Creating chemical sensors to catch drug-drivers

The University of Oxford's chemistry department leads the way in electrochemical sensors that can be used to detect the presence of drugs in saliva samples – or even measure how hot chillies are.

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It is difficult to say how widespread the problem of drug-driving is because, until now, there has been no reliable method of testing for the presence of drugs in a person's system at the roadside. But chemists at the University of Oxford have developed a simple test that could help.

Professor Richard Compton's research group has created a device which uses electrochemical processes to detect the presence of drugs. All that is needed is a saliva sample which is placed in the device. The drug present in the sample reacts with the coating on the sensor, providing a measurable current proportional to the concentration of drug present.

The detector is quick, easy to use and incredibly reliable. These factors combined helped to secure the device's place as the forerunner amongst its competitors in a recent study by the UK Home Office. That makes it a likely choice for use by the police in the near future.

So far, the team have developed sensors capable of detecting cannabis from just a 3mm diameter dot of saliva. They have plans to extend the technology, and a sensor capable of detecting amphetamines is already in the pipeline. In fact, the work, now being developed by spin-out company OxTox, currently boasts six patents at various stages of application.

The group does not just produce sensors capable of detecting drugs, recently they produced a sensor capable of measuring how hot chillies are. Molecules of capsaicin, the compound that gives chillies their heat, stick to a sensor covered in carbon nanotubes. The more that stick, the stronger the signal, and the hotter the chilli.

Crucially, the sensor agrees with the previous gold-standard measurement – a panel of taste testers. The technology has received a positive reaction throughout the food industry, and even leading the group to devise a similar sensor to measure the strength of garlic.

'An exciting aspect of the electrochemical sensors being developed by Richard Compton's group is the ability to make them as hand-held devices. This makes them very useful for point-of-need applications such as in clinics and road-side detection, and they are easily operated by non-technical personnel.'

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