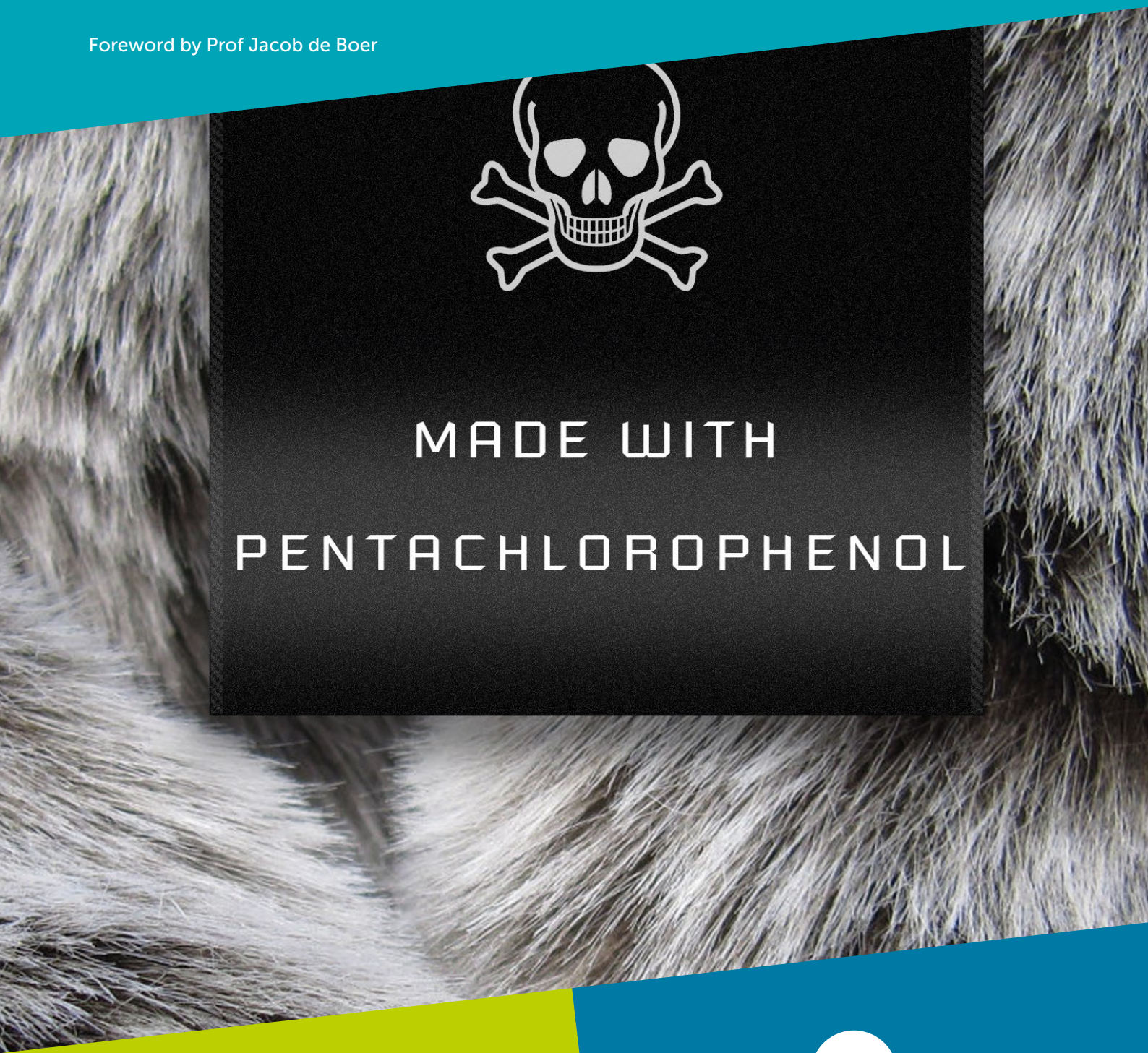
Toxic Fur: A Global Issue

Research in China

Foreword by Prof Jacob de Boer



ACT Asia


ACT
Asia


furfree
ALLIANCE

Foreword

Professor Jacob de Boer

The levels of hazardous chemicals found in the fur trims of infant jackets and fur accessories in Europe and China justify stringent measures to seriously limit or prohibit the use of these chemicals in the preparation of fur products during production processes.

Fur trim attached to the hood of an infant jacket are near the child's face and mouth and chemical substances, such as ethoxylates, may be directly absorbed through the skin into the blood of children. These chemicals find their way through the body, are stored in fat cells and may still exhibit chronic effects such as endocrine disruption twenty years later.

Children are already burdened by prenatal exposure to various chemicals through the mother, and are also in a sensitive stage of development, which reinforces the effects of hazardous chemicals. Adding exposure to hazardous chemicals in early childhood through (unnecessary) fur items may well worsen the levels of toxins in their blood, hereby increasing the changes of detrimental effects to their development and health.

This research follows other studies in European countries over the last ten years. These and earlier findings show levels of hazardous chemicals in fur products which are exceeding norms in national or regional legislation and standards. It's time for governments to take appropriate action, including a preventative approach by halting the production and sale of fur items currently exceeding applicable norms of national or EU regulations, as well as developing proper labelling of fur products.

Prof Dr Jacob de Boer
Professor of Environmental Chemistry and Toxicology, Director Environment & Health
Vrije Universiteit, Amsterdam, The Netherlands

Contents

Executive summary

This report charts and discusses the analysis of chemical residues found in six sample items of fur clothing and accessories, bought from shopping malls in four locations in China. The research follows and builds upon several recent studies into chemical residues in fur clothing and accessories in Europe, which found potentially hazardous levels of toxic chemicals.

Of 62 fur items investigated in ten countries within Europe, the majority contained potentially hazardous toxic chemicals. All six samples analysed from China failed both Chinese and international recommended standards of chemical substances. Five of the six samples failed international legal specifications, and four of the six items failed Chinese legal standards. All items contained Formaldehyde , Chromium VI, Polycyclic aromatic hydrocarbons (PAH), Alkylphenol ethoxylates (APEO + NPEO), Azo Dyes and heavy metals, including lead.

Analysis of clothing was conducted by an independent accredited laboratory in China, based on Chinese and international regulations and legislation. In addition, the results were sent to an independent European scientific laboratory in Germany for further evaluation. The presence of chemical residues exceeding permitted levels in all six sample items demonstrates the problem is likely to be very common, and the safety of fur clothing and accessories cannot be guaranteed to retailers or consumers, neither in China, nor any country to which Chinese fur is exported.

The chemicals found in fur produced both in Europe and China have the potential to disrupt sexual development or reproduction, may cause cancer, skin irritations, and may be highly toxic to the environment, to people, and to animals.

ACTAsia recommends the fashion industry, designers and retailers in China avoid including fur in clothing, textiles and accessories and join the Fur Free Retailer scheme. We also ask the industry to commit to transparency if they do use fur, by informing consumers about the presence of chemicals, as well as the origin and species of animals used. Consumers in China and globally can use their influence by demanding fashion brands and retailers stop using

Image: Jo-Anne McArthur / Unbound Project

fur, and that they avoid buying or wearing fur items, but replace them with sustainable, animal-friendly alternatives.

In addition, the Government in China could consider halting the production and sale of fur items exceeding norms of national regulations, carry out their own testing programme to monitor the chemical content of fur items, and work to eliminate the use of potentially hazardous chemicals.

In recognising the limitations of this report, we should be aware there may be additional potentially hazardous chemicals present in our samples, for which we did not test. The choice of chemicals was made based on previous findings in European research.

In addition, although we did not include the issue of mislabelling in our formal research, anecdotal evidence suggests the prevalence of labelling real fur from Chinese origins as faux fur for western markets. In the case where faux fur is acceptable to consumers but real fur is not, the mistaken purchase of real fur could potentially expose an unwitting public to a risk they are not even aware they are taking.

Introduction

Recent years have seen an increased interest by citizens around the world for sustainable, fairtrade and ethical products. Consumers care increasingly about the origin of the products they consume, the environment, animal welfare and their own health. But despite a significant conflict of interests, the animal fur industry still manages to market its damaging products to the public.

The industry utilises PR tactics similar to the tobacco industry, and tries to greenwash their products as sustainable and ethical. Many consumers and retailers are unaware of the cruelty behind animal fur items, or are misled by unclear labels and marketing slogans. There seems to be a general lack of knowledge around the origin of products and how the supply chain works. At the same time there appears to be a lack of (or implementation of) legislation to prevent or improve situations related to animal welfare.

Most people are also unaware of the health risks related to exposure to fur. For animal skins to be transformed into fur items sold as 'fashion' products, chemicals are used in the cleaning and tanning processes of the skins.

After animals have been killed, a 'pelt' which is the animal's skin with the hair still attached, is sent to be tanned and perhaps dyed, bleached, or otherwise treated. Common methods for tanning skins with fur involve chemicals that are listed as carcinogens and are often toxic to humans. Other chemicals may be used or emitted in the dressing and dyeing processes (see Annex A for more detailed information).

Hazardous chemicals may well find their way into the human blood stream because of fur trim or a fur keychain. This report aims to help consumers become more informed about possible dangers to adults and children.

Image: Antonia Coenen, 2015 Loupe FilmProduktion

Image: Lu Guang, Greenpeace

1.1 Purpose of the China research

The purpose of this research report is to establish whether fur products manufactured in China contain the similar potentially dangerous levels of chemicals to those found recently in European countries

The emission and use of these different chemical substances affects both human health and the environment. The fur industry uses diverse methods to promote fur as 'green' and 'eco- friendly' to consumers by claiming improvements to the treatment and killing of production animals, developing their own standards such as 'Welfur' without independent monitoring, omitting the use of real fur in their labels or alleging to comply with (international) legislation regulating the use of chemical substances[1].

Retailers and consumers usually have difficulties accessing information about the use of fur and the substances used in cleaning and tanning. It is the residues of these substances which are often still present in fur clothing by the time the items are in the shops. In Europe and the US there is legislation designed to control and restrict the use of chemicals in, for example, toys and leather products. Companies which import fur items into the EU carry the responsibility for the safety of their products, but retailers need to trust that these companies invest in proper investigations and measures. However, because of the common mislabeling , or absence of labelling of fur products, retailers and consumers are often unaware that the items they buy include real fur. This means they are also unaware of the potential risk of exposure to chemicals associated with fur production.

Potentially hazardous chemicals have been found in abundance in fur trim and accessories investigated to-date. Previous studies in several European member states, including Italy, Germany and Denmark (see Annex B), has already revealed that investigated fur items contain high levels of dangerous substances, such as carcinogenic formaldehyde and other chemicals which can cause allergies, distort sexual reproduction and/or are damaging to the environment.

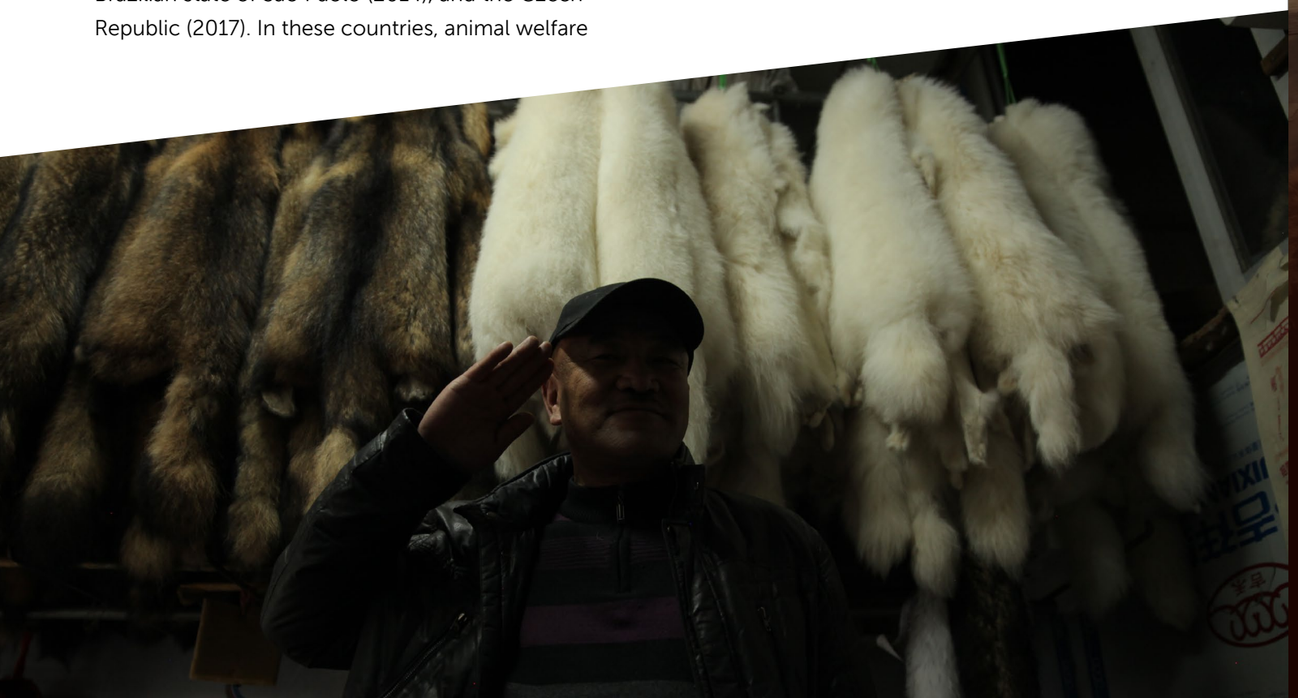
The results of this research reinforce our demand for measures to prohibit the sale of fur products containing these chemicals. This report addresses the toxicity of fur products and demonstrates that the use of chemicals by fur manufacturers is far from 'green' or 'risk-free'. Rather, the production of fur for fashion can impose significant adverse impacts on both the environment and human health, and consumers should be made aware of this.

1.2 The fur industry in China and the rest of the world

Most fur sold globally is from farmed animals, with common examples being mink, fox, raccoon dog, rabbit and chinchilla. Worldwide millions of animals are killed on fur farms after short and miserable lives in small, wire mesh battery cages. Keeping animals in small cages without the potential to exhibit natural behaviours results in numerous serious stress-related health problems, including commonly infected wounds, mutilations, cannibalism and stereotypical behaviour. The recommendations of the European Commission's Scientific Committee on Animal Health and Animal Welfare (SCAHAW, 2001[2]) explain this by stating correspondingly: 'In comparison with other farm animals, species farmed for their fur have been subjected to relatively little active selection except with respect to fur characteristics.'

As a result, fur bans have been introduced in many countries in recent years, prohibiting the farming of some or all species for fur. Fur farming bans were introduced in the UK and Northern Ireland (2000), Austria (2004), Croatia (2006), Bosnia and Herzegovina (2009), The Netherlands (2013), Slovenia (2013), Republic of Macedonia (2014), the region of Wallonia and Brussels of Belgium (2014), the Brazilian state of Sao Paolo (2014), and the Czech Republic (2017). In these countries, animal welfare concerns have been given priority over the interests of the fur industry. Furthermore, countries including Switzerland, Germany, Sweden, Spain and others have adopted stricter regulations, which have phased out either the breeding of all animals for fur, or the breeding of certain species, such as foxes. Japan closed down its last fur farm in 2016.

ACTAsia's recent research has indicated that China is now the world's largest fur importer, exporter and consumer country, responsible for more than 53%[3] of the global output and consuming 80% of its local produce[4]. In 2014, the quantity of fox produced in China was 13 million[5], while the quantity produced in Europe was only 2 million[6]. The fox production of China is nearly six times that of Europe. Furthermore, China produced 14 million raccoon dog pelts, whereas Europe produced around a hundred thousand[7], making China's racoon dog fur output more than a hundred times that of Europe[8]. Regardless of whether we consider a single species such as mink, fox or raccoon dog, or all species combined, the quantity of fur pelts harvested by



concentrated near the Shandong, Hebei and Liaoning provinces of China. These central fur farming areas have created nearby processing and wholesale markets. Smaller household farms are developing across various parts of China[9].

End products made from fur have changed considerably and as a result, so have the target consumer groups for fur. While full length fur clothing still exists to attract the high end consumer, cheaper items of clothing and accessories with fur trim have flooded markets worldwide. These items are often so cheap that consumers do not realise they are buying real fur.

Global consumers buying fur trim from China are supporting an industry that differs from Europe's fur trade. Although methods for breeding and housing may be similar, animals in China are not protected by animal welfare law. They suffer miserable lives and cruel deaths by gassing, neck-breaking or anal or genital electrocution before skins are extracted. There is evidence that in some cases, the skinning takes place while animals are still alive and conscious.

Based on information collected on the fur industry in China, there is also evidence that fur production in China causes serious environmental problems[10] during all stages of farming, slaughter and processing.

1.3 The China research objectives

- **To raise public awareness of potential dangers from toxic chemicals found in fur clothing**
- **To support international research with the findings of the China research**
- **To inform relevant stakeholders of the findings**
- **To request certain precautions are taken by relevant stakeholders (such as labelling, withdrawal of items from the market etc)**
- **To promote fur free fashion**

1.4 The China research methodology

Purchase

Articles of clothing were chosen based on brand popularity, ensuring there was a selection of local and international brands. In addition, items of men's, women's and children's clothing were selected as well as an accessory - with the types of fur used being as diverse as possible.

The articles of clothing tested were purchased from brands' flagship stores and other stores authorised to sell the branded products in China, all being from current collections (ie not items in the 'sale' section).

The items were bought from four cities in China to ensure a diverse sample range: Shenzhen, Shanghai, Beijing and Changchun. Namely, items were bought from the MaoYe Mall in Shenzhen, XinMei Plaza i Shanghai, ZhuoZhan Shidai Plaza in Changchun and R&F Plaza in Beijing.

Shenzhen MaoYe Mall
2 items

Shanghai XinMei Plaza
1 item

Changchun ZhuoZhan Shidai Plaza
2 items

Beijing R&F Plaza
1 item

Transport

Sealed bags containing the articles were sent to ACTAsia's office in Zhongshan for cataloguing and dispatch to the assigned independent laboratories in Guangzhou for analysis.

测试品牌采购分布

Company 品牌	City 购买城市
Wanlima万里马	Shenzhen 深圳
Vero Moda	Shenzhen 深圳
Me&City	Shanghai 上海
HEILAN HOME海澜之家	Changchun 长春
E.LAND	Changchun 长春
Gb好孩子	BeiJing 北京

Analysis

Analysis of clothing was conducted by an independent accredited laboratory in China. The laboratory was selected based on its credibility and 130 years of experience in the field of testing, with cases from a wide variety of sectors such as food, industrial manufacturing, chemicals and many more.

A separate report for each item of clothing was issued based on Chinese and international regulations/ legislation by the same laboratory. In addition, the results were sent to a European independent scientific laboratory in Germany for further evaluation.

Image: Lu Guang / Greenpeace

2. Chemicals found and their health risks

Hazardous chemicals have the potential to cause a range of adverse health effects when their residues remain in the end-products purchased by consumers.

The use of hazardous chemicals in fur items leads to the release of such chemicals into the environment, either during manufacturing or from the products directly. In some instances, exposure to certain chemicals can result in loss of fertility, allergies or even cancer. Infants and children may be more sensitive to the effects of some hazardous chemicals compared to adults[11]. Various specialists, including dermatologist Xiaoqing Lin and chemist Zheng Qing Fei, have commented on the impact of such chemicals.

This research into six fur items obtained in China entailed testing the samples for five specific chemical substances: Formaldehyde, Chromium VI, Azo Dyes, Chlorinated phenols and Alkyphenol Ethoxylates. These are among the more hazardous chemicals typically used in the preparation of fur products.

However, this does not mean that tested samples did not contain other chemical substances which can also have detrimental effects on human health and/or the environment. The choice to investigate the presence of these specific five chemical substances followed from a decision to prioritise dangerous substances and to limit the costs of the chemical analysis. The choice was also made based on the previous findings in the European studies.

Formaldehyde[12]

Formaldehyde is a colourless, flammable, strong-smelling chemical that is used in building materials and to produce household products. It is used in pressed-wood products, such as particleboard; glues and adhesives; permanent-press fabrics; paper product coatings; and certain insulation materials. Formaldehyde is commonly used as an industrial fungicide, disinfectant, and as a preservative in mortuaries and medical laboratories. In addition, formaldehyde is commonly used for the preparation of leather and fur items.

Health risks of formaldehyde

In 1980, laboratory studies showed that exposure to formaldehyde could cause nasal cancer in rats. In 1987, the US Environmental Protection Agency (EPA) classified formaldehyde as a probable human carcinogen under conditions of unusually high or prolonged exposure in their Assessment of Health Risks to Garment Workers and Certain Home Residents from Exposure to Formaldehyde[13]. Since that time, studies of humans have suggested that formaldehyde exposure is associated with certain types of cancer. The International Agency for Research on Cancer (IARC) and the World Health Organisation (WHO) classify formaldehyde as a human carcinogen since 2004[14]. In 2011, the National Toxicology Program named formaldehyde as a 'known human carcinogen' in its 12th Report on Carcinogens[15]. The EU REACH Committee adopted the decision to reclassify formaldehyde as a category 1B carcinogen in 2012[16]. In view of its widespread use, toxicity, and volatility, formaldehyde poses a significant danger to human health. Formaldehyde can be toxic, allergenic and carcinogenic.

Chromium VI

Hexavalent chromium compounds are a group of chemicals that have useful properties, such as corrosion resistance, durability and hardness. These compounds have been used widely as corrosion inhibitors and in the manufacture of pigments, metal finishing and chrome plating, stainless steel production, leather tanning, and wood preservatives. They have also been used in textile-dyeing processes, printing inks, drilling muds, fireworks, water treatment, and chemical synthesis. Occupational exposure to hexavalent chromium can occur from inhalation of dusts, mists, or fumes containing hexavalent chromium, or from eye or skin contact[17].

Health risks of Chromium VI

Heavy metals like Chromium VI can accumulate in the body over time and are highly toxic, with irreversible effects including damage to the nervous system (lead and mercury) or the kidneys (cadmium).

Chromium VI is highly toxic even at low concentrations, including to aquatic organisms. Hexavalent chromium is classified as a Class 1 human carcinogen by the World Health Organization's International Agency for Research on Cancer (IARC)[18]. Chromium and chromium compounds are found to be absorbed after oral, dermal or inhalation exposure[19].

Occupational exposure to these compounds is associated with increased risks of lung cancer and cancer of the paranasal sinuses and nasal cavity.

Alkylphenol ethoxylates

Commonly used alkylphenol compounds include nonylphenols (NPs) and octylphenols, and their ethoxylates, particularly nonylphenol ethoxylates (NPEs). NPEs are surfactants, a functional class of chemicals that provide increased surface activity and reduce the surface tension of water, allowing easier spreading, wetting, and better mixing of liquids. NPEOs are widely used in the textiles industry, in cleaning and dyeing processes.

Health risks of alkylphenol ethoxylates

Alkylphenol ethoxylates are toxic to aquatic life, persist in the environment and can accumulate in body tissue and biomagnify (increase in concentration through the food chain)[20]. Alkylphenols are xenoestrogens[21].Their similarity to natural oestrogen hormones can disrupt sexual development in some organisms, most notably causing the feminisation of fish[22]. The European Union has implemented restrictions on sales and use of certain applications in which nonylphenols are used because of their 'toxicity, persistence, and the liability to bioaccumulate'[23].

According to REACH, the use of NPEOs in leather or textile production is not completely forbidden, but is limited[24]. If the excipients and chemicals used contain more than 1000 mg/kg NPEO, these may not be used. However, through the import of clothing items from countries including China, India and Turkey, approximately 4,500 tonnes of the substance are 'imported' into the EU per year as residues in textiles, furs and leather products[25].

Azo dyes

Colorants are used in many industries to colour clothes, paints, plastics, photographs, prints and ceramics. Colorants are also now being used in novel applications and are termed functional (high technology) as they are not just included in the product for aesthetic reasons, but for specific purposes, for example in surgery. Colorants can be either dyes or pigments.

Dyes are soluble coloured organic compounds that are usually applied to textiles from a solution in water. They are designed to bond strongly to the polymer molecules that make up the textile fibre.

Health risks of azo dyes

Azo dyes derived from benzidine are carcinogens[26]; exposure to them has classically been associated with bladder cancer. Accordingly, the production of benzidine azo dyes was discontinued in the 1980s in the most important western industrialised countries. In particular, O'Anisidine which belongs to the group of Azo Dyes, can be absorbed into the body by inhalation of its vapour, through the skin and by ingestion. It is considered dangerous because it's harmful if swallowed and may be harmful through contact with skin[27]. It is also suspected of causing cancer, damage to blood through prolonged or repeated exposure, and it is toxic to aquatic life[28].

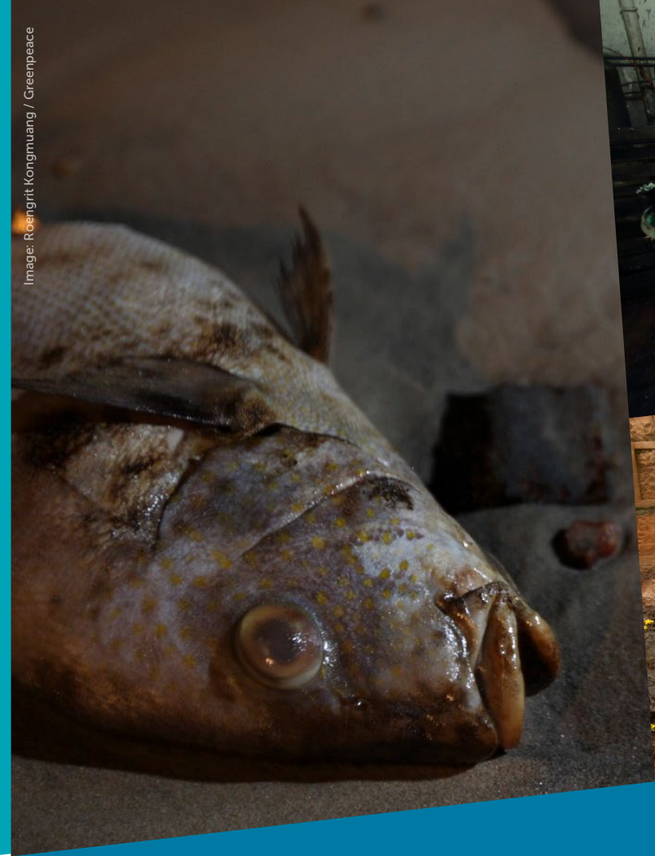


Image: Roengrit Kongmuang / Greenpeace

Image: Lu Guang / Greenpeace

Image: Qiu Bo / Greenpeace

Chlorinated Phenols (PCP, TeCP, TriCP)

Chlorinated aromatics, such as chlorophenols, are environmental pollutants of great health concern. Among the 19 different chlorophenols are: 2-chlorophenol (2-CP); 2,4-dichlorophenol (2,4-DCP); 2,4,6-trichlorophenol (2,4,6- TCP); and pentachlorophenol (PCP) have been listed by the US EPA as priority pollutants.

These compounds have widely been used in the production of pesticides, herbicides, and wood preservatives. They can also be generated as byproducts in industrial operations, such as the paper-pulp bleaching process and water disinfection with chlorine[29]. PCP is banned in the EU[30].

Health risks of chlorinated phenols

Pentachlorophenol is extremely toxic to humans from acute (short-term) ingestion and inhalation exposure. Acute inhalation exposures in humans have resulted in neurological, blood and liver effects, and eye irritation. EPA has classified pentachlorophenol as a Group B2, probable human carcinogen[31].

It can easily be taken in through the skin and trigger liver and kidney damage and cause non-specific symptoms like dizziness, nausea and vomiting, depending on the concentration of chloracne. PCP is genotoxic and is classified by the WHO as possibly being carcinogenic to humans[32]. TriCP can be absorbed into the body by inhalation of its vapour, through the skin and by ingestion. In short term exposure, the substance irritates the eyes, the skin and the respiratory tract. Repeated or prolonged contact with skin may cause dermatitis, including chloracne. The substance may have effects on the liver , resulting in impaired functions. This substance is possibly carcinogenic to humans[33].

Effects of chemicals

Chemical	What it is	Typical use	Harmful effects
Formaldehyde	Formaldehyde is a gas with a sweetish to pungent odour that exhibits cell damaging and mutagenic effects	Building materials and to produce household products, pressed-wood products, glues/ adhesives, permanent-press fabrics, paper product coatings, certain insulation materials, industrial fungicide, disinfectant, preservative in mortuaries and medical laboratories. Commonly used for the preparation of leather and fur items	**Toxic, allergenic and carcinogenic**
Chromium VI	Hexavalent chromium compounds are a group of chemicals that have useful properties, such as corrosion resistance, durability and hardness	Corrosion inhibitors, pigment manufacturing, metal finishing, chrome plating, stainless steel production, leather tanning, wood preservatives, textile-dyeing processes, printing inks, drilling muds, fireworks, water treatment, chemical synthesis.	**Highly toxic, damage to the nervous system or the kidneys, carcinogenic (associated with lungs, nasal cavity and sinuses), mutagenic, harmful to fertility**

Chemical	What it is	Typical use	Harmful effects
Alkyphenols & Alkyphenol Ethoxylates	Alkylphenol ethoxylates (APEO) belong to the group of non-ionic tensides with emulsifying, dispersing, surfactant effects. The most relevant compounds considering the production volume and the toxicology are the nonylphenol NPEO and octylphenol ethoxylates. compounds considering the production volume and the toxicology are the nonylphenol	Detergent substances in textile or leather auxiliaries (as well as in softeners, colour fixations, drying agents, binders and oils)	**Xenoestrogens similar to natural oestrogen hormones can disrupt sexual development in some organisms, are toxic to aquatic life, have a poor influence on reproductive health (ie low sperm count, early menstruation)**
Arylamines/ Azo Dyes	Colorants can be either dyes or pigments. Dyes are soluble, coloured organic compounds that are are usually applied to textiles from a solution in water.	Colour clothes, paints, plastics, photographs, prints and ceramics, novel applications such as in surgery	**If these dyes enter the body of humans, they may get reductively cleaved during metabolism (eg intestine or liver) and form partially carcinogenic amines, associated with bladder cancer**
Chlorinated phenols	Chlorinated aromatics (PCP, TriCP, TeCP)	PCP: pesticides, herbicides, and wood preservatives, water disinfection. TriCP: pesticide formulations, eg as a wood or leather preservative	**Carcinogenic potential, genotoxic, eye-skin-respiratory irritation, dermatitis, liver and neurological problems, dizziness, nausea, vomiting**

Image: Alex Stoneman / Greenpeace

3. Research results

3.1 Findings in Europe

Between 2011 and 2015, six studies analysing fur items took place across Europe. During these studies, fur items were tested in various countries, from different clothing brands, within different price ranges, items for both adults and children, dyed and non-dyed, and manufactured in different countries. All results indicated some presence of chemicals dangerous to human health, in many cases at alarming levels which exceeded legal limits. (See Annex B for complete results, and Annex C for European legislation and standards.)

While the largest study in terms of items, chemicals and participating countries was conducted in 2011 by Vier Pfoten[34] (see Annex A), two Italian studies in 2012 and 2014 had the most resounding impact. When Italian research into the presence of hazardous substances in the fur trims of infant clothing unveiled their toxicity, the European Commission ordered the removal of the jackets from stores across Europe because Chromium VI – classified as a human carcinogen used in textile cleaning and dyeing processes – was found in the fur trim of an infant jacket. This lead to an official EU RAPEX procedure, which ensures the rapid sharing of information on EU products posing a serious risk.

In total, 62 items have been investigated in ten countries including the UK, Denmark and the Netherlands. The majority of the analysed samples were substantially contaminated with hazardous chemicals. All items contained chemicals such as Formaldehyde, Chromium VI, Polycyclic aromatic hydrocarbons (PAH), Alkylphenol ethoxylates (APEO + NPEO), Azo Dyes and Heavy metals such as Lead.

3.2 Findings in China

Following the international studies, research in China was carried out in order to investigate the toxicity of fur items available in China's market. Taking into consideration the potentially serious health risks, consumers and retailers deserve to know the truth behind fur clothing and accessories.

Items were tested for the presence of five chemical substances. The resulting reports from the independent testing laboratory in China were also sent to the Bremer Umweltinstitut in Germany for further scrutiny.

Ms Siemers Dipl. Ing. Chemietechnik (FH) from the Bremer Umweltinstitut provided ACTAsia with an independent evaluation report, supporting the credibility and importance of the research results[35] (see Annex D for her full report).

All analysed samples were contaminated with one or more of the following hazardous chemicals:

Formaldehyde - used as an auxiliary agent in the dyeing process, applied as tanning substance, considered to be a human carcinogen and allergen.

Formaldehyde was found in all six items, but in five of these samples it exceeded international limits, and in four of the six samples it exceeded limits as indicated by Chinese standards. The highest concentration (133mg/kg) was found in a child's jacket.

Alkylphenol ethoxylates – a functional class of chemicals allowing easier spreading, wetting and better mixing of liquids. NPs (which belong to Alkyphenol Ethoxylates) are widely used in the textile industry in cleaning and dyeing processes. They are toxic to aquatic life, persist in the environment and can accumulate in body tissue, bio-magnify and can disrupt sexual development in some organisms.

NPEOs were found in all items with four of the six samples exceeding limits according to international standards. The two women's jackets had 1,119mg/kg and 1,459mg/kg concentration respectively, and exceeded international regulations. The men's clothing and one child's item exceeded the Oeko-Tex standards. China's equivalent of the Oeko-Tex regulation prohibits all use of NPEOs in production and as a result, all items would have failed the regulation tests.

> ***When chemicals with potentially life-threatening properties are identified in consumer goods, there is an obvious need for control by authorities. Acne is the plague of adolescence, and a cause of adolescent suicide. Chlorophenols, found in fur, are among its causes.***
>
> - Professor Terence Ryan, Oxford University

Azo dyes - the group of azo dyes is very diverse. Some of them are considered to be carcinogenic, others thought to be possibly carcinogenic. The azo dyes can be absorbed via inhalation or through the skin and separate in the body into carcinogenic aromatic amines.

O-Anisidine is a classified carcinogen and was found at a very large concentration in one sample, at 250 times the legal amount. This sample was the accessory item used as a key ring or to hang on handbags. This is an item that is particularly dangerous, as key rings are often handled and mouthed by young children.

Chlorinated Phenols - PCP has insecticidal and fungicidal properties. It became known through its many health damaging effects in wood preservatives ('Wood Preservative Syndrome'). TriCP can, in short term exposure, irritate the eyes, the skin and the respiratory tract. Repeated or prolonged contact with skin may cause dermatitis and may have effects on the liver, as well as possibly being carcinogenic to humans.

TriCP, one of the Chlorophenols, was detected in the accessory item and exceeded the amount listed by German Government legislation. This is particularly dangerous if used by children as a toy.

Chromium VI - widely used as corrosion inhibitors and in the manufacture of pigments, leather tanning and wood preservatives. They have also been used in textile-dyeing processes. Chromium VI is highly toxic even at low concentrations, and classified as a Class 1 human carcinogen.

Chromium VI was not detected in any of the samples.

*"O-Anisidine is a classified carcinogen and was found at a very large concentration in one sample, at **250 TIMES THE LEGAL AMOUNT.***

This sample was the accessory item used as a keyring or to hang on handbags. This is an item that is particularly dangerous, as keyrings are often handled and mouthed by young children.

- Dr Xiaoqing Lin, dermatologist

Results by product

Brand
Wanlima

Product
Keyring/bag accessory (bobble)

Colour/type of fur
Red, fox fur

Formaldehyde (100mg/kg)

FAILED CN compulsory and recommended standards

FAILED INT laws and standards:

- ISO 14184:2011 (≤75mg/kg)
- GB 18401-2010, GB 31701-2015*, GB 20400-2006, GB/T 18885-2009, HJ 507-2009 (products with direct contact to skin ≤75mg/kg, children 20mg/kg)
- SG Leather® (20mg/kg children, 75mg/kg skin contact)
- Öko Tex® (children ≤16mg/kg, for adults 75mg/kg)
- IVN (International Association of Natural Textile Industry - prohibited)
- GOTS (Global Organic Textile Standard - prohibited substance)

NPEO (366mg/kg)*

FAILED INT and CN recommended standards

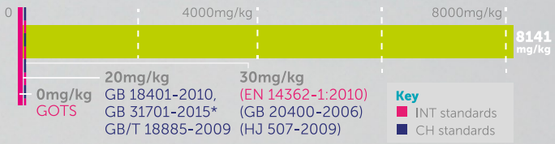
- HJ 507-2009 (its use is prohibited in production)
- Öko Tex® (≤100mg/kg)
- IVN (International Association of Natural Textile Industry ≤100mg/kg)

O-Anisidine Azo Dye (8141mg/kg)

FAILED CN compulsory and recommended standards

FAILED INT laws and standards:

- EN 14362-1:2010 (≤30mg/kg)
- GB 18401-2010, GB 31701-2015*, GB/T 18885-2009 (≤20mg/kg)
- GB 20400-2006, HJ 507-2009 (≤30mg/kg)
- GOTS (Global Organic Textile Standard - prohibited substance)



TriCP Chlorinated Phenols (2.68mg/kg)

FAILED INT laws and standards:

- §64 LFGB 82.02.8 (2.0mg/kg)
- Öko Tex® (1.0mg/kg)
- SG Leather® (1.0mg/kg)
- GOTS (Global Organic Textile Standard ≤0.2mg/k)

Brand
Vero Moda

Product
Women's coat

Fur colour/type
Black, fox fur

NPEO Nonyphenol Ethoxylate (1119mg/kg)

FAILED CN recommended standards
FAILED INT laws and standards:

- REACH 1000, ISO 18254-1:2016 (≤1000mg/kg)
- Öko Tex® (≤100mg/kg)
- GOTS (Global Organic Textile Standard ≤20mg/k)
- HJ 507-2009 (its use is prohibited in production)
- SG Leather® (500mg/k per compound)
- IVN (≤100mg/kg)

Formaldehyde (56mg/kg)

FAILED INT standards:

- GOTS (prohibited substance)
- IVN (prohibited)

Brand
Me and City

Product
Women's coat

Colour/type of fur
Black, raccoon dog fur

NPEO Nonyphenol Ethoxylate (1459mg/kg)

FAILED CN recommended standards
FAILED INT laws and standards:

- REACH 1000, ISO 18254-1:2016 (≤1000mg/kg)
- Öko Tex® (≤100mg/kg)
- GOTS (≤20mg/k)
- SG Leather® (500mg/k per compound)
- HJ 507-2009 (its use is prohibited in production)
- IVN (100mg/k)

Formaldehyde (22mg/kg)

FAILED INT standards:

- GOTS (prohibited substance)
- IVN (prohibited)

"Skin is the largest organ of human body whose area is 1.6 square meters. Many kinds of gas and liquid can be absorbed by skin in considerable quantity, thus fur with excessive hazardous materials such as anisidine and formaldehyde gives rise to allergy and irritation, and even more seriously, cancer.

- Dr Xiaoqing Lin, dermatologist

Colour/ type of fur
Pink/brown, unknown origin

Brand
Good Baby (GB)

Product
Children's jacket

Formaldehyde (62 mg/kg)

FAILED CN compulsory and recommended standards
FAILED INT standards

- GB 18401-2010, GB 31701-2015*, GB 20400-2006, GB/T 18885-2009, HJ 507-2009 (products for babies ≤20mg/kg)
- SG Leather® (20mg/kg children)
- Öko Tex® (children ≤16mg/kg)
- GOTS (prohibited)
- IVN (prohibited)

NPEO (141 mg/kg)*

FAILED INT and CN recommended standards

- Öko Tex® (≤100mg/kg)
- HJ 507-2009 (its use is prohibited in production)
- GOTS (≤20mg/k)
- IVN (≤100mg/kg)

Brand
Heilan Home

Product
Men's coat

Fur colour/type
khaki, raccoon dog fur

Formaldehyde (100mg/kg)

FAILED CN compulsory and recommended standards
FAILED INT laws and standards:

- ISO 14184:2011 (≤75mg/kg)
- GB 18401-2010, GB 31701-2015*, GB 20400-2006, GB/T 18885-2009, HJ 507-2009 (products with direct contact to skin ≤75mg/kg)
- SG Leather® (75mg/kg skin contact)
- Öko Tex® (adults 75mg/kg)
- GOTS (prohibited substance)
- IVN (prohibited)

NPEO (625 mg/kg)

FAILED INT standards:

- Öko Tex® (≤100mg/kg)
- HJ 507-2009 (its use is prohibited in production)
- SG Leather® (500mg/k per compound)
- GOTS (≤20mg/k)
- IVN (≤100mg/kg)

Brand
E land

Product
Children's jacket

Colour/type of fur
Red with brown, rabbit fur

Formaldehyde (133mg/kg)

FAILED CN recommended standards
FAILED INT laws and standards:

- ISO 14184:2011 (≤75mg/kg)
- GB 18401-2010, GB 31701-2015*, GB 20400-2006,
- GB/T 18885-2009, HJ 507-2009 (products for babies ≤20mg/kg)
- SG Leather® (20mg/kg children)
- Öko Tex® (children ≤16mg/kg)
- GOTS (prohibited substance)
- IVN (prohibited)

NPEO (39mg/kg)

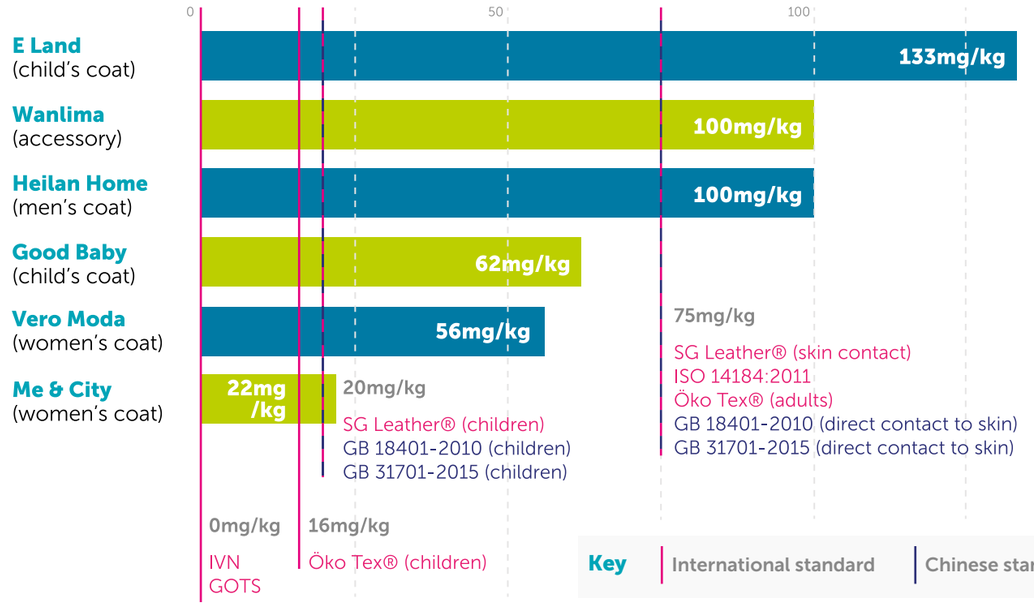
FAILED INT and CN recommended standards:

- GOTS (≤20mg/k)
- IVN (prohibited)

Results by chemical

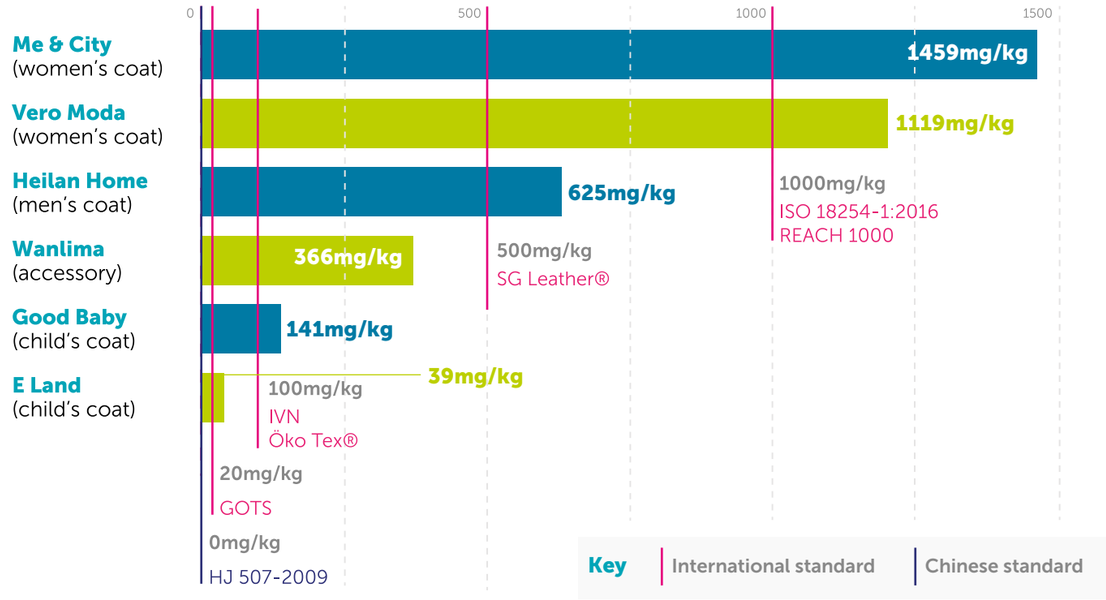
Formaldehyde

Items that failed and relevant laws and standards (mg/kg)



NPEO

Items that failed and relevant laws and standards (mg/kg)



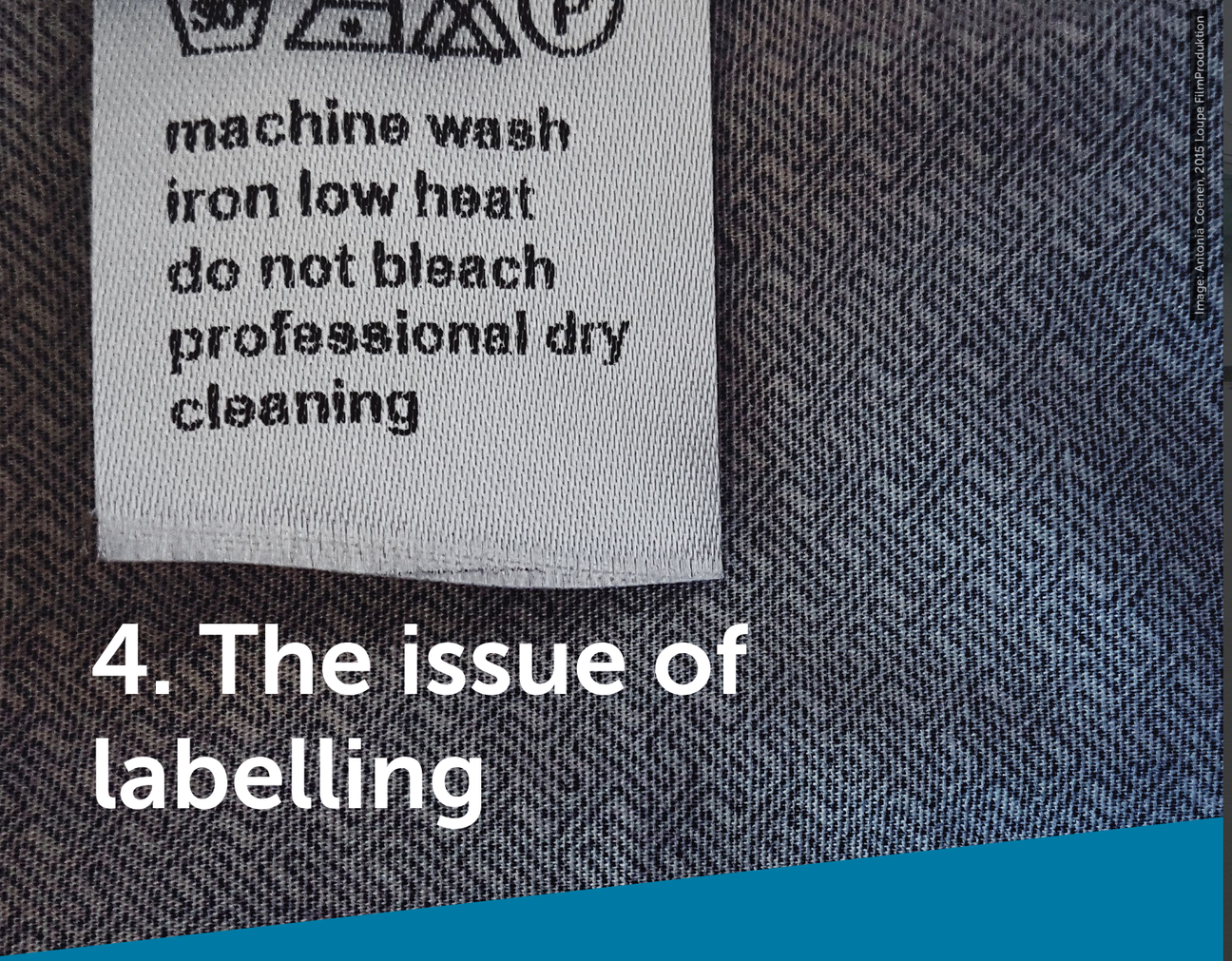


Image: Antonia Coenen, 2015 Loupe FilmProduktion

4. The issue of labelling

Consumers need clear and accurate labelling to make informed buying-choices. This is especially relevant in the fur fashion market, where real animal fur and faux fur garments are becoming increasingly similar in their look, feel and price. The Fur Free Alliance's EU research into labelling indicated that in all ten participating countries, fur labelling regulations were not complied with. The absence of a clear fur labelling system is failing the consumer.

In China, most items included in the Toxic Fur research had labels indicating the use of real fur and which species it derived from. However, further unofficial market research has indicated that in most cases, items with fur such as hats, shoes and accessories found for sale in China have little or no information on the labels. In many cases, the items have no labelling at all and would therefore be found to breach China labelling laws for Product Quality and Consumer Rights.

With regards to the toxic chemicals, one of the samples of our research had labelling to ensure consumers washed the garments before use. All other items were in breach of Article 27, Paragraph 5 of the Product Quality Law of the People's Republic of China which stipulates 'If improper use may cause damage to the product itself or may harm the personal and property's safety, there should be warning signs or written warnings' (see Annex A for more detailed information).

Many consumers reject real fur on welfare grounds or for human health and environmental reasons. In the case where faux fur is acceptable to consumers but real fur is not, the mistaken purchase of real fur could potentially expose an unwitting public to a risk they are not even aware they are taking. There is a need for provision of sufficient and accurate information to enable consumers to make ethical choices with confidence.

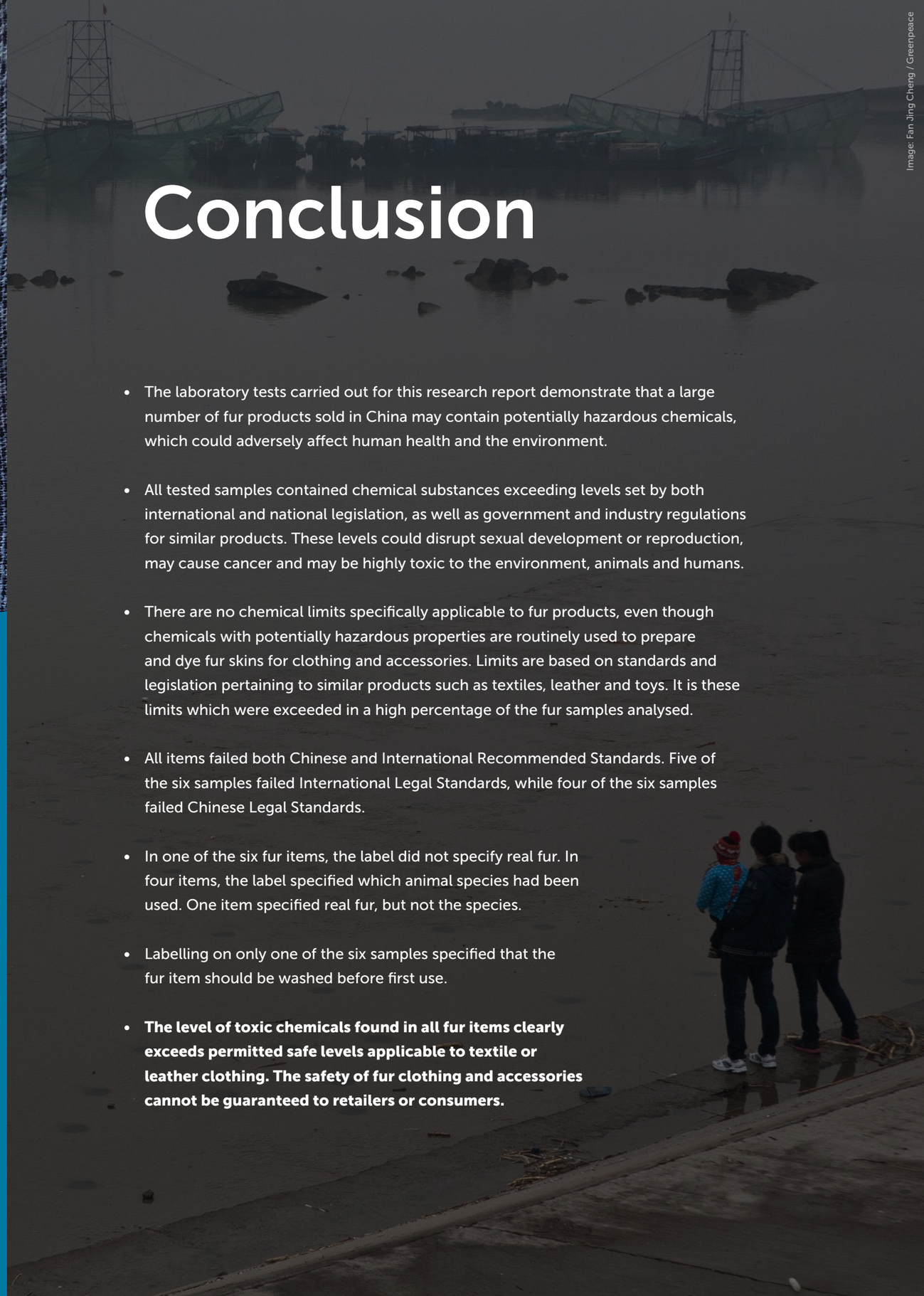


Image: Fan Jing Cheng / Greenpeace

Conclusion

- The laboratory tests carried out for this research report demonstrate that a large number of fur products sold in China may contain potentially hazardous chemicals, which could adversely affect human health and the environment.

- All tested samples contained chemical substances exceeding levels set by both international and national legislation, as well as government and industry regulations for similar products. These levels could disrupt sexual development or reproduction, may cause cancer and may be highly toxic to the environment, animals and humans.

- There are no chemical limits specifically applicable to fur products, even though chemicals with potentially hazardous properties are routinely used to prepare and dye fur skins for clothing and accessories. Limits are based on standards and legislation pertaining to similar products such as textiles, leather and toys. It is these limits which were exceeded in a high percentage of the fur samples analysed.

- All items failed both Chinese and International Recommended Standards. Five of the six samples failed International Legal Standards, while four of the six samples failed Chinese Legal Standards.

- In one of the six fur items, the label did not specify real fur. In four items, the label specified which animal species had been used. One item specified real fur, but not the species.

- Labelling on only one of the six samples specified that the fur item should be washed before first use.

- **The level of toxic chemicals found in all fur items clearly exceeds permitted safe levels applicable to textile or leather clothing. The safety of fur clothing and accessories cannot be guaranteed to retailers or consumers.**

Recommendations

Retailers and Designers

ACTAsia calls on the apparel industry, fashion designers and retailers in China:

- To show leadership and avoid the use of fur in clothing, textiles and accessories. As global players, fashion brands have the opportunity to halt the production of fur by eliminating the use of fur throughout their supply chains and joining the international Fur Free Retailer scheme.

- To commit to transparency when using fur by informing consumers about the presence of chemicals, the origin and species of animals used. This commitment must include transparent and easily accessible information about the chemicals that the brands are currently using. Consumers have a right to know which chemicals they are exposed to when wearing fur items.

Consumers

ACTAsia calls on consumers in China:

- To use their influence to change the industry in China. Together we can demand that fashion brands and retailers stop using fur in their collections. Many high-end international designers and retailers have committed to a fur-free policy. Designers including Gucci, Armani, Hugo Boss and Bei Chen as well as retailers Gateone, Zara and VF Corporation (which includes Timberland, North Face and more) have joined the Fur Free Retailer programme, and more follow every year.

- To avoid buying and wearing fur clothing, textiles and accessories or decorative items made from fur. These products can easily be replaced by sustainable and animal friendly alternatives which do not present a health risk. We ask consumers not to buy or wear fur.

Governments

ACTAsia calls on governments in Asia to adopt a political commitment to:

- A preventative approach by halting the production and sale of fur items currently exceeding applicable norms of national regulations.

- Develop post-market testing and strict norms for hazardous chemicals specifically applicable to fur items.

- Ensure proper and complete labelling of fur products to reveal the supply chain, indicate the specific animal species and the presence of hazardous chemicals, based on producer responsibility in order to fully inform consumers and to eliminate the use of such chemicals or products.

Annex A

Chemicals and the fur production process

Vier Pfoten: Poison in Furs, 2011

Skin and hair

Morphologically there is essentially no difference between the skins and the furs of animals that are reprocessed for leather and those that are used for furs. Whereas the leather skin of some fur-bearing animals is thin, for example that of the chinchilla, other species like seal have a very thick leather skin. The hair of many different kinds of fur skins is very different in form and structure and is species specific. Hair is the product of the thin outer layer of the skin, the epidermis. In the manufacturing of leather, hair and the outer layer of skin are removed using liming.

Fur production

Hides and pelts that are used for the manufacturing of leather and furs and even the hides of larger species, eg sheep, beavers, seals and those of the big cats, are almost always tanned in smooth form. In contrast, 'the coat is pulled over the ears' of the smaller species: The skin is cut along the underside of the tail and along the hind legs and then the fur is removed over the body like a glove.

Preservation

Freshly tanned skins are rarely processed immediately, but instead are preserved in most cases. The water content of the skin is reduced in order to prevent decomposition by microorganisms. The skin is air dried in a slightly stretched state. The hair itself is resistant to microorganisms, but if the skin begins to rot, because of inadequate or negligent storage, bacterial destruction of the hair roots sets in and loosens the hair so that the entire fur becomes worthless. The process of preserving the skins with salt (also combined with drying) is only used for skins from large fur-bearing animals. Common salt is used to remove moisture from the skin which in turn inhibits decay. Preserving agents are still found in leather today like the endocrine disrupting organotin compounds (eg Tributyltin) or the allergenics DMF (Dimethylfumarate) or PCP (Pentachlorophenol), which are prohibited in the EU. As a replacement for PCP, 2-(thiocyanomethylthio) benzothiazole (TCMBT), 4- chloro-m-cresol and ortho-phenylphenol, which is well known through its use in the treatment of citrus fruits, have been used in recent years.

Soaking

Soaking should bring the skins back to the state they were in immediately after skinning. It also removes dirt, blood, salt and preservatives, as well as water and salt soluble proteins. As a rule, bactericides are added to the soaking immersion baths. Common salt and tenside are also occasionally added to accelerate the soaking.

Degreasing

Dirty and very greasy skins are washed once or twice. Detergents that are commonly used are mixtures based on alkyl ether sulphates and alkyl sulphates with non ionic alkyl (phenyl) polyglycol ether. Furthermore, nonylphenols, nonylphenol ethoxylates (NPEOs), which today are known to have strong hormonal effects, as well as other alkylphenol ethoxylates, organic degreasing solvents and soda continue to be used. These days paraffinsulphochloride is also often used.

Mechanical cleaning

After cleaning, the subcutaneous tissue, and meat and fat residues are removed from the skin. This process is done either manually or mechanically using fleshing machines. Smaller skins are shaved with a rounded knife to even out the thickness of the leather and to reduce the weight.

Pickling

Before they go through the actual tanning process, the skins are pickled. This serves several purposes: the collagen of the skin is loosened through the hydrolytic action of an acid salt to remove soluble proteins and prepare the leather for tanning. For a long time, the most common pickling acid used was sulphuric acid, but as that can damage the leather, it has been largely replaced by organic acids like sulphophthalic acid or by certain short-chain dicarboxylic acids.

Tanning

The tanning process turns the skin into leather. It strengthens the collagen and increases the shrinkage temperature. The Leipzig method is the oldest method for processing and finishing and was once very commonly used. It consists only of treating the skin with salt and sulphuric acid, followed by oiling. The water resistance and storage characteristics of the product are unsatisfactory though.

Refining the skins with aluminum salts is one of the oldest methods that is still often used today. The chemicals used are ammonium or potassium aluminum sulphate and aluminum sulphate. Solutions of these salts produce white leather which is fairly elastic, but the water resistance is low.

Free acids are formed during the tanning process and it is therefore necessary to add salt to prevent swelling of the collagen. Aluminum chlorides that are used are often stabilised with masking agents and are offered in the market as tanning salts. The use of aluminum salts is often combined with formaldehyde or chromium salts to improve the water resistance, accelerate the process and increase the shrinkage temperature.

In contrast to treatments with aluminum salts, tanning with chromium (III) salts is irreversible. Tanning or re-tanning with chromium salts produces leather that has good resistance to water and heat but somewhat

inferior elastic properties. The chrome method is particularly used for synthetic dyes. However, when the tanning method is incorrectly carried out, the chromium (III) used can end up being converted into highly poisonous chromium (VI). Chromium (VI) is still being found in leather products despite a ban on its use in the EU. To what extent arsenic and materials containing antimony are still being used around the world is unclear.

The products used for chromium tanning of fur skins are the same as those used for the tanning of leather. How much chromium tanning agent is used depends on the specific fur skin, the treatment that it has already received and the desired shrinkage temperature.

Oils and fats

The purpose of oiling or greasing is to make the leather of the fur skin soft and supple. During this process, the fibres of the skin are covered with grease to prevent them from sticking during drying. The greasing with oil is done emulsified in water. In most cases, the raw materials for this process are mostly liquid derivatives of animal and vegetable oils as well as synthetic products (highly molar chlorinated hydrocarbons like the environmentally hazardous chlorinated paraffins). Natural oils are partially sulphated or sulphonated synthetic oils through partial chlorosulphonation with subsequent hydrolysis which thus makes them able to be emulsified in water. In many cases, medium viscosity mineral oils are added.

Degreasing in organic solvents

Degreasing removes fat particles and soluble substances from the hair and the leather so that the weight of the furs is reduced and the dyeing properties are improved. The usual method is the treatment of dry skins, dyed or undyed, with solvents like the neurotoxic and potentially carcinogenic perchloroethylene or with the environmentally hazardous perfluorooctanoic acid, PFOA.

Bleaching

Reductive bleaching: the furs are treated with sulphites, bisulphites or, in most cases, with dithionite during or after washing. For a strong effect, the reductive bleaching can be carried out as an oxidative bleaching with hydrogen peroxide.

Oxidative bleaching: real bleaching, in the sense of intensive destruction of the natural pigments found in the hair, is achieved through oxidative bleaching with peroxides, eg. with hydrogen peroxide or persulphate, catalysed with iron (II) salts. This method, or one of its numerous variations, is for bleaching hair for naturally dark skin, e.g. black karakul or muskrat, so that it can be subsequently dyed in fashionable dyes. For catalytic bleaching, the furs must be in perfect condition and cannot have been subjected to chromium tanning. Catalytic bleaching is a process that is very difficult to control and must be monitored carefully; reductive bleaching often has to be carried out afterwards to remove the iron salts. After bleaching the furs are retanned and are greased or oiled again in most cases.

Dyeing

Although many types of fur, especially valuable furs, are processed without dyeing, the proportion of skins that are being dyed has been increasing in recent years (eg for sheep skin products for decoration, automobile seat covers and clothing). Dyeing is used for refining ‘cheap’ types of fur or for the unification of precious furs, eg Persians. There are many variations in the dyeing process; the method used depends on the type of fur. There are dyeing processes that beautify, intensify, cause blueing, colour the tips of the hair or create stripes in the fur. The hair must be treated before it is dyed. It is first ‘killed’ with ammonia, soda, or (more rarely) with a caustic soda solution in combination with wetting agents or detergents. Before dyeing with oxidation dyes, the furs are treated with metal salt solutions, usually potassium dichromate, iron (II) sulphate, or (rarely) copper (II) sulphate or with a mixture of these products. It is possible to also use the neurotoxic chemical, lead acetate. This substance converts the color pigments into paints and thereby contributes to improvements in their authenticity and depth. The pH value of the dye solution is reached with various organic acids.

Vegetable dyes: the oldest method for dyeing fur skins is the treatment of the furs with extracts from woods or sumac leaves. This method is seldom used these days; it is almost solely limited to the black colouring of the karakul with logwood and iron or copper salts.

Oxidation dyes: these dyes were put on the market at the end of the 19th century and are still frequently used. Examples are the toxic and environmentally hazardous 1.4-phenylenediamine, the eye irritant pyrocatechol, the environmentally hazardous resorcin, and the harmful aminophenols and derivatives of naphthalene, a polycyclic aromatic hydrocarbon.

The dye is used with about the same amount of hydrogen peroxide. Since the various baths and rinses remove a large amount of the tanning and greasing agents from the fur, most of the furs are retanned and oiled or greased again after dyeing. Many oxidation dyes are allergenic.

Synthetic dyes: the large number of synthetic dyes, together with the use of new technologies for dyeing the hair of furs, has made it possible to obtain furs in fashionable colours. Synthetic dyes are only absorbed by the material at an elevated temperature – for this reason the furs most have undergone chromium tanning. A stain is not necessary.

Dispersion dyes have been used for a long time, like the carcinogenic azo and anthraquinone dyes or metal complex dyes, used for dark colors with the aid of carriers (chlorobenzenes or ester of phosphoric acid).

From the anionic dyes, nitro, monoazo and anthraquinone dyes are used. As the treatments in the baths can damage the hair on the furs, it is customary to add fibre protection agents based on protein degradation products which shorten the treatment. After dyeing, the furs are washed and dried again and if necessary retanned and greased. To protect against moths, the furs are treated with pesticides, for example the suspected carcinogen naphthalene (a polycyclic aromatic hydrocarbon, PAH) or, a long time ago, with the environmentally persistent chlorophenylid (trade name EULANEST® from Bayer).

Purification

Now the dye and grease are removed. To do this, the furs are rotated in drums for several hours, first moist, then with sawdust, which in the past had been mixed with carbon tetrachloride – damaging to the liver and kidney, or the neurotoxin tetrachloroethelyne. This may still be done today in some production countries. The rotation in the drums increases the softness of the leather and the gloss of the fur. Following this treatment there are further mechanical treatments like shearing, ironing, beating, combing and sorting. Wet ironing solutions with formaldehyde, alcohol and acid are used when ironing imitation furs.

Conservation

To protect the end product during transportation, storage, trade and ultimately the consumer against mould, fungus, insects such as moths and other degradation factors, the furs are often conserved. Pesticides, biocides and preserving agents are used for this.

Images: Antonia Coenen, 2015 Loupe FilmProduktion

Annex B

European research findings: a summary of past European research and the results it yielded

2011 - Europe (incl. Bulgaria, Germany, Great Britain, Netherlands, Austria, Romania, Switzerland).
Checked for 37 chemicals in total. In 14% of the samples, legal limits were exceeded due to strong contamination, critical to health. 83% of the samples were strongly contaminated and critical to health, but did not exceed legal limits. 3% of the samples were contaminated and not recommended for use.

2012 - Italy
Of six randomly selected samples:

- 1 (Brums) is illegal (EU Reg. REACH)
- 4 (Brums, Il Gufo, Miss Blumarine, Fix Design – the coat-) cannot be sold on the market of China and South Korea.
- All samples (also Gucci and the second sample of Fix Design - the bag -) have a content of chemicals otherwise potentially dangerous (Formaldehyde; Pentachlorophenol)

2014 - Italy
Fur trim is found to still have presence of hazardous substances and possible carcinogenic agents found in fur trim of children's wear, for babies aged less than 36 months.

2015 - Denmark
The products tested were aimed at children and young people. All six garments tested were found to contain Formaldehyde and NPEOs, while four of the six contained Chromium. Two of the garments contained Chromium VI and PAHs. Values in some items exceeded the EU chemicals regulation REACH.

2015 - Netherlands
All six investigated fur items contained ethoxylates (44-3100 mg/kg) and in two samples (fur jacket Canada Goose and fur Nikcelon Amara) with octylphenolethoxylates (7 and 12 mg/kg). Nonylphenol was detected in fur 'from market (airforce)' and in fur 'jacket Canada Goose' (9 and 4 mg/kg). Hexavalent chromium was not detected in any of the furs. The total amount of load with PAK was 0.05 to 1.42 mg/kg.

2015 - Czech Republic
All six investigated fur patterns were loaded with formaldehyde (92-250 mg/kg), nonylphenol ethoxylates (130-1400 mg/kg) and with nonylphenol (3-8 mg/kg). Hexavalent chromium was not detected in any of the furs. The total amount of load with PAK was 0.24 to 4.2 mg/kg.

Annex C

Legislation and Standards

This annex presents important statutory and private standards that include limits and benchmarks for leather and textile products. As there are no specific standards for fur products, regulations for closely related product groups are used in this report. As a matter of principle, it is necessary for industry and governmental institutions to create regulations and standards that clearly include fur products.

Industrial and private standards

Global Organic Textile Standard GOTS
This standard was launched by 15 organisations in 2008, mainly from the bio-textile branch, and developed in cooperation with experts. Version 5.0. GOTS has been valid since 01.03.2017. It deals with textiles that are made from 70% organic fibres and largely complies with the BEST benchmarks of the International Association of the Natural Textile Industry. The standard for leather is the IVN Natural Leather standard.

SG Leather, SG schadstoffgeprüft (inspected for hazardous substances)
SG – The symbol for leather products (Germany) that have been inspected for hazardous substances was launched by TÜV Rheinland and Institut Fresenius. It is currently only published by PFI (Test and Research Institute Pirmasens e.V.), 01/2015. It sets the requirements for low levels of hazardous substances in leather products so that they pose no health risks.

IVN - International Association of the Natural Textile Industry e.V.
This organisation was founded in 1989 and has approximately 70 members from textile production and trading. Since 2000, the IVN has awarded the quality seals NATURTEXTIL, NATURLEDER and finally the stringent BEST seal. BEST refers to the classification according to CLP-VO (EC 1272/2008, formerly 67/548/EEC) for the requirements of 'inputs' in the manufacturing process, and excludes inputs with specific ratings (eg classification carcinogenic, mutagenic, toxic to humans and aquatic organisms).

The intention of the association is not only based on textiles being free from poisons, but also on their environmentally friendly production, low carbon dioxide emissions, the welfare of animals and people in the production process, saving resources and other standards. Only organic products or those that come from organic cultivation are used. BEST refers to the EU Directive 67/548. This directive is used for the classification, packaging and labelling of dangerous substances. The list contains approximately 1200 substances.

Öko-Tex - Oeko-Tex® Standard 100
The Oeko-Tex Standard includes a testing and certification system. It was founded in 1992 by the Austrian textile research institute ÖTI and the German research institute Hohenstein. Tests for hazardous substances are carried out and evaluated according to limits and other criteria. Production, ecology, human ecology and disposal ecology are examined. The seal is awarded for one year and may be renewed upon application and verification.

Bluesign system
The bluesign® system is the solution for sustainable textile production. It eliminates harmful substances right from the beginning of the manufacturing process and sets and controls standards for an environmentally friendly and safe production.

Industrial and private standards

Product Safety Directive 2001/95/EG and RAPEX (Rapid Alert System)
The Rapid Alert System for non-food dangerous products facilitates the rapid exchange of information between national authorities and the European Commission on dangerous products found on the market. The Commission publishes a weekly overview of the alerts on products reported by the national authorities. They include information on the dangerous products found, the risks identified and the measures taken in the notifying country in order to prevent or restrict their marketing or use. Measures can be ordered by national authorities ('compulsory measures') or be taken directly by producers and distributors ('voluntary measures'). Each alert also includes information on the countries where the same product was found and further measures were taken. The basis for the creation of RAPEX is the Product Safety Directive 2001/95/EG, which came into force on 15 January 2004. The reported product groups usually deal with toys, clothes, shoes, cosmetics, jewellery and electrical appliances. The products that have been found to have toxic chemicals most frequently come from China and Southeast Asia, India, Bangladesh and Pakistan.

REACH Regulation (EG) 1907/2006 Registration, Evaluation, Authorisation and Restriction of Chemicals
The REACH regulation entered into force on June 1 2006. This EU Regulation aims to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances.

Various lists from REACH deal with risky materials. Substances with certain hazardous properties are subject to an approval process. Article 33 of REACH regulates the obligation to inform consumers. Consumers must be informed upon request if so-called SVHCs (Substances of Very High Concern) constitute more than 0.1% of the weight of a product. Several of the chemicals examined in the scope of this report are SVHCs.

Annex C

United Nations' Globally Harmonised System of Classification and Labeling of Chemicals (GHS)
The GHS provides a harmonised basis for globally uniform physical, environmental and health and safety information on hazardous chemical substances and mixtures. It sets up criteria for the classification of chemicals for physical-chemical, health and environmental hazards of chemical substances and mixtures and sets up standardised hazard information to facilitate global trade of chemicals. GHS was adopted by the United Nations in 2002 and is periodically updated.

The GHS has been implemented in the EU by Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (the 'CLP Regulation'). The CLP Regulation entered into force on 20 January 2009. In line with the GHS standard, CLP allows for the identification of hazardous chemicals and the communication of these hazards to users through labelling. It also provides the basis for safety data sheets (SDS) regulated under the REACH Regulation, and sets requirements for the packaging of hazardous chemicals.

Toy Safety Directive (2009/48/EC)
The EU Toy Safety Directive (2009/48/EC) complements Directive 2001/95/EC for general product safety. The Toy Safety Directive refers to the physical-mechanical characteristics of toys, the flammability, the chemical properties, the electronic properties, hygiene and radioactivity. The CE labelling (Conformité Européene) on toys is also covered by this Directive. The Directive puts an emphasis on CMR substances (carcinogenic, mutagenic, toxic to reproductive processes). Toys that an infant (<36 months) can place in its mouth are prioritised. The chemical substances are dealt with in Directive Annex III. There is an exclusion list of 55 fragrances, a limit list of 11 fragrances as well as a migration threshold list for 19 chemical substances. The exclusion list includes, among others, various PAHs (Polycyclic Aromatic Hydrocarbons).

Chinese standards

These standards are created by the Standardization Administration of the People's Republic of China[35].

GB - National Compulsory Standards

GB 18401-2010《国家纺织产品基本安全技术规范》
National General Safety Technical Code For Textile Products
This law was revised in 2010 and officially implemented in 2011. It is a national compulsory standard which specifies the safety technical requirements, test methods, inspection rules and implementation and supervision of textile products. This legislation applies to the clothing, decoration and domestic textiles produced and sold in China. (Textile definition: products mainly made of natural fibe and chemical fibe, through processes like spinning, weaving, dyeing and other processing technology, or sewing, laminating). Therefore, the fur collar belongs to textile made of natural fibre and this technical specification is relevant.

GB 31701-2015《婴幼儿及儿童纺织产品安全技术规范》
Safety technical code for infants and children textile products
This legislation was revised in 2015 and officially implemented in 2016. It is a national compulsory standard which specifies the technical safety requirements, test methods and inspection rules of textile products for infants and children. This standard applies to the infant and children's textile products sold in China and is also applicable to children and infant clothing with fur.

**this regulation refers back to Standard GB18401-2010*

GB20400-2006《皮革和毛皮 有害物质限量》
Leather and fur - Limit of harmful matter
This law was revised in 2006 and officially implemented in 2007. It is a national compulsory standard and specifies the limits of hazardous substances in leather and fur products as well as their inspection methods. This legislation applies to daily products made from leather and fur.

Recommended standards

GB/T 18885-2009《生态纺织品技术要求》
Technical specifications of the ecological textiles (National Standards)
This standard is formulated for the purpose of implementing the *Environmental Protection Law of People's Republic of China*, and reducing influences on the environment and human health during production and use of leather and synthetic leather products. This standard is a guiding standard, which is applicable to the certification of environmental labelling products in China. This standard was formulated by the Ministry of Environmental Protection and implemented in 2010.

HJ 507-2009《环境标志产品技术要求 皮革和合成革》
Technical requirement for environmental labelling products - Leather and synthetic leather (Industry Standards)
This is a national recommended standard, which has been implemented since 1 January 2010. Product classification and requirements refer to international environmental protection textile association Oeko-Tex Standard 100, General and Special Technical Requirements of Eco Textiles. It defines the terms and definitions of eco textiles, product classification, requirements, test methods, sampling and decision rules. This standard applies to all kinds of textiles and their accessories.

China legislation relevant to labelling

《中华人民共和国产品质量法》第二十七条规定，产品或者其包装上的标识必须真实，并符合下列要求:
Article 27 of the Product Quality Law of the People's Republic of China stipulates that the markings on the products or their packaging must be true and meet the following requirements: (1) have a product quality inspection certificate; (2) the name of the product, the factory name and the factory site in Chinese; (3) According to the characteristics and use requirements of the product, it is necessary to indicate the specification and grade of the product as well as the name and the amounts of the main components contained in the product. Anything that is required to be known by the consumer, shall be marked on the packaging, or relevant information should be provided to consumers; (4) Products to be used within a limited period of time shall clearly indicate the date of production and the safe use period or expiry date in a prominent position; (5) If improper use may cause damage to the product itself or may harm the personal and property safety, there should be warning signs or Chinese warnings.

Based on the characteristics of clothing products, clothing tag shows the fabric composition and amount, level, producing place and other content.

《中华人民共和国消费者权益保护法》第八条 消费者享有知悉其购买、使用的商品或者接受 的服务的真实情况的权利。
Article 8 of Consumer Rights Protection Law of People's Republic of China stipulates that consumers shall have the right to know the truth of the goods they purchase or use or the services they receive. The consumer shall have the right to ask the proprietor to provide the price, origin, producer, use, performance, specification, grade, main ingredient, date of manufacture, expiry date, inspection certificate, method of use of the goods, after-sales service, or services content, specifications, fees and other related information.

Annex D

Independent Evaluation Report of research in China

Written by Ms Ulrike Siemers of the Bremer Umweltinstitut
on the findings of ACTAsia's research in China

Summary of Results

All six investigated fur patterns are loaded with formaldehyde (22-133 mg/kg) and nonylphenol ethoxylates (39-1459 mg/kg). Trichlorophenol (constitution isomers not exactly identified) was detected in two furs with 2.68 mg/kg and 0.06 mg/kg. One fur pattern contains o-Anisidin (8141 mg/kg). Hexavalent chromium was not detected in any of the fur samples.

Evaluation of formaldehyde

Formaldehyde is a gas with a sweetish to pungent odour that exhibits cell damaging and mutagenic effects. In a statement from June 2007 by the German Federal Institute for Risk Assessment (BfR), a provocation of allergic reactions cannot be completely excluded with low levels of formaldehyde in textile. Formaldehyde was already classified as a human carcinogen in 2004 by the World Health Organization (WHO). In a toxicological revaluation, also the BfR classified formaldehyde as human carcinogen in 2006.

With the regulation (EU) no. 605/2014 from the June 5 2014, the regulation (EC) no. 1272/2008 (CLP- V) was currently modified in Europe. Thus, formaldehyde is classified to the categories C1B and M2 (may cause cancer, suspected of causing genetic defects).

In Germany textiles with mass contents of more than 0.15 % (1500mg/kg) of free formaldehyde that are in dermal contact within intended use, have to be labelled, concerning the German consumer goods ordinance (Annex A).

Basing on the Toy Safety Directive (Directive 2009/48/EC) and on relevant European standards of series EN 71, textile components of toys intended for children under three years, must not contain more than 30mg/kg formaldehyde (free and hydrolysed).

Due to the harmful relevance of formaldehyde, critical organisations like the IVN (International Association of Natural Textile Industry) agreed in their demands for residues in goods for precautionary reasons, to a preferably low formaldehyde value. Concerning the IVN guideline for textiles, no more than 16 mg/kg of formaldehyde are allowed in prior sale (chemical analysis according to ISO 14184-1), for leather a maximum value of 50mg/kg is pretended (chemical analysis according to ISO 17226-1).

Annex D

The Leather Standard by Öko-Tex describes an upper limit for formaldehyde in leather products of 10mg/kg for babies, 75mg/kg for fabrics with physical contact and 300mg/kg without physical contact.

Overall, the analysed formaldehyde concentrations in the determined furs would not lead to any restrictions in the trading business according to the European legislation - legal requirements are not exceeded.

However, according to the evaluation criteria of the Leather Standard by Öko-Tex, none of the investigated furs would be allowed to receive the quality label of the association, concerning formaldehyde in leather products for babies. Also none of the fur complies with the requirements of the IVN Textile Standards or the GOTS (Global Organic Textile Standard, Version 5.0, requirements for babies).

Formaldehyde is a compound with carcinogenic potential. The Bremer Umweltinstitut recommends a minimisation of this compound in children's clothing in order to avoid health hazards, as even at low concentrations allergenic effects of formaldehyde cannot be safely excluded.

Evaluation of alkylphenols and alkylphenol ethoxylates

Alkylphenol ethoxylates (APEO) belong to the group of the non ionic tensides with emulsifying resp. dispersing effects (surfactant effects). They consist of an isomeric mixture of alkylphenols with substituted ethoxylate units of different chain lengths. They are frequently used as detergent substances in textile or leather auxiliaries (as well as in softeners, color fixations, drying agents, binders, oils etc).

The most relevant compounds considering the production volume and the toxicology are the nonyl- and octylphenol ethoxylates which can degrade in sewage to the fish-toxic compounds nonylphenol and octylphenol. Nonylphenol is considered readily biodegradable and has hormonal effects. It can accumulate in the tissue of fish and further organisms and finally reach the food chain. According to the CLP-VO (EG 1272/2008, table 3.1) it has been classified as toxic for reproduction in category R2.

Referring to the German 'Gefahrstoffverordnung' and REACH regulation (EG 1907/2006) nonylphenol ethoxylates are neither allowed as a substance nor as a preparation for the textile and leather processing with a content of above 0.1% (1000mg/kg).

Since June 20 2013, nonylphenol ethoxylates are listed by the ECHA (European Chemicals agency) as substances of very high concern (SVHC). The SVHC list includes substances hazardous to health or environment, which can be supplied for later admission or limitation procedure. If a product contains more than 1000 mg/kg of one or more listed substances, all suppliers and producers from the EU have to inform both their commercial customers and consumers about the use and the potential hazard. In addition, the ECHA must be informed if the production volume is above one tonne per year with a content of more than 1%.

In their directives for textile and leather, the IVN (International Association of Natural Textile Industry) and the international working group from the Global Organic Textile Standard (GOTS) claim the exclusion of nonyl- and octylphenols and corresponding ethoxylates for textile and leather production. In the latest GOTS version the total limit value for residues of alkylphenols (AP) and alkylphenol ethoxylates (APEO) in textiles is 20mg/kg. In their leather directive the IVN sets this value to 100mg/kg.

The limit mentioned in Leather Standard by Öko-Tex is set to 100 mg/kg for the sum of octyl- and nonylphenol ethoxylates and octylphenols and nonylphenols. Further labels demand a restriction of these compounds in their products too (eg bluesign: Consumer safety limit for OP, NP, NPEO and OPEO each 10mg/kg).

In their detox campaign, the environmental organisation Greenpeace even states the complete abandonment of the use of hazardous substances (this includes AP and APEO) and sets a zero limit for the final product.

All six furs are burdened with nonylphenol ethoxylates (between 39 mg/kg and 1459 mg/kg). The industrial use of these compounds is restricted within the European union, however, imported products are not statutorily regulated. Customers and users only have a right of information on request for the substances included in the candidate list (SVHC list) and with a proven content in the product of more than 1000mg/kg.

None of the investigated samples meets the criteria of the IVN or GOTS.

Overall, the test results do not indicate a good manufacturing practice compared with the criteria catalogs of critical commercial organisations. The renunciation of the manufacturer concerning the use of APEO, claimed by Greenpeace and several organisations (IVN, GOTS), is not recognisable in the fur industry.

Evaluation of arylamines

Azo dyes are one of the most relevant dyes for textile and leather industry. Some azo dyes may release one or more carcinogenic aromatic amines.

If these dyes enter the human body, they may be reductively cleaved during metabolism (eg intestine or liver) and form partially carcinogenic amines. There is evidence that certain bacteria on the skin can split the azo dyes in their corresponding amines too.

According to REACH-VO (VO (EG) 1907/2006) Appendix XVII No. 43 it is not allowed to use azo dyes in textile or leather which, by reductive cleavage of one or more azo groups, may release one or more of the aromatic amines listed in Appendix VIII, in detectable concentrations, i.e. above 30 mg/kg (0,003 %by weight). One of the aryl amines in appendix VIII of the REACH-VO is o-Anisidin which is classified as carcinogenic according to CLP-VO (VO (EG) 1272/2008).

Due to the usage of an azo dye forbidden in the EU which can cleavage o-Anisidin in high concentration (>8000 mg/kg) one of the analysed furs must not be traded in the EU.

Evaluation of trichlorophenols

Triclorophenols belong to the group of chlorophenols. All six different isomers can cause skin and eye irritation, 2,4,6-triclorophenol is suspected of causing cancer (CLP-V category C2).

It is used in pesticide formulations, eg as a wood or leather preservative. Besides trichlorophenols are degradation products from the fungicide pentachlorophenol.

For fur (not applied for toys) the use of trichlorophenols is not restricted in the EU. Concerning GOTS the maximum value of trichlorophenols is 0.2 mg/kg.

The Leather Standard by Öko-Tex describes an upper limit for trichlorophenols in leather products of 0.5 mg/kg for babies' clothing and 1.0 mg/kg for other fabrics.

Referring to trichlorophenols, one of six fur samples does not meet the requirements of GOTS and the Leather Standard by Öko-Tex. However, trading these furs is not prohibited in the EU.

Due to the carcinogenic potential of 2,4,6-trichlorophenol the Bremer Umweltinstitut recommends a minimisation of this compound in children's clothing. The requirements of GOTS and the leather standard by Öko-Tex are useful in this case.

References

1. http://www.respectforanimals.org/wp-content/uploads/2017/04/WELFUR_REPORT_WE-B.pdf Accessed Apr. 13, 2018

2. SCAHAW (2001). The Welfare of Animals Kept for Fur Production. Directorate C – Scientific Opinions

3. As shown in *Statistical Report on the Production of Skins of Mink, Fox and Raccoon in China (2014)*, the official report conducted by China Leather Industry Association in 2015, nearly 60 million of mink pelts were produced in 2014 in China. Assuming that the mink pelts produced outside China were 52.5 million in the same year according to The Case Against Fur Factory Farming, China's mink production should account for nearly 53% instead of only 40% of the global output. Previously, the three biggest mink farming countries were Denmark, China and the Netherlands. After the latter enforced the legislation to ban mink farming in 2015, China and Denmark remains the two most important mink fur farming.

4. *Report on the current state of Chinese fur clothing market and its development trend – 2014 version.* (2014). Website of China research reports (Original reference in Chinese: 2014版中国毛皮服装市场现状调研与发展趋势分析报告 (2014)。中国研究报告网。)

5. China Leather Industry Association. (2015). *Statistical Report on the Production of Skins of Mink, Fox and Raccoon in China (2014).*

6. Respect For Animals. (2015). *The Case Against Fur Factory Farming.*

7. China Leather Industry Association. (2015). *Statistical Report on the Production of Skins of Mink, Fox and Raccoon in China (2014).*

8. Humane Society International. (2011, May 10). Fur Farming in the European Union. Retrieved on 4 April 2016 from http://www.hsi.org/world/europe/work/fur/facts/fur_farm- ing_eu.html

9. Yangzhiuu. (2016, December 11) Breeding northern minks in the south - several cases on going through failure and ending up in making 2 million RMB per year. *Ishuo*. Retrieved on 12 February 2017 from https://www.ishuo.cn/doc/tiuyznqf.html (Original reference in Chinese: 养殖一点通 (2016，12月31日)。北貂南养贴近市场，几个经失败年赚200万。经典网。)

10. Sewage pollution from leather factories in Heibei Wuji have an impact on areas hundreds of square meters. (2014, April 10). People.cn. Retrieved on 3 December 2016 from http://society.people.com.cn/n/2014/0410/c1008-24874702.html (Original reference in Chinese: 河北无 极皮革厂渗坑直排污水10多年 污染近百平方公里 (2014，4月10日)。人民网。

References

11. Dorey, C.N. (2003), Chemical Legacy: Contamination of the Child, Greenpeace UK, October 2003, ISBN 1-903907-06-3, http://www.greenpeace.org/international/Global/international/ planet-2/report/2003/10/chemical-legacy-contaminatio.pdf

12. http://www.cancer.gov/about-cancer/causes-prevention/risk/substances/formaldehyde/formaldehyde-fact-sheet

13. Assessment of health risks to garment workers and certain home residents from exposure to formaldehyde. (1987). [Report] EPA National Library Catalog, United States. Environmental Protection Agency. Office of Pesticides and Toxic Substances. USA

14. IARC-WHO () IARC CLASSIFIES FORMALDEHYDE AS CARCINOGENIC TO HUMANS, Available at: https://www.iarc.fr/en/media-centre/pr/2004/pr153.html (Accessed: April 2018)

15. National Toxicology Program, Department of Health and Human Services (2011) Report on Carcinogens, Twelfth Edition, USA

16. OEMETA UK () RECLASSIFICATION OF FORMALDEHYDE IN THE EU, Available at: https://uk.oemeta.com/support/reclassification-of-formaldehyde/ (Accessed: April 2018)

17. National Cancer Institute (2015) Hexavalent Chromium Compounds, Available at: https://www.cancer.gov/about-cancer/causes-prevention/risk/substances/chromium (Accessed: April 2018)

18. Wikipedia (2016) List of IARC Group 1 carcinogens, Available at: https://en.wikipedia.org/ wiki/List_of_IARC_Group_1_carcinogens#cite_note-evaluated-3 (Accessed: April 2018)

19. Evidence on the Developmental and Reproductive Toxicity of Chromium (hexavalent compounds) (OEHHA, 2009) Aug 29, 2009

20. Jensen A & Leffers H (2008). "Emerging endocrine disrupters: perfluoroalkyated substances", International Journal of Andrology, vol 31, pp161-169

21. Kochukov, Y.; Jeng, J.; Watson, S. (May 2009). "Alkylphenol xenoestrogens with varying carbon chain lengths differentially and potently activate signaling and functional responses in GH3/B6/F10 somatomammotropes". Environmental Health Perspectives. 117 (5): 723–730

22. Baughman GL & Weber EJ (1994). Transformation of dyes and related compounds in anoxic sediment: Kinetics and products. Environmental Science & Technology 28: 267-276;Novotný C, Dias N, Kapanen A, Malachová K, Vándrovcová M, Itävaara M & Lima N (2006). Comparative use of bacterial, algal and protozoan tests to study toxicity of azo- and anthraquinone dyes. Chemosphere 63: 1436–1442

23. Dr R.G. Visser (2016) *Results of Proficiency Test APEO in textile*, The Netherlands: Institute for Interlaboratory Studies Spijkenisse.

24. (30 December 2006) 'L 396', Official Journal of the European Union, 49 (ISSN 1725-2555)

25. EcoAid-Manfred Krautter (2011) Poison in Furs-Gift im Pelz, Germany: Four Paws

26. Golka, K.; Kopps, S.; Myslak, Z. W. (June 2004). "Carcinogenicity of azo colorants: influence of solubility and bioavailability". Toxicology Letters. 151 (1): 203–10. doi:10.1016/j.toxlet.2003.11.016. PMID 15177655. Review.

27. Sigma-Aldrich (2010) Material Safety Data Sheet for o-Anisidine, Available at: https://www.lakeland.edu/PDFs/MSDS/1137/o-Anisidine%20(Sigma).pdf (Accessed: April 2018).

28. Klaus Hunger, Peter Mischke, Wolfgang Rieper, Roderich Raue, Klaus Kunde, Aloys Engel: "Azo Dyes" in Ullmann's Encyclopedia of Industrial Chemistry, 2005, Wiley-VCH, Weinheim.doi: 10.1002/14356007.a03_245. http://www.inchem.org/documents/icsc/icsc/eics0970.htm

29. University di Torino (2004) Chlorinated Phenols, Available at: http://lem.ch.unito.it/didattica/infochimica/Liquidi%20Ionici/Chlorophenols.html (Accessed: 2016).

30. (1999) 'L329', Official Journal of the European Communities, 42(ISSN 0378-6978), pp. [Online]. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L: 1999:329:TOC (Accessed: 2017).

31. https://www.epa.gov/sites/production/files/2016-09/documents/pentachlorophenol.pdf

32. WHO (2003) Pentachlorophenol in drinking-water. Background document for preparation of WHO Guidelines for drinking-water quality. Geneva, World Health Organization (WHO/ SDE/WSH/03.04/62).

33. The Rutgers Occupational Training and Education Consortium (OTEC) and New Labor (2009) Systems of Safety and Hazard Communication. School of Public Health, Office of Public Health Practice [Online]. Available at: https://www.osha.gov/dte/grant_materials/fy08/sh-17818-08/l3_hazard_- communication.pdf (Accessed: 2018)

34. http://www.vier-pfoten.org/files/International/Campaigns/Fur/PDFs/2011_FourPaws_Poison_in_Furs_Report_Engl.pdf

35v. Siemers, U. Bremer Umweltinstitut (2017) Report China Research

Acknoweldgements

With special thanks to the following experts for their professional endorsement of our research:

Prof. Jacob de Boer, Vrije Universiteit Amsterdam
Prof. Terence Ryan, University of Oxford
Ulrike Siemers, Bremer Umweltinstitut
Dr. Xiao Qing Lin, Demartologist
Dr. Qing Fei Zheng, Chinese Academy of Sciences

And thanks and appreciation for the use of research and imagery to:

ANIMA, Denmark
Bont voor Dieren, Netherlands
Fur Free Alliance, International
Greenpeace, International
Jo-Anne McArthur, Canada
LAV, Italy
Loupe Filmproduktion, Germany
Sloboda Zvierat, Slovakia
Vier Pfoten, Germany

www.actasia.org • info@actasia.org

ACTAsia is registered as a non-profit organisation in the UK, the Netherlands, and Australia, with 501(c)3 in the USA. It also has offices in China, as well as several international representatives. ACTAsia was established in 2006 by an Asian sociologist and an Asian veterinarian, with the aim to help Asian cultures evolve into caring societies, respecting all forms of life.

furfree ALLIANCE

ACT Asia