

Exclusive: Chemical cocktail found in face masks

PREMIUM 

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Top German scientists have found that wearing certain types of face masks for long periods of time could result in potentially hazardous chemicals and harmful microplastics being inhaled deep into human lungs.

Professor Michael Braungart, director at the Hamburg Environmental Institute and co-founder of the world-renowned Cradle to Cradle environmental standard has told *Ecotextile News* that mask wearers unwittingly run the risk of breathing in carcinogens, allergens and tiny synthetic microfibrils by wearing both textile and nonwoven surgical masks for long periods of time.

His recent findings have been backed up by another leading industry textile chemist Dr. Dieter Sedlak, managing director and co-founder of Modern Testing Services Augsburg, Germany in partnership with Modern Testing Services Global, Hong Kong who found elevated concentrations of hazardous fluorocarbons, formaldehyde and other potentially carcinogenic substances on surgical face masks: "I can only say 100 per cent that I have similar concerns to Prof. Braungart."



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With over 40 years in the business, Dr. Sedlak, who was also the former Global Product Safety Director at a major global Specialty Chemicals supplier is one of the most respected figures in the textile chemicals sector and helped to develop various leading EHS chemical management systems and RSL concepts used today by major global apparel and footwear brands.



Initial analytical tests by both of these experts have now thrown into doubt the wisdom of whether people should be wearing certain types of masks for hours on end. Particularly schoolchildren, factory workers and long-haul flyers who may be at a greater risk from the long-term damage to lungs through exposure to both restricted chemistry and microplastics – perhaps outweighing the short-term risk of any exposure to the coronavirus?

"What we are breathing through our mouth and nose is actually hazardous waste," said Professor Braungart, who ran preliminary tests on used surgical masks that found traces of chemicals such as the known carcinogen aniline as well as formaldehyde and optical brighteners – both heavily restricted on consumer goods by European and US authorities to minute parts per million concentrations.

Separate studies by Dr. Sedlak have also shown the presence of compounds such as 2-butanone oxime (carcinogenic) blocked diisocyanates used as crosslinkers for perfluorocarbons (PFCs) on face masks. Used in the textile sector as oil and water repellents on fabrics, by-products of PFCs are known to be bio-persistent and their use is heavily restricted by authorities in Europe and the USA. Last year, a group of US scientists called for all per- and poly-fluorinated substances (PFAS) to be treated as one single class of chemistry and said they should be avoided for non-essential uses due to their hazardous toxicological and eco-toxicological profile.

"Honestly, I had not expected PFC's would be found in a surgical mask, but we have special routine methods in our labs to detect these chemicals easily and can immediately identify them. This is a big issue," explained Dr. Sedlak.

"It seems this had been deliberately applied as a fluid repellent – it would work to repel the virus in an aerosol droplet format – but PFC on your face, on your nose, on the mucus membranes, or on the eyes is not good." Along with PFCs, he also detected – besides the PFC crosslinkers – compounds such as formaldehyde and acetaldehyde whereas a GCMS chromatogram showed "100s of peaks from other contaminants."

Microfibre concern

Like Sedlak, Braungart noted that surgical masks have been designed to be worn for very specific purposes such as by clinicians or for a short period of time before being discarded. They are not designed to be crumpled up in people's pockets where the "friction and damp environment promotes both fibre abrasion and encourages bacterial colonisation over time," he said.

This abrasion can, he says, cause the release of tiny microplastics as the polypropylene fibres break down from mechanical wear and tear, finding in tests that some masks shed microfibrils classed as hazardous 'dust' by the German Social Accident Insurance (DGUV). Fibres of this type of geometry that meet this dust standard are also referred to as 'WHO fibres' after earlier work by the World Health Organisation on asbestos.

Textiles preferable to nonwovens?

During the on-going pandemic most people are now also wearing masks and face coverings made from traditional textile materials that would normally be used to make our clothing.

Thankfully, the risks associated with harmful chemicals on clothing are lower than ever, but the risks aren't zero. "The risks associated with clothing tend to be due to skin contact, apart from babies that tend to suck anything they can get near their mouth – and therefore it is normal to have tougher, more stringent chemical standards for babywear textiles," according to textile chemical expert, Phil Patterson of Colour Connections, who also works with the highly respected ZDHC Foundation on chemical management.

"In my opinion, textile masks do not begin to pass this most basic hazard test for kids, for whom the risks of COVID have been categorically demonstrated to be miniscule," he said.

Potential litigation risks?

One unforeseen problem for those mandating the continued and long-term wearing of face masks, such as governments and businesses, is the potential for future litigation if they are proven to have any long-term adverse impacts on human health – especially since long-term studies have yet to be undertaken.

Patterson, who has advised some of the world's biggest clothing retailers and brands on chemical management agrees this could be an issue.

"I'd be very wary of mandating masks, as some chemicals and fibres may have long-term effects – and that possibly opens the floodgates of personal injury claims at some stage in the future."

Big brands

Nate Sponsler, director at the AFIRM Group that represents over 30 well-known consumer brands, such as Amazon, Nike and Levi Strauss, in a bid to reduce the use of harmful substances in textiles says it's early days when looking at face masks. "We have not yet done any formal data aggregation or studies specific to face masks, so I'm glad this issue is being highlighted," he said.

He says textile face masks are a different issue to surgical face masks where he says he's "not surprised" to see potential hazardous substances based on fluorine applied to these masks, given that they're designed for use in the medical sector, "where all kinds of exemptions for chemistry on PPE exist," he said.

He also noted that for kids face masks "the AFIRM best practice would be to use organic cotton, and for adults where more materials and chemistry are being used (such as prints for example), this does require more due diligence."

Masks have been an integral part of the global response to the coronavirus and a necessary intervention – especially at the height of the pandemic. But as we start to emerge from this global health crisis, leading scientists are now questioning whether the real risk of exposure to potentially hazardous chemicals from long-term mask wearing is actually higher than the risk of coming into contact with the Sars-CoV-2 virus – especially for children and young adults who are in the low-risk category when it comes to developing severe COVID-19.