K12 Putting an Ecstasy Test Kit to the Test

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The learning objective of this presentation is to evaluate the reliability of the DanceSafe™ Ecstasy Testing Kit.

There has been a significant rise in the use of the club drug MDMA (3,4-methylenedioxymethamphetamine), or Ecstasy, over the past few years. Coupled with this increase in use is a rise in emergency room visits and deaths attributed to the drug. Unfortunately, many Ecstasy users feel that MDMA is a safe drug and that the problems associated with its use primarily result from contamination with other chemicals or wholesale substitution of MDMA with more dangerous drugs. As a result of this widespread belief and the media attention in the U.S., there is an ongoing effort among harm reduction organizations to provide colorimetric test kits to differentiate between substituted and authentic Ecstasy. Until recently, these kits consisted only of the Marquis reagent, a reagent routinely used by law enforcement agencies and crime laboratories. In an attempt to resolve the ambiguity in interpreting results when using the Marquis reagent as a single test, some organizations such as DanceSafe™ (www.dancesafe.org), have recently updated their test kit by adding two additional colorimetric tests, the Mecke and Simon's reagents.

As with most colorimetric methods, the interpretation of these qualitative tests is highly subjective. The danger here is two-fold. First, the users of the test are typically young and generally inexperienced with the testing procedures. Second, the tests themselves cannot reliably differentiate MDMA from other chemically-related phenethylamines, as well as other drugs.

The MDMA test kits containing the Marquis, Mecke, and Simon's reagents were purchased from DanceSafe and evaluated in a controlled laboratory setting utilizing three independent analysts. Thirty-nine tablets obtained for this portion of the study were street-grade Ecstasy tablets currently held as evidence in cleared cases from the Alachua County (Florida) Sheriff's Office and from the Forensic Toxicology Laboratory at the University of Florida. Using the instructions provided by DanceSafe, the Marquis reagent was judged alone and in combination with the Mecke and Simon's reagents. The identities of the tablets were confirmed by gas chromatography/mass spectrometry (GC/MS) operated in full-scan mode.

All three analysts generally agreed on the final identity of the tablets, although they did not agree on the colors observed. Two testers recorded four negative results, and one tester recorded 3 negative results, and 1 weakly positive result. Based upon GC/MS analysis, all 35 positive samples contained MDMA; however 8 were adulterated with other drugs including caffeine, ephedrine/pseudoephedrine, amphetamine, diazepam, and paramethoxymethamphetamine (PMMA). The four samples that tested negative were identified by GC/MS as alprazolam, ephedrine/pseudoephedrine with guaifenesin, ephedrine/pseudoephedrine with caffeine, and a tablet containing no identifiable drug (considered weakly positive by one tester).

Because the tablets held in evidence were known to contain controlled substances, and hence represented a biased selection, a follow-up evaluation was conducted. This part of the study consisted of two testers who were professionals knowledgeable in the field of toxicology, but inexperienced with the practical use of test kits. The testers were given the DanceSafe Test Kit and eight blinded samples. When tested, samples containing codeine, dextromethorphan, dihydrocodeine, ketamine, MDMA (2 each), morphine and d-norpropoxyphene produced many false positive and false negative results.

In addition to the disagreement between testers' conclusions and the inadequacy of the test results themselves, participants in all tests noted numerous problems with the kits. These problems included the inconsistency between the color charts provided in the instruction booklet and the actual colors observed during testing, the variation in the intensity of the color changes, and the variation in the rate of the reactions. It is also important to correlate these findings with the reality that these tests were designed for untrained personnel in an uncontrolled environment. Some potential issues include the lack of control samples provided for comparison, the lack of optimal lighting, the ambiguity in the written directions provided with the kits, the mental state of the user when reading the tests, the leakage of the cap seals after use, and the unpredictable drop times often leading to impatience and chemical spills. The latter issue creates an obvious danger from the reagents themselves because each one contains toxic and/or corrosive substance(s). Finally, accidental mixing of the reagents can be extremely hazardous.

In conclusion, these color tests are inadequate for use as harm reduction tools, especially in the hands of inexperienced users. If the goal of harm reduction is to reduce or minimize the risks associated with drug use, on no occasion in this study did the findings lead to avoidance of a contaminated drug. These tests have the potential to provide a false sense of security, encouraging the consumption of tablets whose composition is in question. There are potential consequences of ingesting a preparation containing a toxic ingredient, yet thought to be "pure" MDMA. Further, occasions occurred where the test reagents themselves caused injury to the tester or damage to the surroundings. While these types of tests may have a place in the hands of experienced personnel for forensic purposes, a decision on whether or not to ingest a tablet should not be made solely on the basis of these tests.

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