible to find safe alternatives. Suppliers come up with a lot of innovative and creative solutions such as products made from natural materials that are naturally flame resistant, making brominated flame retardants superfluous. As of January 1st 2002, H&M stopped selling all products containing PVC and the company avoided any PVC flooring in new or refurbished outlets. This plastic contains many phthalates and organotins as additives and creates additional pollution problems throughout its lifecycle.

RECORD PROFITS

The clothing chain certainly didn't suffer as a result: in 2003, H&M achieved a record profit of 700 million Euro! And, not insignificantly: 'We didn't have to make any important concessions in the area of fashion or quality,' says Environmental Manager Ingrid Schullström.

SAMSUNG ELECTRONICS

- Net sales 2003 \$ 54.2 billion
- Net profit 2003 \$ 5 billion
- Number of offices 88
- Number of countries 48
- Number of employees 88,000

SAMSUNG

Samsung is world leader in colour monitors and memory chips for computers. The electronics concern is coming up with alternatives for hazardous chemicals before European producers are legally required to do so. In 2001 Samsung became the first company with a 'green semi-conductor'. The quality is good and it even saves the company hundreds of thousands of euros.

SPEEDING UP THE PROCESS

Following discussions with Greenpeace, the environmentally friendly intentions of this electronic giant accelerated. In June 2004 Samsung announced that

PVC, phthalates, organotins and brominated flame retardants, among others, will be eliminated from its products. The company was upgraded on the Greenpeace product website from a red to an amber status.

RESPONSIBLE

Samsung sets its suppliers to work tracking down existing alternatives or developing new ones. Gregor Margetson, Environmental Manager for Samsung Electronics Europe: 'Samsung Electronics wants to contribute to a sustainable future and that in itself carries obligations. We develop, produce and sell 'high tech' consumer goods. This means we must be both cautious and responsible with substances that have significant environmental impacts. Greenpeace acted as an important catalyst to speed up this process and we have strengthened our environmental goals even further. Sometimes it may be the case that there is no irrefutable proof that a substance is hazardous for mankind and the environment, but that there is still reason for concern. This could mean that we then decide not to use a certain chemical.'

NOKIA

- Net sales 2003 € 29,455 million
- Net profit 2003 € 3,592 million
- Number of offices 50
- Number of countries 130
- Number of employees 51,359

NOKIA

Nokia is the world's largest producer of mobile phones and one of the market leaders in mobile, fixed and IP networks. Nokia is Scandinavia's largest company with 11 production facilities in 9 countries around the world.

WEBSITES

Nokia has pursued an active environmental policy since 1994: it is the wish of this electronics concern that its products cause as little environmental damage as possible. Nokia employs environmental experts to help with the development of new products. The tens of thousands of employees have worldwide

access to special internal websites with up-to-date environmental information.

STRICT DEMANDS

Suppliers have to keep to the strict environmental demands that Nokia requires. In this way, the company asks how parts can be recycled such as a mobile phone that will no longer be used. Nokia also requires to know precisely what substances suppliers use, yet it also offers support to its suppliers to help them be able to comply with these demands.

LIST OF SUBSTANCES

The Nokia Substance List names the substances that are banned from use in Nokia products. It also has a list of substances that the company will be phasing out in the future. At the end of 2006, all brominated flame retardants will disappear from printed wiring boards in new mobiles and other products will follow as quickly as possible. Also PVC and phthalates will disappear completely. From the end of 2005, the company will no longer use PVC to make mobile phones. The electronics manufacturer is strongly advising its suppliers to start investing in alternatives for hazardous chemicals as of now.

SONY

Sony, world-wide market leader in consumer electronics, is hard at work eliminating hazardous chemicals from its products. As of 2006, the electronics giant wants to be PVC-free. Sony informed Greenpeace in October 2004 that it was phasing out all brominated flame retardants. This has already been achieved in 17 percent of all television models on the European market. As of June 2004, half of all Sony computer models in Europe are also free from these hazardous chemicals.

UNILEVER

Unilever is one of the largest manufacturers of consumer articles in the world. It is known for its brand names: Omo, Cif, Dove, Andrélon and Calvin Klein. Unilever has decided to tighten its policy on hazardous chemicals. The company wants to provide more clarity on how it will phase out these chemicals from all products. In new household and care products, no polycyclic and nitro musks or phthalates will be included, with the exception of one type of phthalate that the company needs more time to replace. 'Unilever is committed to the sustainable management of chemicals – this includes the logical use of both the Precautionary and Substitution Principles within an overall framework of risk management', says Unilever R&D top man David Duncan.

**WANT TO KNOW MORE ABOUT THE
RESULTS OF THE RESEARCH PROJECT
AND HAZARDOUS CHEMICALS?**

Check the following websites:

- www.greenpeace.org/chemicals
- www.lichaamzondergif.nl
- www.greenpeace.nl

COLOFON

© November 2004
Produced by Stichting Greenpeace Nederland
Veemkade 18-20
1019 GZ Amsterdam

ISBN 90-73361-85-0

Text: Jacqueline Schuiling
Supervision: Monique Harthoorn
Translation: Sabra Kemner
Design: Mels grafische vormgeving, Hoorn
Cover photos: Image source

Produced on chlorine free recycled paper.

For background information see the reports *'The Poison Link – The story nobody wants to hear'* and *'Man-made Chemicals in Human Blood'*.