

Free Range Bulletin 03/03:

## Toxic shock! – my non-stick frying pan killed my budgie!!

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<http://www.fraw.org.uk/rangers/index.shtml>

**This is no joke. It's deadly serious – to budgies at least, and perhaps in the longer term humans too. There are a group of chemicals, *per-fluoro-chemicals* (PFCs), that are found in many products, and increasingly in human tissues. In the USA, where Teflon® is used in many products, a syndrome called *teflon flu* has been reported after people have been exposed to over-heated pots and pans. This is fatal to small birds. In the longer term, the build-up of these indestructible chemicals could damage our health too. Perhaps, like in the mines before safety lamps, the canary falling off its perch is a warning to us all.**

*Teflon*® – the wonder, space-age, non-stick coating, used in everything from lubricants to kids clothes. *Scotchgard*® – another similar coating for carpets and fabrics. *Gore-tex*® – that wonderful waterproof but airy fabric. *Silver-stone*® – those wonderfully hard-wearing pots and pans. All products that permeate our society. But what is the longer-term effect of the chemical cocktail that these products contain?

### **PFCs – something the chemical industry would like to keep private**

All these products are based upon a series of chemicals called per-fluoro-chemicals – PFCs. In the US, these are now being implicated as the source of widespread ill-health, as the source of potentially longer-term impacts of the health of the whole US population, and as the cause of the deaths of many pet birds. As well as in coatings, other PFC compounds, like *polytetrafluoroethylene* (PTFE), are now in widespread use. So the potential toxic impact, once we understand the mechanisms involved, could be very great.

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Fluorine, like chlorine some years ago, is now being implicated as the source of serious health impacts. Some of this has been the result of studies related to the fluoridation of water supplies. But, increasingly concern, is mounting about the break-down of fluorine-based polymers and coatings that are used everywhere in society. Most of this research is being done in the USA, and in some European countries such as Germany. There is yet to be a debate in the UK.



### **The canaries begin to fall...**

Problems began to arise in the US with the discovery of *teflon toxicosis* – pet birds exposed to the pollutants emitted from hot Teflon®-coated objects died. The lungs of the birds exposed to the gases haemorrhaged, filling with fluid, that eventually caused suffocation.

*Dupont acknowledge the existence of teflon flu, and teflon toxicosis, but do not consider the health impacts to be in any way serious*

In humans, there is also evidence that many people may be suffering the effects of Teflon®-like coatings breaking down. A syndrome, called *teflon flu*, has been discovered in the US. People who have been exposed to off-gassing report flu-like symptoms – congested airways, headache and pains in the muscles. These are in fact the effects produced by low doses of chemical like *hexafluoropropene* and *monofluoroacetic acid* (see box on next page) being given off by the PFC-based compounds.

The availability of research studies show that DuPont had known of the off-gassing of heated Teflon®, and had been researching the subject since the 1950s. DuPont acknowledge the existence of *teflon flu*, and *teflon toxicosis*, but do not consider the health impacts to be in any way serious. But there could be other reasons for this.

The compound that is of the greatest concern is *per-fluoro-octanoic acid* (PFOA). It is a carcinogen, and could have serious health impacts upon the young. PFOA is extremely persistent in the environment. In fact, the 3M company has in the past boasted of its durability. This means that, unlike other compounds that are banned, even though manufacture

may stop this stuff just won't go away. But there is one major manufacturer of PFOA left in the US – DuPont. 3M, because of the impact PFOA had on the health of its workers, has discontinued the use of PFOA in products like *Scotchgard*®.

### PFCs, PFCs, everywhere – but where?

Compounds like PTFE, PFOA and other PFCs are now routinely part of our lives. The origin of the writing of this briefing was an interest in the effects of Teflon® because all the school uniforms that you get these days are coated with it – it is in fact difficult to get hold of a school uniform that is not treated with some form of 'toughening' coating.

Beyond this, most ovens and cooking pots now have some sort of non-stick coating. Irons and ironing boards contain Teflon® to make them longer lasting. Carpets, curtains and other fabrics are coated with compounds to prevent stains. PFC-based compounds are everywhere. But we have no knowledge of their use because, unlike food products, we are not allowed to have information on what these products are made of and treated with. Even where trade names are used, like DuPont's *Stainguard*®, we have no right to know the formulation of these products in detail.

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Like benzene, lindane, DDT and flame retardants in the past, PFCs are under the spotlight – in the USA at least – as a threat to public health that could have widespread impacts. In the UK, as usual, there is not even a public debate. In terms of fluorine compounds, currently most people are concerned with water fluoridation. Not realising that every time they bake food, or fry an egg, they could be imparting their food, and their lungs, with more toxic compounds.

The only way this problem will be solved is by the consumer products industry providing clear information on the use of PFCs. Currently PFCs are used in the treatments, coatings and polymers of carpets, ovens, pots and pans, ironing boards and clothing. In particular, we need to have full disclosure on the content of trademarked products so that their chemical content cannot be hidden behind friendly and functional names.

*Watch this space...*

### Why is Teflon® so bad for budgies... and us?

Teflon®, and the many similar coatings for cooking pots or fabrics, becomes unstable as it is heated. According to the manufacturer DuPont, this is not a problem, and can only happen when a pan is heated higher than 340°C. They dismiss any harmful effect resulting from what they describe as *polymer fume fever*. The the evidence from the USA, where the impact of PFCs is now being studied seriously, is that the impacts on human health are far more serious and widespread.

Studies by the US-based *Environmental Working Group*§, a public interest research organisation, show that pre-heating a Teflon® pan creates ultra-fine particulate matter at 230°C – potentially damaging to the lung. Other non-stick pan coatings, using compounds like PTFE, may break-down at lower temperatures. At 360°C a Teflon® pan gives off:

- ◆ *Tetrafluoroethylene* (TFE), a compound that the US National Toxicology Program describes as a *human carcinogen*.
- ◆ *Hexafluoropropene* (HFP), a chemical implicated as the cause of certain types of illness and birth defects, and which in acute (short-term) exposure can cause irritation of the air passages and the lung.
- ◆ *Trifluoroacetic acid* (TFA), which, as a breakdown product of the commonly used *HCFC-123* (hydro-chloro-fluro-carbons, a compound introduced to replace the CFCs that deplete the ozone layer) has been implicated in liver and bone damage.
- ◆ *Monofluoroacetic acid* (MFA), a very toxic compound that affects the nervous system, and which at high levels can cause irregular heart rate, convulsions and respiratory failure.
- ◆ Perhaps the most nasty is *per-fluoro-octanoic acid* (PFOA), a chemical over which there are great concerns in the USA. It has become a ubiquitous organic contaminant (it has been found in 92% of human blood samples in the US), it is a known carcinogen, and has serious neuro-toxic effects, impacting the developmental health of the young.

Above 470°C, more toxic compounds are emitted: *silicon tetrafluoride* (forms hydrofluoroic acid in the lung), *per-fluoro-isobutene* (toxic on inhalation, and listed in the *UN Chemical Weapons Convention*), *carbonyl fluoride* (a fluoridated version of the First World War chemical weapon *phosgene*), and *hydrogen fluoride* (a toxic and highly corrosive gas).

There are other impacts of these emissions. Some are ozone depleting chemicals. Others are potent greenhouse gases. The effects of such complex chemical cocktails on health is poorly understood, and the potential for health damage cannot be determined by anyone at this time.

§ – Environmental Working Group, <http://www.ewg.org/reports/toxiciteflon/> and <http://www.ewg.org/reports/pfcworld/>

The Free Range Network is a 'disorganisation' of activists and specialists that organises workshops and develops information resources for community and grass roots campaigning organisations. Free Range Bulletins are produced on an occasional basis, and are intended to promote debate and learning on current campaign issues.

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