

# TipNovusMini™ Tip Washer System validation with 3 LC-MSMS tests



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## Purpose

The purpose of this validation is to demonstrate the performance of the Tip Washer System, TipNovusMini for reusing 250 and 1000 µL Rainin non-filter tips, used for serum or plasma transfer for 3 different analyses: Methylmalonic acid, Metanephrine and Steroid Hormones. Reuse of the disposable plastic pipette tips for up to 5 washes and more will be evaluated. The main goal is cost saving as well reducing biohazard waste. For system description see figure 1 and

[www.grenovasolutions.com/tipnovusMINI](http://www.grenovasolutions.com/tipnovusMINI)

## Validation plan

The Methylmalonic acid (MMA, 250 µL), Metanephrine and Steroid Hormones (1000 µL) are analysed every week on an LC-MSMS system.

Ideally every run 10 samples should be tested with new- and washed pipette tips. Due to the amount of samples and sample volume less than 10 samples in a run is possible.

A minimum of 50 samples with new and washed pipette tips should be analysed.

Because of environment regulation the liquid waste must have a pH <10.

## Data Analysis

Chromatography from the reference run (new pipette tips) will be compared to the validation run (washed pipette tips). We used linear regression analysis.

Acceptance criteria:

Correlation coefficient >0,95.

No outliers > 3 Sy.x



Figure 1

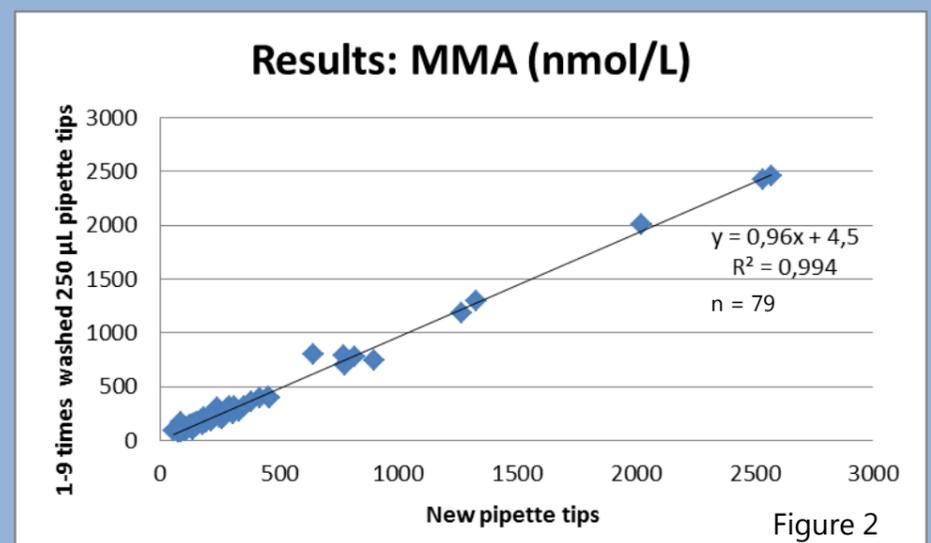


Figure 2

Results: Steroid Hormones with 1-5 times washed 1000 µL pipette tips				
Analyte	n=	Concentration range	y=x	R <sup>2</sup>
Cortisol	68*	0,8 - 700 nmol/L	0,974x+3,36	0,993
Androstenedione	69	0,14 - 10,3 nmol/L	0,982x+0,006	0,995
Testosterone	60*	0,06 - 9,92 nmol/L	1,011x+0,02	0,995
17-OHP	67*	0,05 - 7,64 nmol/L	1,059x-0,03	0,980
DHEA	69	2 - 54 nmol/L	1,029x-0,49	0,984

\* High results were excluded from the comparison

Table 1

Results: Metanephrine with 1-5 times washed 1000 µL pipette tips				
Analyte	n=	Concentration range	y=x	R <sup>2</sup>
Metanephrine	57	<0,1 - 1 nmol/L	0,960x+0,005	0,990
Normetanephrine	57	0,16 - 1,3 nmol/L	0,928x+0,036*	0,959

3-MT remark:  
55 samples had a result <0,1 nmol/L, all results were comparable  
No contamination has been found

\* 3 Times washed 0,973x+0,011 R<sup>2</sup>=0,977

Table 2

## Optimize the Tip Washer

After installation the TipNovusMini was optimized to wash the 250 and 1000 µL pipette tips. It has two different inlays for the pipette tips and two wash programs are available. To dry the pipette tips it was necessary to raise the temperature to 65 degrees and let the pipette tips dry for 15 minutes. In the beginning the liquid waste had a pH above 10,5. The cleaning solution Grenoclean was replaced by Grenoclean+ in order to reduce the pH <10.

## Results

The correlation coefficient of all 3 analyses are between 0,959 and 0,995, see for more details figure 2 and table 1-2.

No outliers were detected.

## Cost saving

If the 250 µL pipette tips (10x96) are re-used 9 times it saves about €336, the 5 times re-use off the 1000 µL pipette tips (8x96) will save about €160.

## Biohazard waste reduction

The refill off 10x96 250 µL pipette tips weighs 445 gram, because it can be re-used 9 times we reduce the amount off plastic waste with 3.560 gram.

The refill off 8x96 1000 µL pipette tips weighs 745 gram, because it can be re-used 5 times we reduce the amount off plastic waste with 2.980 gram.

Finally the washed pipette tips can be recycled instead of discarded as biohazard waste.

## Conclusion

There is a good correlation between results from the new and washed pipette tips. It demonstrates that the 1000 µL pipette tips can be re-used 5 times for the Steroid Hormones and Metanephrine analysis. The 250 µL can be re-used 9 times for the Methylmalonic acid analysis.

Cost saving and biohazard waste reduction is substantial.

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