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The end of colours?

Since the beginning of 2022, certain substances have been banned in tattooing products. What's behind this? What health risks are being discussed? Where is more research needed?

According to the statistics database “Statista”, roughly 17 per cent of the German population are tattooed, and the trend is rising! Few of us think about the health consequences, and many even consider tattoos to be harmless. Although science is making great progress and more and more health risks are being explored and identified, little is known about the long-term effects of tattoo ink ingredients in the body.

As of 4 January 2022, certain ingredients in tattoo inks are now banned, with further restrictions to follow in early 2023. The topic has been widely discussed in public for months. Does it mean the provisional end of colourful tattoos?

Scientists point to a wide range of health risks associated with tattoos, from the occurrence of carcinogenic substances to allergies and infections. In Germany, tattoo inks are subject to the regulations of the Tattoo Inks Ordinance (see box on page 35). This contains a list of ingredients that may not be contained in tattoo inks. These include, for example, pigments that are harmful to health and certain carcinogenic compounds from azo dyes, a group of industrially produced dyes. Similar national regulations also exist in other EU Member States.

Over 4,000 ingredients regulated

With the aim of achieving uniform regulation at the European level, the European Chemicals Agency (ECHA) has drawn up a restriction proposal for certain ingredients in tattooing products on behalf of the European Commission. This is based on the European chemicals regulation REACH (see box, page 34).

This regulation generally prohibits substances that have been proven to be carcinogenic and mutagenic or to damage the development of (unborn) children and reproduction. In addition, substances that irritate the eyes and skin and trigger allergies are banned along with substances already banned or restricted via certain annexes of the EU Cosmetics Regulation. The rationale: substances that are not permitted for use on the skin shouldn't get under the skin either.



In the lab: biotechnologist Dr Ines Schreiber researches the safety of tattoo inks.

What is REACH?

REACH stands for Registration, Evaluation, Authorisation of Chemicals and is the EU chemicals regulation. In force since 2007 as REACH Regulation (EC) No. 1907/2006, it's an important tool for chemical safety in the European Union. If a substance or group of substances poses an unacceptable risk that cannot be adequately controlled, the authorities responsible for REACH in the EU Member States can propose restricting its use: this can then be subject to certain conditions in all EU states or be generally prohibited.

Finally, as of 4 January 2022, approximately 4,200 substances for use in tattoo inks have been banned or only allowed in very small quantities, including certain pigments as well as binding and preserving agents. A transitional period has been granted for the pigments "Blue 15:3" and "Green 7", so that the restriction will only apply starting 4 January 2023.

The ECHA's restriction proposal was developed jointly with the EU Member States Denmark, Italy and Norway and with the participation of Germany and the German Federal Institute for Risk Assessment (BfR). Basically, however, the insufficient data situation is making the assessment of the health risks and a final regulation

difficult. Especially with regard to the pigments "Blue 15:3" and "Green 7", the BfR concludes that the currently available data only shows comparatively low toxicity. However, the data is incomplete and needs to be refined.

BfR research team examines skin samples

At the BfR in Berlin, the safety of tattoo inks has been researched for years. At the "Dermatotoxicology" study centre, biotechnologist Dr Ines Schreiber has been in charge of the "Tattoos" subsection since February 2021 and has reason to be proud: "We're the only research group worldwide that conducts full-time research on tattoo inks," she explains. For example, her team is using skin samples to investigate which colour pigments trigger allergies. It is known that red pigments in particular can cause this. In addition to actual skin samples, specially developed skin models are also used to observe the interaction between cells and colour pigments under UV irradiation.

How are colour pigments and other ingredients of tattoo inks distributed in the body? Where and how heavily are they deposited in the body and organs? There is still a need for research here. The question of the substances' metabolism has also not yet been sufficiently investigated. To improve the study situation concerning the distribution of tattooing ingredients, the BfR is already in the process of obtaining human data. "We're currently conducting a bioavailability study. We want to find out how many of the soluble tattooing ingredients actually enter the body," explains the scientist. For this purpose, blood and urine samples from human subjects are analysed shortly after the tattooing process.

The research at the BfR will contribute to improving the scientific data and the safety of tattoo inks. Commenting on the future of tattoo research, Schreiber adds: “There are still some side effects with unknown causes, so we’ll certainly be continuing our research here at the BfR for years to come.” ■

More information:

www.bfr.bund.de/en > A-Z Index: Tattoo



www.youtube.de > BfR
> Feature: Research on tattoos at the BfR
> 3 questions about tattoos
> Statements 2. International Conference on the Safety of Tattoo Inks

What legal provisions apply to tattoo inks in Germany?

In Germany, food and feed, tattoo inks, cosmetic products and consumer products are subject to the German Food and Feed Code (Lebensmittel- und Futtermittelgesetzbuch, LFGB). Accordingly, products must be safe for consumers and must not harm human health. The respective manufacturer is responsible for their safety. Tattoo inks in Germany are also subject to the provisions of the Tattoo Inks Ordinance (Tätowiermittelverordnung).

BUZZ TALK

“A large proportion of the colour pigments remain in the body for life”



Dr Peter Laux is head of the Product Properties and Nanotechnology unit at the BfR

Where do the pigments wind up after getting a tattoo?

The pigments from the tattoo inks do not all stay exactly where the tattoo was applied. We know from clinical studies that the lymph nodes of tattooed people are coloured. This means that some of the pigments are found there. It’s not yet known how pigments accumulate in other organs and what effects this has. There’s a great need for research in this area.

How can we increase the safety of tattoo inks?

We can already significantly increase the safety of tattoo inks. To this end, the BfR has proposed the introduction of minimum requirements that would have to be met by manufacturers on a voluntary basis. The minimum requirements include consistent purity. The impurity profile must remain the same during different phases of the manufacturing process. Secondly, we propose the introduction of in vitro testing – that is, non-animal testing methods. For example, these might be used to test the light-mediated toxicity or allergenic properties of pigments.

Dr Laux, what are the greatest health risks of a tattoo?

The greatest health risks of getting a tattoo are allergic reactions such as redness and swelling. These can occur even years after being tattooed. When you get a tattoo, pigments are pricked into your skin. They come into contact with lymph fluid as well as blood. A large proportion of the pigments remain in the human body for life and the long-term effects are still completely unexplored.