Press Release

For Immediate Release

STUDY REVEALS ALUMINUM BEVERAGE BOTTLES HAVE SURPRISING INSULATING ABILITY COMPARED TO GLASS

The study was independently conducted. The thermocouples used were carefully calibrated. The results, however, may place the entire beverage industry in thermodynamic shock.

According to the findings of a study conducted by undergraduate engineering science students at Loyola College in Maryland, the liquid content of aluminum bottles stays slightly colder than the liquid content of glass bottles when allowed to warm to room temperature.

Why is "slightly colder" such a big deal? Because aluminum is normally thought of as a good conductor while glass as an insulator. In fact, the thermal conductivity of aluminum is over 100 times greater than that of glass.

In an unrelated study commissioned in 2004 by The Absolut Spirits Company, in association with its aluminum-bottled Danzka brand hitting the market, aluminum bottles were found to chill faster.

This latest study implies that aluminum bottles defy logic and essentially behave like glass when it comes to keeping beverages cold.

Of course, there is a scientific explanation for the interesting results, according to Professor Wayne Elban, a 21-year veteran of Loyola's Department of Engineering Science. Whatever the explanation, the results are on paper for all to see. According to Professor Elban, "The students have agreed to make their data available to anyone who wants to take a look. And we're open to explanation and interpretation from both the beverage and the scientific communities."

The study itself was performed by five students as part of the laboratory requirement for their junior experimental methods course. Natasha Epps, Caitlin Hogan, Amanda Levinson, Tom Scida and David Wright worked with commercially available bottles of identical content capacity: one impact-extruded aluminum bottle supplied by CCL Container, and the other an amber soda-lime glass bottle.

The identical thermocouples used to measure temperature change over time were calibrated using an ice-water bath. Both bottles were filled with 355mm (12 oz.) of water and cooled overnight to about 6 degrees Centigrade. The thermocouples were suspended at the same depth in the radial center of each bottle.

About two and one-half hours later, the water in the glass bottle registered the study's end point of 20.9 degrees Centigrade versus 20.2 degrees Centigrade for the water in the aluminum bottle. However while the aluminum bottle gives measurably better insulating performance, the difference is so small that the responses are the same within measurement uncertainty.

When asked whether he was surprised by his students' data, Professor Elban said, "I conducted this same experiment myself on three different occasions last summer after aluminum bottles first came to my attention, and obtained readings in the same hierarchy within one-half to one degree each time. To me, the results of this student work are reassuring."

Professor Elban received his PhD in Applied Sciences (Metallurgy) from the University of Delaware, where he also earned a Bachelor of Chemical Engineering. Elban earned his MS (Engineering Materials) from the University of Maryland and has a longstanding interest in the behavior of metals as well as other materials.

"My interest in this phenomenon was peaked by a news radio report on WBAL here in Baltimore," explained Professor Elban. "The story was about a brewery that discovered that its beer stayed cool longer in aluminum bottles compared to glass. However, we opted to forgo the beer and work with water here on a college campus."

Are more "cool, longer" studies in the offing at Loyola? "Dr. Rob Bailey, a newly hired mechanical engineering professor, has begun a heat transfer modeling study in an effort to come up with an explanation for this counter-intuitive behavior," says Elban.

Meanwhile, the battle between aluminum and glass bottles continues to heat up, even though it doesn't seem to make much difference as to their contents.

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