

Drugwipe II

A Tool for the Community Corrections Officer Illegal Narcotics Detection and Identification on Surfaces, in Saliva in Sweat (Short term and Longer Term).

Robert McCullough

Lycoming County Probation Dept.
43 West Third St., Williamsport, PA 17701, USA
Tel: (570) 327-2391, Fax: (570) 327-2287, Email: Robert_W._McCullough@lyco.org

Sherry Bender

AFFINITON
460 Market St., #301, Williamsport, PA17701, USA
Tel.: (570) 327-6112, Fax: (570) 327-1966, Email: sbender@affiniton.com

Dr. Franz Aberl, Rudolf Zimmermann, Robert VanDine

Securetec Detektions-systeme AG, Rosenheimer Landstr. 129, D-85521 Ottobrunn
Tel.: +49/89-627 896 60, Fax: +49/89-627 896 52, Email: Aberl@Securetec.net

1. Introduction

Drugwipe is a pen-size device for the identification of invisible traces of illegal narcotics on surfaces. It is available for the detection of Cocaine, Opiates, Cannabinoids and Amphetamines/Methamphetamines/Ecstasy.

In 1996 the Drugwipe was evaluated by the ONDCP/CTAC with respect to its accuracy, sensitivity and specificity to detect invisible traces of narcotics on surfaces [1]. Having established a very high reliability, the Drugwipe is now in use by U.S. Customs Service as well as by State and Local Law Enforcement Units for surface, sweat, and/or saliva testing.

In 2002 a novel Drugwipe II generation became available. This improved product line provides the additional capability that it can be used at the roadside for the identification of drivers under the influence of drugs, as well as improved sensitivity levels (see Fig. 1 below).

DRUGWIPE Type	DRUGWIPE I (in ng/ml)	DRUGWIPE II (in ng/ml)
Cannabis delta-9THC	1000	30
Cocaine Cocaine	200	50
Opiates Heroin Morphine	200	20 20
Amphetamines d-Amphetamin MDMA d-Methamphetamin MDA MDE	300 200 200 200 750	200 100 100 100 500

2. The Drugwipe Concept

Drugwipe was originally designed for trace detection purposes and drug search. The major user groups initially were customs service and drug enforcement units all over the world. In the United States the Drugwipe kit was evaluated in 1996 by ONDCP/CTAC. In this test campaign sensitivity was proven to be in the low nanogram range with no false positives.

Figure 2 shows the Drugwipe components.

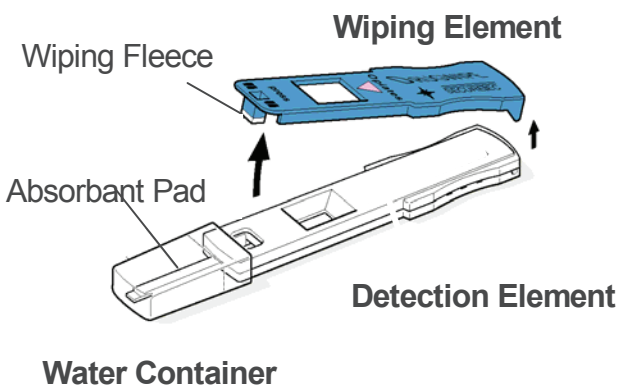


Figure 2: Drugwipe components

The wiping element is designed for taking samples from various surfaces like the skin, the tongue or the mucous membrane inside the cheek. The sample is transferred to a lateral flow immunoassay strip mounted in the detection element by reassembling the wiping and the detection element. Drugwipe is able to analyse a sweat or saliva volume of less than 10 μl . A significant percent of those drug consumers abusing designer drugs or Cannabis suffer from a “dry mouth” and are not able to produce enough saliva to be tested by most other existing devices.

To perform the analysis the Drugwipe absorbent pad is dipped into tap water. For this a water container is included in the Drugwipe kit. The result appears after 3 to 10 minutes in the read out window in the form of 1 (negative) or two (positive result) red lines.

3. Sweat and Saliva Testing with Drugwipe Amphetamine

3.1. Study Concept

In winter 2002/2003 Drugwipe II Amphetamine was evaluated by the Institute for Legal Medicine of the University of Munich, Germany concerning its analytical criteria (sensitivity, specificity and accuracy) [2].

The traffic police in Munich selected suspicious drivers from the street traffic based on external signs. Drivers who were classified as suspicious were brought to the Institute for Legal Medicine for a blood sample. In parallel to the process of taking a blood sample Drugwipe was applied for testing sweat from the forehead and from inside the palm of the hand. Saliva was collected directly from the tongue and analysed with Drugwipe. All Drugwipe tests have been applied on a voluntary basis. All volunteers were tested 3 times (2 sweat and 1 saliva tests).

Finally the blood status was correlated with the results of the Drugwipe tests.

3.2. Results

Figure 3 summarizes the results of the study described in section 3.1. Between 76 and 80 persons have been tested with Drugwipe and approximately 30 percent of the tested population were positive in the blood for Amphetamines or Ecstasy. 70 percent were Amphetamine free.

The accuracy of the Drugwipe Amphetamines is in the range of 92 to 97 percent depending on the specimen and the sample location. Specificity is between 89 and 96 percent whereas sensitivity is always 100 percent indicating that Drugwipe Amphetamines is sensitive enough for sweat and saliva testing.

3.3. Discussion

Accuracy in the context of this study means how reliable is Drugwipe Amphetamines in predicting the blood status of a suspicious driver. Specificity means the percentage of drivers negative for Amphetamines or

Methamphetamines(XTC) in the blood which is indicated by Drugwipe correctly. Sensitivity is the percentage of correct positives in relation to all positives.

In this study the best accuracy and specificity were achieved when testing sweat from inside the palm of the hand. Sweat from the forehead is nearly equal in terms of accuracy and specificity but not as good as taking and analysing the sweat from inside the palm of the hand.

Most scientists would anticipate that the inner palm of the hand is more prone to contamination than the forehead. This is obviously not the case, because results from inside the palm of the hand demonstrate the highest accuracy and specificity.

Despite the scientific opinion that saliva is a better option than sweat, the results from this study do not support this thesis.

Specimen	Sampling Location		Accuracy	Sensitivity	Specificity		Number of cases
			in percent				
Sweat/Skin	Forehead		92	100	89		80
	Inside the palm		97	100	96		76
Saliva	Tongue		94	100	91		78

Figure 3: Accuracy, Sensitivity and Specificity of the Drugwipe results in relation to the blood status of drivers suspicious for driving under the influence of drugs

4. Field Evaluation of Drugwipe Cannabis

The traffic police in Germany has evaluated and introduced Drugwipe I especially for roadside sweat testing [3]. Due to the importance of Cannabis abuse in street traffic the Drugwipe II for Cannabis has been field evaluated by the German traffic police in 2002.

The traffic police in Baden-Württemberg has equipped 6 police units with the new Drugwipe Cannabis. Police officers working with Drugwipe were trained in the recognition of driving under the influence and the handling and interpretation of Drugwipe II. Drugwipe Cannabis was applied as screening test in the field (at the roadside) to confirm or contradict the officers initial suspicion. Screening results were compared with the later result of the analysis of the corresponding blood sample from the laboratory.

Approximately 80 persons were tested with Drugwipe Cannabis for recent consumption. The overall accuracy was sufficient to introduce Drugwipe Cannabis as a roadside screening device for Cannabis abuse [4]

Lower Saxonia introduced Drugwipe II including the Drugwipe II for Cannabis in the same year on a state wide basis. Drug recognition experts were trained in the usage and specific innovations of Drugwipe II. In the first phase data from the field were collected and evaluated to prove the efficiency of the Drugwipe II as a roadside screening device.

Based on the experiences in Baden-Württemberg, Saxonia, Berlin and Lower Saxonia additional German States have decided to introduce Drugwipe as roadside screening device.

5. Community Corrections Officers - Needs and requirements

The duties of the community corrections officer stretch from peace officer to investigator, supervisor to counsellor, which leaves little room for additional duties, let alone the duty of drug test administrator.

The need for drug testing within the area of community corrections is all too real and necessary. Many agencies are now open to alternative methods of drug detection.

The following list of needs and requirements reflects the situation in the majority of community corrections agencies:

- **A non-gender specific test.**
▶ Officers need to eliminate ‘same sex’ issues.
- **Portable.**
▶ Test must be easy to carry and use in field operations.
- **Sanitary and non-invasive.**
▶ No body fluids to collect.
- **Tamper proof.**
▶ Eliminate common adulterants.
- **On-site results.**
▶ Immediate results means immediate action can be taken.
- **Legally defensible.**
▶ Training and certification for court purposes provided.
- **Early detection**
Measures can be taken for early intervention.
- **Safe.**
▶ Testing requires little or no cooperation from client.
- **Accurate.**
▶ Reduce false positives and/or false negatives).

6. DrugWipe Experience in Community Corrections

Unlike many urine tests, there are no known adulterants to the Drugwipe test. Even if clients 'flush' their system with the products which can be purchased or ordered over the Internet, Drugwipe will not be affected by such activities or means of adulteration.

To date, Drugwipe is being utilized in 20 counties throughout the state of Pennsylvania, as well as several counties in California, Colorado, and Texas. The majority of these probation agencies are testing their clients using one of three testing methods:

Sweat:

- 1) Short-Term On-Site Sweat Test: By wiping Drugwipe across the forehead or inside the palm of the hand, an officer can detect recent drug use/consumption (see Fig. 4).
- 2) Long-Term Monitoring Method: The client wears a 'patch' on the upper arm, upper back, or midriff area for a period of 3-10 days, followed by testing the skin with a Drugwipe after removal of the 'patch'.

The benefit of utilizing the latter method is two-fold: a) an officer can monitor a client 24 hrs. a day, up to 10 days; and b) the 'patch' acts as a deterrent for the client during those times they might be tempted to use drugs between visits.

Surface:

In addition to detecting drug use, agencies that have clients they suspect may be trafficking drugs, as opposed to consuming, now have a tool to detect illegal drug residue on fingertips or personal articles. Simply by wiping

Drugwipe over fingers or articles such as car keys, telephone, steering wheel, etc., an officer can detect residue deposited through contact with drugs.



Figure 4: Sweat testing with Drugwipe II

7. Summary and future Perspectives

Further studies are on the way or in planning to provide similar data for the other Drugwipe types. The Institute for Legal Medicine in Munich is currently evaluating the Drugwipe Cannabis for sweat or saliva testing and it will be of great interest to see whether there is a similar accuracy profile as for Amphetamines.

A second round of the ROSITA (roadside testing assessment) is in preparation. Other studies are running in Paris, Rome and Vienna.

With the introduction of the 5-drug Drugwipe test and the Drugwipe Benzodiazepine test the Drugwipe optimisation program will be completed.

8. Acknowledgement

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9. References

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