

# Chemists develop new approach to detect counterfeit medicines such as Viagra

May 21, 2014, University of Montreal



Researchers at the University of Montreal have developed an improved chemical analysis method that is more efficient and faster in detecting counterfeit medicines, which have skyrocketed in recent years. The method was developed and tested in a study by Philippe Lebel, Alexandra Furtos and Karen Waldron of the university's Department of Chemistry. It identifies and quantifies the various compounds present in a pharmaceutical product, in a fifth of the time it takes governmental services to do the same job. "Fake drugs are a scourge for public health," says Lebel. Once a simple artisanal activity, counterfeiting has become a global industry linked to organized crime and the mafia. "According to the World Health Organization, worldwide sales of counterfeit medicines reached \$75 billion in 2010. Sildenafil citrate, better known by its trade name, Viagra, and the two other erectile dysfunction drugs, Cialis and Levitra, are among the most counterfeited drugs in the world."

It is not a coincidence. Men who suffer from erectile problems often have difficulty talking about it with their doctor. "On the Internet, they don't have to consult a professional or have embarrassing conversations," says Furtos. "It also costs much less: \$1 per tablet compared to \$15 for the real deal."

However, buying prescription drugs online exposes the buyer to potentially serious health risks. "These drugs are often manufactured in garages with poor sanitation. They can be dosed less, even devoid of the active ingredient," Waldron says. "Worse, they can contain a different substance that can cause undesirable side effects."

In 2008, in Singapore, 150 patients were hospitalized with severe hypoglycemia caused by a sudden drop in blood sugar. Four died and seven suffered brain damage. They had taken counterfeit erection-inducing drugs that contained glyburide, a [drug](#) to treat diabetes. "The number of deaths from [counterfeit drugs](#) is unknown," Waldron says, "but given the scale of the trade, the risks are considerable."

Faced with this potential danger, the researchers decided to unite their efforts to improve detection systems.

## A better method

Between September 2012 and June 2013, at the University of Montreal's Mass Spectrometry Laboratory, using highly specialized equipment, Lebel developed an analytical method to detect the 80 substances that may be substituted for the active ingredients in the three erectile dysfunction drugs on the market: Viagra, Cialis, and Levitra. Thirty pharmaceutical and natural products, some of which were seized at the Canadian border, were then analyzed to test and prove the potential of the new method.

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"Our approach does not only target a medication's active ingredient," says Furtos. "Rather, using a scanning technique, it also detects non-targeted compounds, some of them new synthetic analogs of the [active ingredient](#). This is the originality of the method."

The results of the study, which were recently published in the *Journal of Chromatography*, reveal that the University of Montreal analyses match those previously conducted by Health Canada using the older method. While it is therefore possible to tell whether a product is counterfeit or not using either method, the researchers' technique is much more efficient. "Our analysis takes ten minutes, whereas previously, it took up to fifty," says Lebel. "In addition, our method identifies compounds that were not identified before, even in low concentrations."

Another sign that their approach is promising is that Health Canada has already incorporated it in its counterfeit monitoring process. It could even serve as a model for the rest of the world in the anti-counterfeiting and anti-doping battle.

### Awareness above all

The threat of counterfeit pharmaceuticals is not new. But the growth of e-commerce has flooded the market with a wide range of both brand name and generic drugs.

Note, generics are not counterfeit products. They are copies of drugs whose formulas have become part of the public domain. They are subject to the same safety and quality control regulations as brand name drugs.

"The problem comes from the sale of [prescription drugs](#) outside pharmacies," notes Lebel. "There is no information on the actual origin of these products, their storage conditions, their composition, their dosages, or their toxicity, for example."

Asia and India take the lion's share of the counterfeit drug trade. But there is counterfeiting all over the world, and counterfeiters have been extremely creative in imitating products and avoiding detection. "Customs officials often find them hidden in plush toys, [natural products](#), or rice cookers," notes Furtos.

People do not necessarily realize that the medicine they purchased online is counterfeit because the packaging and appearance are often similar to the genuine product. But the tablets received are anything but genuine. A Dutch study cited by the *International Journal of Clinical Practice* in 2009 found that of 370 samples of Viagra seized, only 10 were genuine.

"Our method can identify [counterfeit medicines](#) more quickly and efficiently, but safety must begin with public awareness," says Waldron.

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