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Cases of poisoning: Liquids containing cannabidiols for e-cigarettes can be manipulated

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The health risks of e-cigarettes have come into focus after the deaths of several “vapers” due to lung injury in the USA recently. These health risks were discussed in press reports on eight young people who were poisoned in Bremerhaven in October 2019. Patients suffered from convulsive seizures, impaired consciousness and memory, and heart palpitations. According to a preliminary assessment from the German Federal Institute for Risk Assessment (BfR), the prohibited use of synthetic cannabinoids in e-liquids can be assumed with high likelihood as reason for the observed symptoms. According to media reports, the patients admitted to have consumed cannabidiol (CBD). CBD is a weakly psychoactive cannabinoid. Already a year ago, the use of CBD liquids manipulated with psychoactive cannabinoids has been reported on from the USA. The users suffered from neurological symptoms as the youths in Bremerhaven. Thus, both case series share similar symptoms – including the fact that no respiratory symptoms appeared – and the absence of fatal cases in contrast to earlier reports from the USA. The cases of poisoning in Bremerhaven can only be assessed to a limited extent by BfR due to the lack of sufficient available information. Further data, particularly regarding the products, additives, and devices used, are required for a toxicological risk assessment. At the moment, there are no hints that indicate the cause or enhancement of the symptoms of poisoning by e-cigarettes. However, e-cigarettes in general, with nicotine or nicotine free, compromise health.

1 Subject of the assessment

The BfR has issued a statement regarding possible health risks arising from the use of e-cigarettes recently. The background are media reports¹ dated 25 October 2019 in Bremen, covering poisoning of eight youths in Bremerhaven that was attributed to the use of e-cigarettes. Although the symptoms in the Bremerhaven case series were clearly different from the severe respiratory illnesses in the USA, the cases were partially summarised. Poisoning was attributed to e-cigarettes as a new consumption habit - with no differentiation with regard to the e-liquids consumed.

2 Results

With a very high likelihood, the poisoning cases in Bremerhaven are due to the use of synthetic cannabinoids in e-liquids. They clearly differ to the current cases of severe illness in the USA.

Already one-and-a-half years ago, there were cases reported from USA similar to the cases in Bremerhaven. The cases of illness or poisoning were attributed to manipulated cannabidiol liquids (CBD liquids) by the American authorities. The cases of poisoning in Bremerhaven are, based on current knowledge, due to other psychoactive synthetic cannabinoids. The liquids in question were acquired from a tobacconist in some cases. The BfR has no information regarding the origin of the liquids containing cannabinoids.

It is also possible that the e-liquids used in Bremerhaven were spiked with so-called incense or herbal blends. These are mixtures that may contain synthetic cannabinoids such as 5F-ADB, Cumyl-PeGaClone or 5F-Cumyl-P7AICA and that are misused for smoking. Synthetic

cannabinoids could also have been mixed to the liquids in a different form, such as crystals or solids.

The assessment of the current cases in Germany is only possible to a limited extent due to the lack of available information. Further information, particularly regarding the products, additives, and devices used, is required for a toxicological risk assessment. The products that were consumed should be subjected to full chemical analysis and characterisation. Furthermore, there is the question whether further illegal substances have been spread via CBD products.

At the moment, there are no hints that e-cigarettes as an application have triggered or enhanced the symptoms of poisoning. The current opinions of the BfR therefore remain valid. E-cigarettes in general, either with nicotine or nicotine free, compromise health.

3 Risk assessment and discussion

This preliminary assessment is based on press releases describing cases. Faintness, impaired consciousness and memory, seizures, and heart palpitations are listed as symptoms¹. The lack of respiratory symptoms clearly differentiates the cases in Bremerhaven from the illnesses associated with e-cigarettes registered currently in the USA.

Several youths stated that they had used products with the mildly psychoactive cannabinoid CBD. There were approximately fifty similar cases of illness in the USA in 2018 that were caused by CBD liquids which were manipulated with further, more psychoactive cannabinoids³. These manipulated CBD products were available via normal distribution channels (tobacconists) in some federal states⁴. The psychoactive cannabinoid 4-CCB was found in a total of nine seized samples. The confirmed cases can largely be attributed to products containing 4-CCB. The symptoms, as noted by the Centers for Disease Control and Prevention (CDC), are changes in consciousness (including full loss of consciousness), confusion, cerebral seizures, and hallucinations. Respiratory symptoms did not arise. In general, the symptoms are largely consistent with the Bremerhaven cases. Around 75 % of cases in the USA involved "vapers", whilst the symptoms in the remaining cases occurred after sub-lingual use, i.e. regardless of the e-cigarette as an application form. The possibility that CBD products could be used to spread synthetic drugs represents an alarming development from a risk assessment perspective. However, cannabinoids can also be introduced to liquids in other ways such as solids or CBD oils. According to information from the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA)⁵, some synthetic cannabinoids demonstrate considerably increased risk of overdosing compared to cannabis due to their high potency and long half-life. Little is known about these cannabinoids' pharmacology and toxicology in general⁵.

The BfR shares the view of the local authorities that the cases of illness in Bremerhaven, based on the current state of knowledge, are most likely due to synthetic cannabinoids. However, the BfR considers forensic-analytical investigations of corresponding samples necessary to confirm this hypothesis. Such investigations are also required to identify further substances that could be associated with these poisonings. A comprehensive toxicological assessment would also require information regarding the devices used (open/closed systems, evaporator output, specifications amongst others). The possibility, discussed in the media, that liquids are cut with herbal mixtures (or extracts, or similar) can also not be ruled out. A suspicion could be substantiated by forensic examinations of samples, since the substances used in herbal mixtures are already known to a large extent². Further cases of poisoning due to synthetic cannabinoids in e-liquids recently occurred in Bavaria. Also regarding

these cases⁶, there have only been local press releases, no further details are known to the BfR.

4 Conclusion

Independent of the current situation, i.e. the e-cigarette, or vaping, product use associated lung injury outbreak (EVALI) in the USA, a trend becomes apparent that e-cigarettes are increasingly being used for consumption of psychoactive substances and possibly also for other drugs. Increased risks to health may result from misuse and represent new challenges to both, risk assessment and risk management. The BfR maintains its recommendation, to apply regulations already in place for liquids containing nicotine also to nicotine-free products.

Further information on e-cigarettes is available from the BfR website:

E-cigarettes study: There have been no cases of toxic poisoning through “vaping” in Germany (6 December 2019)

https://www.bfr.bund.de/de/presseinformation/2019/51/studie_zu_e_zigaretten_in_deutschland_bislang_keine_bedrohliche_vergiftung_durch_dampfen-243322.html

“Vaping”: The BfR advises against mixing e-liquids yourself (15 November 2019)

https://www.bfr.bund.de/en/press_information/2019/43/vaping_the_bfr_advises_against_self_mixing_e_liquids-244110.html



BfR "Opinions app"

5 References

¹<https://www.butenunbinnen.de/nachrichten/kurz-notiert/gepanschte-e-zigaretten-bremerhaven-100.html>

²Ernst et al., (2019) Identification and quantification of synthetic cannabinoids in ‘spice-like’ herbal mixtures: Update of the German situation in summer. *Forensic Science International* 294:96-102.

³<https://www.cdc.gov/mmwr/volumes/67/wr/pdfs/mm6720a5-H.pdf>

⁴<https://jamanetwork.com/journals/jama/article-abstract/2684620>

⁵<http://www.emcdda.europa.eu/publications/drug-profiles/synthetic-cannabinoids/de>

⁶<https://www.mittelbayerische.de/region/cham-nachrichten/bewusstlos-nach-zug-von-e-zigarette-20909-art1838527.html>

About the BfR

The German Federal Institute for Risk Assessment (BfR) is a scientifically independent institution within the portfolio of the Federal Ministry of Food and Agriculture (BMEL) in Germany. It advises the German federal government and German federal states ("Laender") on questions of food, chemical and product safety. The BfR conducts its own research on topics that are closely linked to its assessment tasks.

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