

**510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
ASSAY ONLY TEMPLATE**

A. 510(k) Number:

k063024

B. Purpose for Submission:

Clearance of new device

C. Measurand:

Amphetamine

D. Type of Test:

Qualitative Enzyme Immunoassay

E. Applicant:

Lin-Zhi International, Inc.

F. Proprietary and Established Names:

LZI Oral Fluid Amphetamine-Specific Enzyme Immunoassay
LZI Oral Fluid Amphetamine Metabolite Calibrators
LZI Oral Fluid Amphetamine Metabolite Controls

G. Regulatory Information:

1. Regulation section:

21 CFR §862.3100, Amphetamine test system
§862.3200, Clinical toxicology calibrator
§862.3280, Clinical toxicology control material

2. Classification:

Class II (test system, calibrator)
Class I, reserved (control material)

3. Product code:

DKZ, enzyme immunoassay, amphetamine
DLJ, calibrators, drug specific
LAS, drug specific control materials

4. Panel:

Toxicology (91)

H. Intended Use:

1. Intended use(s):

See indications for use below.

2. Indication(s) for use:

The Amphetamine-Specific Enzyme Immunoassays for Drugs of Abuse in Oral Fluid is a homogeneous enzyme immunoassay system to detect amphetamine in human saliva with a cutoff of 45 ng/mL when testing oral fluid specimen collected with Salivette collector (manufactured by Sarstedt) and diluted with 1 mL of buffer. The calibrators and controls of the analyte (d-amphetamine) are prepared with oral fluid buffer so that it can be used to verify and validate the assay. The assay is intended for use in the qualitative determination for amphetamine. The assay is designed for professional use with a number of automated clinical chemistry analyzers.

The Oral Fluid Amphetamine-Specific Enzyme Immunoassay is a homogeneous enzyme immunoassay system provides only a preliminary analytical test result. A more specific alternative chemical method must be used to obtain a confirmed analytical result. Gas chromatography/mass spectrometry (GC/MS) is the preferred confirmatory method. Clinical consideration and professional judgement should be applied to any drug-of-abuse test result, particularly when preliminary positive results are used.

3. Special conditions for use statement(s):

For prescription, professional use only in clinical chemistry laboratories.

The assay is not designated for use in point-of-care settings.

4. Special instrument requirements:

The assay is designed for professional use with a number of clinical chemistry analyzers. Performance data submitted was obtained using the Hitachi 717 analyzer.

I. Device Description:

The assay consists of ready-to-use liquid reagents. Reagent 1 contains mouse

monoclonal antibody to amphetamine, glucose-6-phosphate (G6P), nicotinamide adenine dinucleotide (NAD) and stabilizers. Reagent 2 contains amphetamine labeled glucose-6-phosphate dehydrogenase (G6PDH) in buffer.

The calibrator standards are sold separately. They are used to construct the standard curve used to calculate the concentration of the unknown samples as well as to qualitatively determine the presences or absences of amphetamine in the sample. They consist of 3 levels of a buffer matrix spiked with known concentrations of the drug analyte, ranging in concentration from 0-90 µg/mL.

Assayed controls are sold separately and are run with the samples to monitor the performance of the assay. They consist of oral fluid with amphetamine added.

J. Substantial Equivalence Information:

1. Predicate device name(s):

LZI Oral Fluid Cocaine Enzyme Immunoassay, LZI Opiate Oral Fluid Enzyme Immunoassay and LZI Oral Fluid Methadone Enzyme Immunoassay
 OraSure Amphetamine-Specific Intercept Micro-plate oral fluid EIA

2. Predicate 510(k) number(s):

k050945
 k050988
 k051058
 k992918

3. Comparison with predicate:

Similarities		
Item	Device	Predicate
Intended Use	Qualitative detection of amphetamine	Same
Assay Type	Enzyme immunoassay	Same
Matrix	Oral Fluid	Same
Controls	2 levels	Same

Differences		
Item	Device	Predicate
Cutoff	45 ng/mL	100 ng/mL
Calibrators	3 levels	2 levels

The LZI predicate devices are similar in assay type, matrix, calibrators and controls. They differ in that they measure different analytes.

K. Standard/Guidance Document Referenced (if applicable):

None referenced.

L. Test Principle:

The assay is based on competition between drug labeled with glucose-6-phosphate dehydrogenase (G6PDH) enzyme and free drug from the saliva sample for a fixed amount of specific antibody. In the absence of free drug from the sample the antibody binds to the drug labeled G6PDH enzyme thus decreasing the enzymatic activity of the G6PDH. The G6PDH activity is measured spectrophotometrically at 340 nm because of conversion of NAD to NADH.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:

a. *Precision/Reproducibility:*

Precision studies were performed by using the negative, cutoff and high calibrators and two levels of controls. Testing was performed in replicates of 6, twice a day for 10 days for all concentrations. The within-run % CV ranged from 0.46 to 0.63% and the Total precision % CV ranged from 0.70 to 1.02%.

The recovery study showed that the assay correctly identified spiked samples at approximately 50% above the cutoff as positive and at approximately 50% below the cutoff as negative.

b. *Linearity/assay reportable range:*

Not applicable. This is a qualitative assay.

c. *Traceability, Stability, Expected values (controls, calibrators, or methods):*

A commercially available standard solution is made into a secondary (lower concentration) stock solution. The secondary stock solution is then spiked into the calibrators and controls to the desired concentration. The concentrations are confirmed by GC/MS.

Stability Studies:

Real time and accelerated studies have been conducted. Protocols and acceptance criteria were described and found to be acceptable. The manufacturer claims the following expiration date:

When stored at 2-8 °C product is good until expiration date which is 18 months.

Stability of amphetamine in the Salivette collection device was determined by taking a pool of negative oral fluid samples spiked at three different concentrations and split into three hundred and thirty-three samples. On day 1, samples were run to determine the baseline that subsequent runs were compared to. Of the remaining 100 samples for each concentration half were stored at 2-8 °C and the other half were stored frozen -20 °C. The study was conducted over 22 days and samples were run on days 1, 2, 8, 12, 15 and 22. The sample is stable for 21 days when stored at refrigerator 2-8 °C or frozen -20 °C.

d. Detection limit:

See the Precision/Reproducibility section above for performance around the stated cutoff concentration.

e. Analytical specificity:

Various potentially interfering substances were evaluated to determine whether they interfere with assay results. Test compounds were spiked into the drug-free calibrator to various concentrations and evaluated against the cutoff calibrator. The labeling lists the concentration of each compound that gave a response approximately equal to that of the cutoff calibrator (as positive) or the maximal concentration of compound tested that remained negative. The only compound that was seen to significantly cross-react was MDA (see below).

Compound	ng/mL Positive
d-amphetamine	30
MDA	85
PMA	300

f. Assay cut-off:

The stated cutoff of this assay, which includes the dilution of the sample with the Salivette collection device, is 45 ng/mL. Characterization of how the device performs analytically around the claimed cutoff concentration appears in the precision/reproducibility section above.

2. Comparison studies:

a. Method comparison with predicate device:

One hundred and twelve clinical oral fluid specimens were collected. The oral fluid specimens were tested with LZI Oral Fluid Amphetamine-Specific Enzyme Immunoassay and compared to a Gas Chromatography/ Mass Spectrophotometer (GC/MS).

Results from the study are presented below. The table describes the agreement between the device and the GC/MS.

		GC/MS	
		Positive	Negative
LZI EIA	Positive	56	2*
	Negative	1**	44

*Two samples contain less than 45 ng/mL of amphetamine

**One sample contains amphetamine of 45 ng/mL

% Agreement = 97.1%

b. Matrix comparison:

Not applicable. This device is intended for use with only one matrix.

3. Clinical studies:

a. Clinical Sensitivity:

Not applicable

b. Clinical specificity:

Not applicable

c. Other clinical supportive data (when a. and b. are not applicable):

Not applicable

4. Clinical cut-off:

Not applicable

5. Expected values/Reference range:

Not applicable

N. Proposed Labeling:

The labeling is sufficient and it satisfies the requirements of 21 CFR Part 809.10.

O. Conclusion:

The submitted information in this premarket notification is complete and supports a substantial equivalence decision.