Milk: Best drink to reduce burn from chili peppers

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People who order their Buffalo wings especially spicy and sometimes find them to be too "hot," should choose milk to reduce the burn, according to Penn State researchers, who also suggest it does not matter if it is whole or skim.

The research originated as an effort by the Sensory Evaluation Center in Penn State's College of Agricultural Sciences to identify a beverage to clear the palates of participants in tasting studies involving capsaicin. An extract from chili peppers, capsaicin is considered an irritant because it causes warming and burning sensations.

"We were interested in giving capsaicin solutions to many test participants and we were concerned with the lingering burn at the end of an experiment," said center director John Hayes, associate professor of food science. "Initially, one of our undergrad researchers wanted to figure out the best way to cut the burn for people who found our samples to be too intense."

Widespread consumption of chili peppers and foods such as wings spiced with siracha and hot sauce show that many people enjoy this burn, Hayes added. But these sensations also can be overwhelming. While folklore exists on the ability of specific beverages to mitigate capsaicin burn, quantitative data to support these claims are lacking.

The researchers looked at five beverages and involved 72 people—42 women and 30 men. Participants drank spicy Bloody Mary mix, containing capsaicin. Immediately after swallowing, they rated the initial burn.

Then, in subsequent separate trials, they drank purified water, cola, cherry-flavored Kool-Aid, seltzer water, non-alcoholic beer, skim milk and whole milk. Participants continued to rate perceived burn every 10 seconds for two minutes. There were eight trials. Seven included one of the test beverages and one trial did not include a test beverage.

The initial burn of the spicy Bloody Mary mix was, on average, rated below "strong" but above "moderate" by participants and continued to decay over the two?minutes of the tests to a mean just above "weak,"

according to lead researcher Alissa Nolden. All beverages significantly reduced the burn of the mix, but the largest reductions in burn were observed for whole milk, skim milk and Kool-Aid.

More work is needed to determine how these beverages reduce burn, noted Nolden, a doctoral student in food science at Penn State when she conducted the research, now an assistant professor in the Department of Food Science at the University of Massachusetts. She suspects it is related to how capsaicin reacts in the presence of fat, protein and sugar.

"We weren't surprised that our data suggest milk is the best choice to mitigate burn, but we didn't expect skim milk to be as effective at reducing the burn as whole milk," she said. "That appears to mean that the fat context of the beverage is not the critical factor and suggests the presence of protein may be more relevant than lipid content."

Following the completion of all the trials, the participants answered two questions: "How often do you consume spicy food?" and "Do you like spicy food?" Researchers had hoped to see some correlation between participants' perception of the burn from capsaicin and their exposure to spicy food, Nolden pointed out. But no such relationship emerged from the study.

The findings of the research, recently published in *Physiology and Behavior*, might surprise some spicy foods consumers, but they should not, Nolden noted.

"Beverages with carbonation such as beer, soda and seltzer water predictably performed poorly at reducing the burn of capsaicin," she said. "And if the beer tested would have contained alcohol, it would have been even worse because ethanol amplifies the sensation."

In the case of Kool-Aid, Nolden and her colleagues do not think that the

drink removes the capsaicin but rather overwhelms it with a sensation of sweet.

The study was novel, Nolden believes, because it incorporated products found on food-market shelves, making it more user friendly.

"Traditionally, in our work, we use capsaicin and water for research like this, but we wanted to use something more realistic and applicable to consumers, so we chose spicy Bloody Mary mix," she said. "That is what I think was really cool about this project—all the test beverages are commercially available, too."

Provided by Pennsylvania State University

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