

# Chemists devise new approach for rapidly identifying 'legal highs'

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Chemists from Queen's University Belfast have developed a new approach which now allows for rapid screening and identification of 'legal highs' or novel psychoactive substances (NPS).

Conducted by researchers in Queen's School of Chemistry and Chemical Engineering, in conjunction with Forensic Science Northern Ireland, the project was funded by the Department of Justice's Asset Recovery Community Scheme which uses assets seized from criminals.

Published in the Royal Society of Chemistry's journal, *Analyst*, the new approach will now enable statutory agencies to identify the actual substances contained within the [legal highs](#) more quickly, thereby enabling more prompt public health messages to be issued out to communities.

In addition, as well as allowing agencies to build a comprehensive and 'live' picture of which drugs are currently in circulation, it is envisaged that the new rapid identification approach will also help speed up related criminal prosecutions.

## Background

'Legal highs' are substances used like illegal drugs, and have been responsible for a growing number of deaths in the UK over the last decade.

Known as 'legal highs' because when first produced they were not covered by existing drugs legislation, they are now set to face a total ban from 6 April 2016, when the UK government's new Psychoactive Substances Act, comes into force. The ban covers (with the exception of a number of listed compounds such as alcohol, caffeine, etc.), 'any substance intended for human consumption that is capable of producing a psychoactive effect', with those caught producing or supplying such drugs facing a maximum prison sentence of seven years.

## New approach

Devised by Professor Steven Bell and PhD researcher Louise Jones in Queen's School of Chemistry and Chemical Engineering, the new approach combines rapid screening for known drugs with in-depth analysis of new compounds. The screening works by detecting the characteristic vibrations of the bonds within the samples by focusing a laser on the sample and measuring the energy of light scattering from it.

The vibrations are chemical signatures of the compounds, so when they have been recorded, they can be searched against a 'library' of known compounds. They are then either identified as known compounds or marked as new variants which can then be taken for further analysis in the laboratory.

In the Queen's study, 75 per cent of more than 200 previously samples seized by the PSNI, could be identified immediately. In the future, it is hoped that this will allow for laboratory facilities to be freed up for in-depth investigation of those compounds identified as new and unknown.

Speaking about the work, Professor Steven Bell, said: "The production of these drugs is constantly evolving and unfortunately there have been many instances of highly dangerous variants appearing, causing multiple fatalities before the threat they posed was recognised.

"In 2014 alone 101 new [psychoactive substances](#) were identified. As a result of the new approach devised at Queen's, we predict that we will be able to identify many more substances and at a much more rapid pace as our work in this area progresses. This will not only aid in the creation of new legislation but will also enable more meaningful information to be available to the Community, Police and Public Health agencies, with the aim of saving lives and preventing serious

injury."

### **Impact**

Praising the work to date on the new approach, Justice Minister David Ford said: "The importance of this valuable work cannot be overstated. Legal highs continue to be a major problem on our streets and because so many compounds are available, it is very hard to keep ahead of those producing them.

"Whilst there's still work to do, this research will help Forensic Science Northern Ireland to identify what's in these legal highs more quickly, enabling them to identify substances and get public health messages out to communities. It is also very satisfying that this work is funded by the Asset Recovery Community Scheme which uses the assets seized from criminals to support projects aimed at preventing crime."

Stan Brown, Chief Executive of Forensic Science Northern Ireland, added: "This rapid screening will speed up the routine front-end processes of drugs analysis in Forensic Science Northern Ireland. It makes for earlier detection of previously unknown substances which in turn speeds up the processes of declaring such substances psychoactive and therefore illegal under the new NPS legislation."

Speaking about how the new technique could impact on the streets, Inspector Robert Murdie, PSNI, said: "By quickly identifying the substance we will be able to use new powers to tackle NPS production, supply and importation, enabling us to move further up the criminal food chain and prevent such potentially dangerous substances being offered for sale.

"Police will continue to address and confront this threat through a range of tactics and every available legislative opportunity but the drug and NPS problem can only be solved by working collaboratively with our colleagues across the health, judiciary, expert research and local communities.

"I would ask anyone who is aware of any individual involved in the supply of drugs or NPS to contact

their local police on 101. Information can also be passed anonymously to the independent charity Crimestoppers on 0800 555 111."

Owen O'Neill, the Public Health Agency's Lead on Drugs and Alcohol, said: "The PHA welcomes this initiative. Novel Psychoactive Substances pose a real threat to the health and well-being of our population. Services working with users of these substances report that these substances often cause very acute reactions presenting a real risk to life. This initiative will help further our understanding of these risks and ensure that users of these substances are well informed about the risks."

The next stage of the work will be to begin work on live casework samples.

Provided by Queen's University

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