Brief Study on CPAL Settings
90 Asp Variable Dsp
Variable Flow Rates
Variable Plunger

Starting Points
for
Method Development Work
for the Researcher

David P. Holub, PhD
LEAP Technologies, Inc.
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Outline

• This study was conducted over a period of three days with various settings to optimize the Collect PAL in house.
• Liquid (50:50 H2O:MeOH) was collected.
• Parameters were selected in order to test for no dripping between well-to-well or waste-to-well movements.
• Version 2.1 Collect PAL Application was used.
• Only 500 uL/min, 1.0 mL/min, and 1.5 mL/min flow rates were measured.
• 90Asp and Variable Dsp settings were tested with only 3 sec and 6 sec Collection values.
• 0mm PENETRATION and 0mm RETRACTION values were used for the study.
• A Gilson 305 Pump with manometric module and 5.0 mL head were used. These had been PM’d and QA/QC performed just prior to use by Gilson.
• For these studies the furthest plate location was chosen as a worst case scenario for waste-to-well time movement after a short delay.
Study Overview

• A straight line in the graph means that every well was accessed for the same amount of time per well. It can be deduced from this that the Fraction Time per Well setting is accurate over a wide range of Fraction Sites.

• Both Numerical by Column and Serpentine by Column collection patterns were examined.

• Move from Waste incorporates a new feature in version 2.1 that adds 10mm only for the 1st aspiration to prevent dripping from Waste to Well #1.

• Multiple 3 and 6 second collection trials were performed to show the DSP variable effects at these flow rates.
Set Up as Shown for the Study
1) The 3rd Drawer of the 2nd Stack was used for all of these measurements.
2) Flow rates were measured at 500 uL/min, 1.0 mL/min and 1.5 mL/min.
3) Collection into 96, deep-well plates.
90 ASPIRATE Variable DISPENSE 5sec Delay

Results

• With the delay you will always have different first well TOTAL FRACTION TIME that does not match to the Fraction Time per Well setting. This time has to take into account the movement of the Head from the Waste position to Well #1. A worst case (furthest distance scenario was used). A longer collection time does not adjust for this first well movement.

• This time is a measure from time=0 (when the valve switches at the waste station) to the aspirate movement of the syringe prior to moving to well #2. The graph does take into account the 5 sec delay. So REAL time for well #1 is the recorded time – delay time.

• For numerical collection patterns all DSP settings for the flow rates tested had great reproducibility. The only setting that passed for 3sec collection was the 80DSP.

• For serpentine collection patterns all DSP settings for all flow rates passed.
90 ASPIRATION
NUMERICAL COLLECTION – 1.5 mL/min Flow Rate

WellID: A07
WellID: A08
WellID: A09
WellID: A10
WellID: A11
WellID: A12
WellID: B01
WellID: B02
WellID: B03
WellID: B04
WellID: B05
WellID: B06
Average

1.5 mL/min Flow
90 Aspirate
Variable Dispense
5 Delay
12 Plunger
0 Penetrate
0 Retract
12 Fractions
Numerical Collection

Move from A12 to B1

MOVE FROM WASTE
90 ASPIRATION
NUMERICAL COLLECTION – 1.0 mL/min Flow Rate

Move from A12 to B1

1.0 mL/min Flow
90 Aspirate
Variable Dispense
5 Delay
9 Plunger
0 Penetrate
0 Retract
12 Fractions
Numerical Collection
90 ASPIRATION
NUMERICAL COLLECTION – 500 uL/min Flow Rate

Move from A12 to B1

WellID: A07
WellID: A08
WellID: A09
WellID: A10
WellID: A11
WellID: A12
WellID: B01
WellID: B02
WellID: B03
WellID: B04
WellID: B05
WellID: B06
Average

500 uL/min Flow
90 Aspirate
Variable Dispense
5 Delay
5 Plunger
0 Penetrate
0 Retract
12 Fractions
Numerical Collection

Move FROM WASTE

00.000 00.864 01.728 02.592 03.456 04.320 05.184 06.048

06.048 06.096 06.144 06.192 06.240

06.912

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90 ASPIRATION
SERPENTINE COLLECTION – 1.5 mL/min Flow Rate

1.5 mL/min Flow
90 Aspirate
Variable Dispense
5 Delay
15 Plunger
0 Penetrate
0 Retract
12 Fractions
Serpentine Collection

MOVE FROM WASTE

Move from A12 to B12

WellID: A07
WellID: A08
WellID: A09
WellID: A10
WellID: A11
WellID: A12
WellID: B12
WellID: B11
WellID: B10
WellID: B09
WellID: B08
WellID: B07
Average
90 ASPIRATION
SERPENTINE COLLECTION – 1.0 mL/min Flow Rate

MOVE FROM WASTE

1.0 mL/min Flow
90 Aspirate
Variable Dispense
5 Delay
9 Plunger
0 Penetrate
0 Retract
12 Fractions
Serpentine Collection

Move from A12 to B12
90 ASPIRATION
SERPENTINE COLLECTION – 500 uL/min Flow Rate

Move from A12 to B12

500 uL/min Flow
90 Aspirate
Variable Dispense
5 Delay
5 Plunger
0 Penetrate
0 Retract
12 Fractions
Serpentine Collection

Move FROM WASTE
90 ASPIRATE Variable DISPENSE 0sec Delay Results

• With the 0 sec delay you should always have the first well TOTAL FRACTION TIME matching to the Fraction Time per Well setting.

• This time is a measure from time=0 (when the valve switches at Well #1) to the aspirate movement of the syringe prior to moving to well #2.

• For numerical collection patterns all DSP settings for all flow rates passed (with a very slight variation at the 40ASP setting).

• For serpentine collection patterns all DSP settings for all flow rates passed.
90 ASPIRATION
NUMERICAL COLLECTION – 1.5 mL/min Flow Rate

WellID: A07
WellID: A08
WellID: A09
WellID: A10
WellID: A11
WellID: A12
WellID: B01
WellID: B02
WellID: B03
WellID: B04
WellID: B05
WellID: B06
Average

1.5 mL/min Flow
90 Aspirate
Variable Dispense
0 Delay
12 Plunger
0 Penetrate
0 Retract
12 Fractions
Numerical Collection

Move from A12 to B1

06.912
06.480
05.184
04.320
03.456
02.592
01.728
00.864
00.000

03.006
03.006
00.000
00.864
02.592
01.728
00.000

3sec80 Dsp
6sec60 Dsp
6sec40 Dsp
3sec80 Dsp
3sec60 Dsp
3sec40 Dsp
03.006
03.006
03.031
90 ASPIRATION
NUMERICAL COLLECTION – 1.0 mL/min Flow Rate

WellID: A07
WellID: A08
WellID: A09
WellID: A10
WellID: A11
WellID: A12
WellID: B01
WellID: B02
WellID: B03
WellID: B04
WellID: B05
WellID: B06

1.0 mL/min Flow
90 Aspirate
Variable Dispense
0 Delay
9 Plunger
0 Penetrate
0 Retract
12 Fractions
Numerical Collection

Move from A12 to B1
90 ASPIRATION
NUMERICAL COLLECTION – 500 μL/min Flow Rate

WellID:
A07
A08
A09
A10
A11
A12
B01
B02
B03
B04
B05
B06
Average

Move from A12 to B1

500 μL/min Flow
90 Aspirate
Variable Dispense
0 Delay
5 Plunger
0 Penetrate
0 Retract
12 Fractions
Numerical Collection
90 ASPIRATION
SERPENTINE COLLECTION – 1.5 mL/min Flow Rate

Move from A12 to B12
90 ASPIRATION
SERPENTINE COLLECTION – 1.0 mL/min Flow Rate

WellID:
- A07
- A08
- A09
- A10
- A11
- A12
- B12
- B11
- B10
- B09
- B08
- B07

Flow:
- 1.0 mL/min

Aspirate:
- 90

Dispense:
- Variable

Delay:
- 0

Plunger:
- 9

Penetrate:
- 0

Retract:
- 12

Fractions:
- 12

Serpentine Collection:
- Move from A12 to B12

Average
90 ASPIRATION
SERPENTINE COLLECTION – 500 uL/min Flow Rate

- WellID: A07
- WellID: A08
- WellID: A09
- WellID: A10
- WellID: A11
- WellID: A12
- WellID: B07
- WellID: B08
- WellID: B09
- WellID: B10
- WellID: B11
- WellID: B12

- 500 uL/min Flow
- 90 Aspirate
- Variable Dispense
- 0 Delay
- 5 Plunger
- 0 Penetrate
- 0 Retract
- 12 Fractions
- Serpentine Collection

Move from A12 to B12