

Simple new test to combat counterfeit drug problem in developing countries

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In a thrust against the major problem of counterfeit medicines sold in developing countries, which causes thousands of illnesses and deaths annually, scientists today described development of a simple, paper-strip test that people could use to identify counterfeit versions of one of the most-frequently faked medicines in the world.

Their report on an inexpensive test to identify fake tablets of Panadol was presented here at the 244th National Meeting & Exposition of the American Chemical Society, the world's largest scientific society.

Panadol is one of multiple brand names used abroad for the pain-and-fever-reliever acetaminophen, most familiar in the U.S. as Tylenol. The scientists emphasized that no such problem exists with Tylenol or other acetaminophen products marketed in the U.S.

However, Toni L. O. Barstis, Ph.D., a chemistry professor and leader of the research team at Saint Mary's College in Notre Dame, Ind., said that ersatz Panadol and other counterfeit brand-name acetaminophen products are the tip of the iceberg in a wider problem of fake drugs sold in developing countries.

"Panadol long has been among the most common, standard pain-relieving drugs counterfeited around the world," Barstis said. "But the problem has taken on a troubling new dimension. In the past, you could just look at the labeling and packaging and know if it was counterfeit. Now, they do such a good job with the package design it's hard to determine whether it's a package of the genuine medicine or a fake that contains no acetaminophen or even ingredients that may be harmful."

The World Health Organization estimates that at least 10 percent of the drug supply in developing countries consists of counterfeit medicines, causing thousands of deaths every year. Problems

have been documented, for instance, in Kenya, Nigeria, India, Vietnam and Panama. Many of the deaths occur among people who unknowingly take counterfeit antibiotics and anti-malaria medicines that do not contain the active ingredient to combat those diseases. In addition to lacking the active ingredient, [counterfeit medicines](#) may harm people by containing ingredients that are potentially toxic. Officials blame crime rings, which profit from selling at full-price pills that contain plaster of Paris, baking soda or other inexpensive ingredients.

Compounding the problem, Barstis explained, is the difficulty in testing medications for authenticity. In some instances, it may take 3-6 months to test a batch of suspect drugs because the testing is usually done in Europe or the U.S. Barstis' team responded to that situation with the new test for Panadol, which takes less than 10 minutes, can be done by consumers and also can be used by personnel in government regulatory agencies, clinics and hospitals.

The test consists of chemically treated paper the size of a business card. To check for counterfeit ingredients, a person simply swipes the pill over the paper and dips the paper in water. Color changes on the paper indicate suspicious ingredients. Barstis validated the test on 570 pills, including many with fake ingredients added by researchers. The College has applied for a patent for the test.

Barstis' team now is developing a similar test to identify counterfeit antibiotics, anti-malaria drugs, and Tamiflu, the influenza medication. The team works in collaboration with chemistry, biochemistry, computer science and industrial design teams at the University of Notre Dame, Ind.

Abstract

Low-quality pills pose a major health threat in [developing countries](#) where analytical resources are scarce. Panadol (known as Tylenol in the

United States) is a commonly counterfeited analgesic, having little or no active ingredient or fake incorrect excipients such as baking soda or chalk. Using simple, colorimetric chemistry on a paper-based device, undergraduates at Saint Mary's College (Notre Dame, IN) have developed a low-tech method that accurately detects adulterated Panadol pills. Many life-saving medicines are adulterated with similar excipients, and Panadol's active ingredient itself is a counterfeit component in these medicines. For this reason, the device which detects Panadol is the starting point for screening other drugs such as antimalarials and antibiotics. Over 500 field trials were completed during spring 2012 in order to validate the devices for use overseas in summer 2012. Speakers will discuss the development of the devices, as well as the process and results of the validation study.

Provided by American Chemical Society

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