510(k) SUBSTANTIAL EQUIVALENCE DETERMINATION
DECISION SUMMARY
DEVICE ONLY TEMPLATE

A. 510(k) Number:
k042330

B. Purpose for Submission:
Addition of new assay matrix (plasma)

C. Analyte:
Acetaminophen

D. Type of Test:
Quantitative colorimetric assay

E. Applicant:
Diagnostic Chemicals Limited

F. Proprietary and Established Names:
Acetaminophen-SL Assay

G. Regulatory Information:

1. Regulation section:
   21 CFR §862.3030, Acetaminophen test system
2. Classification:
   Class II
3. Product Code:
   LDP
4. Panel:
   Toxicology (91)

H. Intended Use:

1. Intended use(s):
   See below.

2. Indication(s) for use:
   "The Diagnostic Chemicals Limited's Acetaminophen-SL Assay is an in vitro diagnostic device intended to measure acetaminophen levels in human serum or plasma (lithium heparin). Such measurements are used in the diagnosis of acetaminophen toxicity and overdose. This assay consists of two reagents and a calibrator."

3. Special condition for use statement(s):
   This assay is for prescription use only.

4. Special instrument Requirements:
   The assay is intended to be used on automated chemistry analyzers or generic spectrophotometers.

I. Device Description:

This device contains three liquid ready-to-use components; a component that contains a buffer solution containing acyl amidohydrolase, manganese, stabilizers, and a preservative, a component that contains buffer with 8-hydroxyquinoline-5-sulfonic acid, and an acetaminophen standard.

J. Substantial Equivalence Information:

1. Predicate device name(s):
   Acetaminophen-SL Assay

2. Predicate K number(s):
   k981059

3. Comparison with predicate:
   The two devices are identical except this submission adds plasma as an additional sample matrix.

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

This submission did not reference any performance standard documentation but did reference FDA guidance documents on submission preparation.

L. Test Principle:

Acyl amidohydrolase cleaves acetaminophen to yield p-aminophenol and acetate. The p-aminophenol reacts with 8-hydroxyquinoline-5-sulfonic acid in the presence of manganese ions to form 5-(4-iminophenol)-8-quinolone. The increased absorbance at 615 nm is directly proportional to the concentration of acetaminophen in the sample.

M. Performance Characteristics (if/when applicable):

1. Analytical performance:
   a. ***Precision/Reproducibility:***
   Within run precision was determined from 20 replicates of two levels ('low' and 'high') of spiked plasma run in a single assay. Run-to-run precision was determined by triplicate measurements of two level of spiked plasma in five separate assays. The results are presented below:

Precision of Acetaminophen-SL Assay (Plasma, mg/L)

Plasma Level	Criteria	Within Run	Run-to-Run
Low	**Mean**	40.85	43.58
	Std. Dev	0.36	0.43
	CV	0.9 %	1.0 %
	n=	20	15
High	**Mean**	366.28	359.72
	Std. Dev	2.37	2.80
	CV	0.6 %	0.8 %
	n=	20	15

These results met the manufacturer's specification of a coefficient of variation of <5%. Precision of serum was determined in the predicate submission.

b. Linearity/assay reportable range:

A salicylate-spiked plasma sample was diluted with saline to cover the low end of the linear range. Quadruplicate samples at seven levels 0 – 435 umol/L (0 to 6.6 mg/dL) were measured on a Hitachi 717 analyzer. The calculated regression equation is Y =1.062X.

Linearity of Acetaminophen-SL Assay
Low End (Plasma, umol/L)

Assigned Value	Mean (umol/L)	% Recovery
0	-0.3	---
19.5	21.3	109
24.4	28.5	116.8
32.5	34.3	105.4
81.3	93.0	114.4
162.6	159.5	98.1
406.5	435.5	107.1

The upper end of the linear range was tested in the same fashion (840 – 4060 umol/L), yielding a regression of Y = 0.984X +104 umol/L.

Linearity of Acetaminophen-SL Assay
High End (Plasma, umol/L)

Assigned Value	Mean (umol/L)	% Recovery
813	839	103.2
1626	1746	107.4
2439	2566	105.2
3252	3323	102.2
3658	3685	100.7
4064	4064	100.0

These results support the manufacture's claim of linearity between 20– 2500 umol/L (0.3 – 38 mg/dL). Linearity of serum in this assay was established in the predicate submission.

c. Traceability, Stability, Expected values (controls, calibrators, or method):
These parameters were established in the predicate submission.

d. Detection limit:
Ten samples of saline were analyzed and the lower limit of detection was calculated from the mean plus three standard deviations. This value, 2.2 mg/L, was similar to the value in the predicate submission (3 mg/L).

e. Analytical specificity:
Analytical specificity was established in serum in the predicate version of this assay. It is not expected that plasma samples would perform differently.

f. Assay cut-off:
Not applicable.

2. Comparison studies:

a. Method comparison with predicate device:
Serum and plasma samples were drawn from twenty-five people and spiked with acetaminophen then tested on an Advia 1650 analyzer. The following regression statistics were calculated from this data.

Method Comparison, Acetaminophen Assay: Serum versus Plasma

Slope	1.01
Intercept	-0.015
R value	0.9996
N	25
Range	0 – 19.5 mg/dL

These results were similar to the results in the predicate where patient serum samples were used to compare this assay to another salicylate assay.

b. Matrix comparison
See above.

3. Clinical studies:
    - ***a. Clinical sensitivity:***
      Not applicable to this type of device.
    - ***b. Clinical specificity:***
      Not applicable to this type of device.
    - ***c. Other clinical supportive data (when a and b are not applicable):***
      Not applicable to this type of device

4. Clinical cut-off:
   Not applicable to this type of device.

5. Expected values/Reference range:
   Tietz's *Clinical Guide to Laboratory Tests, 3rd Edition* suggests the therapeutic concentration of acetaminophen is less than 30 mg/L (<199 umol/L) and that the toxic concentration of acetaminophen is greater than 200 mg/L (> 1324 umol/L).

N. Conclusion:

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