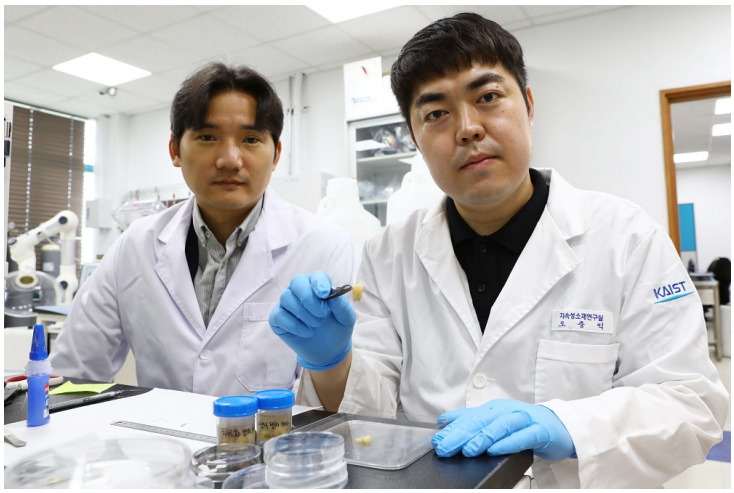
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Korea reveals nanoscale dental erosion from beverage consumption

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AFM is a very-high-resolution type of scanning probe microscopy (SPM), with demonstrated resolution on the order of fractions of a nanometer (nm) that is equal to one billionth of a meter. AFM generates images by scanning a small cantilever over the surface of a sample, and this can precisely measure the structure and mechanical properties of the sample, such as surface roughness and elastic modulus.

The co-lead authors of the study, Dr. Panpan Li and Dr. Chungik Oh, chose three commercially available popular beverages, Coca-Cola®, Sprite®, and Minute Maid® orange juice, and immersed tooth enamel in these drinks over time to analyze their impacts on human teeth and monitor the etching process on tooth enamel.

The researchers observed that the surface roughness of the tooth enamel increased significantly as the immersion time increased, while the elastic modulus of the enamel surface decreased drastically.

It was demonstrated that the enamel surface roughened five times more when it was immersed in beverages for 10 minutes, and that the elastic modulus of tooth enamel was five times lower after five minutes in the drinks.

Additionally, the research team found preferential etching in scratched tooth enamel. Brushing your teeth too hard and toothpastes with polishing particles that are advertised to remove dental biofilms can cause scratches on the enamel surface, which can be preferential sites for etching, the study revealed.

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