

Widely used filtering material adds arsenic to beers

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Image: John White

The mystery of how arsenic levels in beer sold in Germany could be higher than in the water or other ingredients used to brew the beer has been solved, scientists announced here today at the 245th National Meeting & Exposition of the American Chemical Society, the world's largest scientific society. The meeting, which features almost 12,000 reports and other presentations, continues through Thursday.

Mehmet Coelhan, Ph.D., and colleagues said the discovery could be of

importance for breweries and other food processors elsewhere that use the same filtering technology implicated in the elevated [arsenic](#) levels in some German beers. Coelhan's team at the Technische Universität in Munich set out to solve that riddle after testing 140 samples of beers sold in Germany as part of a monitoring program. The monitoring checked levels of heavy metals like arsenic and lead, as well as natural toxins that can contaminate grain used in brewing beer, pesticides and other undesirable substances.

Coelhan explained that the World Health Organization uses 10 micrograms per liter of arsenic in drinking water as a limit. However, some beers contained higher arsenic levels. "When arsenic level in beer is higher than in the water used during brewing, this excess arsenic must come from other sources," Coelhan noted. "That was a mystery to us. As a consequence, we analyzed all materials, including the malt and the hops used during brewing for the presence of arsenic."

They concluded that the arsenic was released into the beer from a filtering material called kieselguhr, or diatomaceous earth, used to remove yeast, hops and other particles and give the beer a crystal clear appearance. Diatomaceous earth consists of fossilized remains of diatoms, a type of hard-shelled algae that lived millions of years ago. It finds wide use in filtering beer, wine and is an ingredient in other products.

"We concluded that kieselguhr may be a significant source of arsenic contamination in [beer](#)," Coelhan said. "This conclusion was supported by analysis of kieselguhr samples. These tests revealed that some kieselguhr samples release arsenic. The resulting [arsenic levels](#) were only slightly elevated, and it is not likely that people would get sick from drinking beers made with this filtration method because of the arsenic. The arsenic is still at low levels—the risk of alcohol poisoning is a far more realistic concern, as stated in previous studies on the topic."

Coelhan pointed out that beers produced in at least six other countries had higher arsenic amounts than German beers, according to a report published four years ago. He said that breweries, wineries and other food processors that use kieselguhr should be aware that the substance can release arsenic. Substitutes for kieselguhr are available, he noted, and simple measures like washing kieselguhr with water can remove the arsenic before use.

More information: Abstract

The German Brewing industry has more than 1000 members and produces annually 100 million hectoliter beer. Although beer consumption in Germany per capita has been stagnating for many years, it is relatively high (around 100 liter) compared to many other countries. A large part of beer produced is exported. Brewers take a great deal of care to ensure that the beers they produce are entirely safe. Heavy metals are subject to stringent legislation under German and EU law. In addition to these requirements, contaminants are subject to monitoring organized by the Association of German Beer Brewers, in order to check for any adverse effects on malt or beer quality or other effect on processing before they are accepted for use on malting barley. Hence, a malt monitoring program was started 2011 in Germany to explore levels of heavy metals, mycotoxins, dioxins and dioxine-like PCBs, and a large number of pesticides. In the present study results for arsenic levels are presented. Analyses revealed that particularly kieselguhr used for filtration of beers may be a significant source of arsenic contamination in beer.

Provided by American Chemical Society

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