

Problem of fake medicines in developing countries could be solved

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Counterfeiting of drugs is a huge industry with an annual turnover of more than SEK 500 billion. In Africa the situation is extremely serious. Half of the malaria medication sold there could be ineffective or even harmful. Researchers from Lund and the UK have now developed a technique that could resolve the situation.

In two years the researchers hope to have a prototype ready. It will resemble a small briefcase, in which a pharmacist, customs officer or pharmaceuticals agent can place a packet of tablets, without having to open the packet. After a minute or so the device indicates whether or not the medicine is fake.

"There are a number of advantages to this technique. It is not only reliable but also simple and cheap, which is a prerequisite if it is to be successfully put into use in developing countries", comments Andreas Jakobsson, Professor in Mathematical Statistics at Lund University and one of the researchers on the project.

The technique has its origins in the research that Andreas Jakobsson's Swedish and British colleagues usually conduct: detection of bombs and explosives. The researchers have been called on by HM Revenue and Customs in the UK to detect explosives at Heathrow Airport.

The research is based on a technique known as nuclear magnetic resonance. By exposing a substance to radio waves, the spin of the atom nuclei changes briefly. When the radio pulse is over and the resonance

returns to normal, a weak signal, unique to each substance, is emitted. In this way, the researchers can usually work out what chemical substances are hiding in the material.

Researchers have long known that it should also be possible to use this technique to trace [counterfeit drugs](#), but it has not been sufficiently well developed for this purpose. However, a recent breakthrough in the Swedish-British research group's work has changed that. Now they can also find out if a certain drug actually contains the active ingredient that the packaging claims.

"The signals that are emitted from a chemical substance are incredibly weak! But we have succeeded in developing mathematical algorithms which allow us to capture them. We have also managed to filter out interference from metals, for example, which are often found both in explosives and in the protective packaging around tablets", explains Andreas Jakobsson.

Professor Jakobsson and his Swedish colleague Erik Gudmundson are responsible for the mathematical calculations, while their colleagues at King's College London are responsible for the chemical experiments and the development of the equipment.

The researchers were recently awarded funding from the Wellcome Trust to develop a prototype. The Swedish research group is also funded by the Swedish Research Council and the Carl Trygger Foundation.

Counterfeit drugs are usually manufactured in factories in China and India and sold by the mafia and other criminal organisations. At best the drug only contains harmless binders.

However, sometimes the manufacturers add rat poison or other cheap but harmful substances that can easily be formed into tablets. Some

contain a weak dose of the active ingredient, which can be particularly harmful in the case of penicillin, for example, when it is important to ensure that all the bacteria are killed.

Some counterfeit products work, but entail a loss of revenue for pharmaceutical companies. Even if the problem is greatest in [developing countries](#) (in India, it is estimated that 15% per cent of all drugs are fake), counterfeit drugs are also found in Europe. Most of the drugs that can be purchased on the Internet are counterfeit.

Provided by Swedish Research Council

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