

# Red wine may hold the key to next-gen wearable technology

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A team of scientists are seeking to kick-start a wearable technology revolution by creating flexible fibres and adding acids from red wine.

Extracting [tannic acid](#) from red wine, coffee or [black tea](#), led a team of scientists from the University of Manchester to develop much more durable and flexible [wearable](#) devices. The addition of tannins improved mechanical properties of materials such as cotton to develop wearable sensors for rehabilitation monitoring, drastically increasing the devices lifespan.

The team have developed wearable devices such as capacitive breath sensors and artificial hands for [extreme conditions](#) by improving the durability of flexible sensors. Previously, wearable technology has been subject to fail after repeated bending and folding which can interrupt the conductivity of such devices due to tiny micro cracks. Improving this could open the door to more long-lasting integrated technology.

Dr. Xuqing Liu who led the research team said: "We are using this method to develop new flexible, breathable, wearable devices. The main research objective of our group is to develop comfortable wearable devices for flexible human-machine interface.

"Traditional conductive material suffers from weak bonding to the fibers which can result in low conductivity. When red wine, or coffee, or black tea, is sprinkled on dress, it will be difficult to get rid of these stains. The main reason is that they all contain tannic acid, which can firmly adsorb the material on the surface of the fiber. This good adhesion is exactly what we need for durable wearable, conductive devices."

The new research published in the journal *Small* demonstrated that without this layer of tannic acid, the conductivity is several hundred times, or even thousands of times, less than traditional conductive material samples as the conductive coating becomes easily detached from the textile surface through repeated bending and flexing.

The team used commercially available tannins but also tried to immerse

the fabric directly in [red wine](#), black tea and black coffee solutions where they saw the same results. The overall impact of this new method could see a reduction in price for wearable technology along with improvements in comfort and robustness.

The improved conductivity using [natural sources](#) can allow technology developers to use more comfortable fabrics, such as cotton, to replace nylon, which is stiff and uncomfortable. The [technology](#) can also allow for circuits to be printed directly on to the surface of clothing to make a comfortable, flexible circuit board.

Due to the strong adsorption of tannic acid, the surface conductive coating has good durability, and the developed wearable devices maintain excellent performance after bending, folding and stretching.

**More information:** Chuang Zhu et al. A Nature-Inspired, Flexible Substrate Strategy for Future Wearable Electronics, *Small* (2019). [DOI: 10.1002/sml.201902440](#)

Provided by University of Manchester

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