PORTABLE DEVICE INVENTED FOR DRINKING WATER MONITORING

In Singapore, scientists have invented a handheld device for quick monitoring of drinking water quality.

Scientists from Nanyang Technological University, Singapore (NTU Singapore) have developed a portable device, inspired by the ability of the human body, to detect trace levels of heavy metals in drinking water in five minutes.

According to Phys.org, the secret lies in an organic substance within the circulating human bloodstream, called a chelating agent, which can detect and bind to heavy metal ions. After binding, it prevents the heavy metal ions from interacting with other molecules and enzymes in the body, and marks it for excretion from the body.

Associate Professor Yong Ken-Tye and Professor Tjin Swee Chuan from the School of Electrical and Electronic Engineering at NTU Singapore developed a device that generates test results quickly without needing to bring samples back, making the device convenient for on-site water testing, according to Phys.org. It also could be integrated into appliances for domestic use, such as water filtration systems.

Drinking water quality is usually monitored via laboratory tests as heavy metals cannot be identified by color, taste, or odor, unless present at high levels. According to Phys.org, lab tests take at least a day to complete.

According to Phys.org, there are some portable devices that can detect heavy metal contaminants quickly, but may require the additional step of mixing the water sample with a buffer solution before the test can be performed. The sensor for these
kits has to be used within 30 minutes after it is exposed to air, as the effectiveness of the sensor can be affected by air, heat, or humidity.

Other mobile alternatives include those that use metal electrodes such as mercury as a sensing probe, which could introduce heavy metal contaminants back into the environment, and test strips that change color when they come into contact with heavy metals but lead to results that rely on subjective readings of the strip, according to Phys.org.

The NTU invention reported in a paper published in the scientific journal ACS Sensors works in the field and requires a few drops of a water sample into a disposable sensor cartridge to detect heavy metals at parts-per-billion precision.