

Worth the risk?

Nicotine pouches are new, tobacco-free products. When placed under the lip they slowly release nicotine. The BfR is investigating the health risks.



NICOTINE POUCHES OR "ALL WHITE" PRODUCTS

are small fabric pouches that contain a powder from nicotine salts and substrates – but no tobacco. They are placed between the lip and the gum so that the nicotine is released from the pouch when it is exposed to saliva. The nicotine then enters the body through the oral mucosa while some of the ingredients are also swallowed. Nicotine pouches are not currently on sale in Germany. However, they can be found on the internet. They are not the same as the oral tobacco snus, which is widely used in Sweden.

Nicotine floods into the brain within 10 to 20 seconds – proven for smoking – and the reward system is activated: dopamine is released and a sense of well-being sets in. With nicotine pouches, this biochemical process begins as soon as they are placed under the lip, but without the tobacco and combustion process. A research team at the German Federal Institute for Risk Assessment (BfR) is investigating whether nicotine pouches are actually as harmless as they seem to some.

The focus is on assessing the health risks of this new product group. The little data that is available mostly comes from the product manufacturers themselves. Important questions that the BfR wants to answer are: how much nicotine do the pouches contain? How much of it reaches the body? Do the pouches contain other substances that are harmful to the consumer's health? The BfR therefore is conducting experimental studies to close the data gaps.

HOW MUCH NICOTINE AND NITROSAMINES ARE IN THE POUCHES?

Many products lack clear information regarding the nicotine concentration. In addition, statements on the packaging about nicotine strength are often actually misleading as terms like easy, ultra, danger, strong, brutal lack consistent definitions. The research team analysed 44 nicotine pouches from different manufacturers. The result: nicotine concentration in the products ranges from 1.79 mg to 47.5 mg per pouch. "The nicotine concentration in some pouches is alarmingly high," says Dr Nadja Mallock-Ohnesorg with regard to the findings. She is head of the experimental investigations at the BfR.

Even if the pouches do not contain any tobacco, BfR scientists want to know whether impurities, such as tobacco-specific nitrosamines, are present in nicotine pouches. These impurities are formed from nicotine and other tobacco alkaloids during tobacco fermentation. Tobacco-specific nitrosamines were found in more than half of the pouches analysed. Two representatives of these substance groups, 4-(methyl-nitrosamino)-1-(3-pyridyl)-1-butanone (NNK) and N'-nitrosonornicotine (NNN), have been classified as group 1 carcinogens (carcinogenic to humans) by the International Agency for Research on Cancer (IARC). There is no safe limit threshold for them, which is why any ingestion should be avoided. Contamination with potentially harmful tobacco-specific nitrosamines can be avoided through the manufacturing process.

REFRESHING, SPICY, SWEET – TRACING THE TASTE

"We carried out an unknown screening with 50 pouches to identify flavouring substances," explains Dr Mallock-Ohnesorg. 186 different chemicals were detected. Among the ten most common flavourings are menthol, linanool, limonene and eucalyptol. Some of the identified flavouring can be allergenic. Even though individual substances are permitted in food, it is unclear whether they can lead to allergic reactions when used repeatedly and over a longer period of time in the same place under the lip, as is often



"Placed between the gums and the lip, nicotine enters the body through the oral mucosa."

NICOTINE

is an alkaloid that occurs naturally in tobacco leaves, but also in other plants. It stimulates the nervous system and can trigger a number of reactions in the body, such as strong cardiovascular effects including increased heart rate and high blood pressure. As an addictive substance, nicotine docks on to receptors in the brain, causing the release of hormones, such as dopamine and endorphins. In doing so, it stimulates the reward system. Regular consumption dulls the neural reward circuits, meaning that the amount of nicotine to achieve the same effect must be increased. A few mild cases of poisoning with nicotine pouches have been reported to poison information centres since 2020. Symptoms are nausea, vomiting, diarrhoea. Cases of severe poisoning can cause a slowing of the heartbeat or even respiratory arrest.

the case with nicotine pouches. The health risk posed by flavourings in nicotine pouches cannot be assessed at present, especially because of the high number of substances used.

HOW MUCH NICOTINE ENTERS THE BLOOD?

The BfR also looked at the question of how nicotine pouches compare to cigarettes with regard to the health risk from nicotine. To answer this question, an experimental study was carried out in which the nicotine blood level was measured after the consumption of nicotine pouches. 15 test persons put pouches with different nicotine concentrations from 0 mg to 30 mg from different manufacturers under their lips for 20 minutes. The



“Nicotine carries a risk of addiction. Therefore, nicotine pouches could be a gateway drug.”

DR NADJA MALLOCK-OHNESORG, BfR

nicotine concentration in the blood, the blood pressure, the heart rate and changes in the oral mucosa were then measured. For comparison, these studies were also carried out after cigarette consumption. The study was carried out in cooperation with the special outpatient clinic for tobacco addiction at the Ludwig Maximilian University of Munich (LMU). The result: in the case of high-dose (30 mg) nicotine pouches, nicotine levels were even higher than after smoking conventional cigarettes. "This indicates that high-dose nicotine pouches have a similar addictive effect as what is known from cigarettes," explains PD Dr Thomas Schulz, who also works on the health risk assessment of nicotine pouches at the BfR. Furthermore, the heart rate increased significantly and

irritation of the oral mucosa could be observed. "It is interesting that all products – even the nicotine-free one – reduced the test persons' urge to smoke," adds Schulz.

NICOTINE IS STILL NICOTINE

Whether with or without tobacco – people who ingest nicotine cannot negate the associated health risks. Nicotine concentrations and ingredients should generally be recognisable by consistent information on the packaging. "Nicotine carries a risk of addiction. Therefore, nicotine pouches can be a gateway drug for young people," explains Mallock-Ohnesorg. Pregnant women should avoid the pouches, as nicotine can harm their unborn baby. —

NOT AVAILABLE TO BUY IN GERMANY

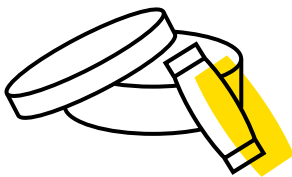
Since nicotine pouches are consumed by placing them in the mouth, the federal states' monitoring authorities classify them as novel food under food law. Since food must not pose a health risk, nicotine pouches are not available to buy in Germany.

More information



BfR opinion
 "Health risk assessment of
 nicotine pouches" (pdf)

**BfR survey:
 Nicotine pouches**



BfR online survey of 4,022 persons in Germany in May 2022.

3 in 4
 respondents have never heard of nicotine pouches.

2 %
 of people in Germany regularly use nicotine pouches, 14 % have already tried them.

85 %
 do not think they will use nicotine pouches in the future.

77 %
 feel that they do not know enough about possible health risks linked to nicotine pouches. In contrast, 19 % feel that they know enough.