Precision and Accuracy of Axygen® 1000 µL Automation Pipet Tips for Hamilton® MICROLAB® STAR line and Nimbus®

SnAPPShots

A brief technical report from the Corning Applications Group

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Introduction

Automated liquid handling and high throughput screening (HTS) are widely used for drug discovery, molecular biology applications, and genomics. For HTS, reliable sample preparation and delivery methods have become critical to assay performance. Corning recently introduced a line of 1000 µL Axygen® pipet tips, which have been specifically designed for applications using the Hamilton MICROLAB® STAR liquid handling workstation.

The focus of this study was to evaluate the quality, dispensing volume accuracy, and precision of the Axygen 1000 µL tips on the Hamilton MICROLAB STAR automation platform as compared to Competitor 1000 µL tips. These criteria were measured using the Artel Multichannel Verification System (MVS®). The results demonstrate that Axygen 1000 µL tips are comparable to Competitor 1000 µL tips using the Hamilton MICROLAB STAR liquid handling workstation to dispense volumes as low as 50 µL and as high as 1000 µL.

Materials/Methods

Materials

Axygen 1000 µL tips (Corning Cat. No. HT-1000-CBK-HTR) and Competitor 1000 µL tips.

Methods

The Hamilton MICROLAB STAR liquid handling workstation (Hamilton Cat. No. 1532) was used to assess accuracy as percent deviation (% D) and precision as coefficient of variation (% CV), for Axygen 1000 µL tips and Competitor 1000 µL tips.

To test the ability of each brand of tips to accurately and precisely dispense 50 µL, a column of 8 tips was arranged so that each tip aspirated 50 µL of Range A solution (Artel Cat. No. MVS-203) from an Axygen Low Profile reservoir (Corning Cat. No. RES-SW96-LP) and each tip dispensed 50 µL into 1 column of a Corning® 96-well black clear-bottom microplate (Corning Cat. No. 3631) containing 150 µL of diluent solution (Artel Cat. No. MVS-202) in each well. To determine the volume of liquid dispensed into each well, absorbance readings for the diluted Range A solution were measured using an Artel ELx800NB® Plate Reader (Artel Cat. No. 1311197). Studies were performed 6 independent times, for each brand of tips. Evaluation criteria include standard deviation, % D, and the % CV of the 6 replicates.

To test the ability of each brand of tips to accurately and precisely dispense 1000 µL, a column of 8 tips was arranged so that each tip aspirated 1000 µL of Range HV solution (Artel Cat. No. MVS-214) from an Axygen Low Profile reservoir and each tip dispensed 250 µL into 4 columns of a Corning 96-well black clear-bottom microplate. To determine the volume of liquid dispensed into each well, absorbance readings for the Range HV solution were measured using an Artel ELx800NB® Plate Reader. Studies were performed 3 independent times for each brand of tips. Evaluation criteria include standard deviation, % D, and the % CV of the 3 replicates.

Results/Discussion

The evaluation criteria for comparing Axygen 1000 µL tips with Competitor 1000 µL tips are listed in Tables 1 and 2. The ability of the pipet tips to dispense 50 µL and 1000 µL volumes accurately and precisely was determined through the analysis of the mean volume dispensed from 8 tips for each brand across 6 replicates for 50 µL dispense, and across 3 replicates for 1000 µL dispense. The precision of each brand of tip is represented by the % CV of the replicates. Similarly, the accuracy is represented by the % D from the target volume of the replicates. It is important to note

Table 1. Evaluation Criteria for 50 µL Dispense Volume

50 µL	Axygen	Competitor
n	6	6
Target Volume (µL)	50.00	50.00
% CV	0.84% ± 0.23%	0.65% ± 0.09%
% D	9.44% ± 0.48%	9.52% ± 0.30%
Total No. of Outliers	0	0

Table 2. Evaluation Criteria for 1000 µL Dispense Volume

1000 µL	Axygen	Competitor
n	3	3
Target Volume (µL)	1000.00	1000.00
% CV	0.38% ± 0.12%	0.37% ± 0.13%
% D	1.51% ± 0.30%	1.16% ± 0.28%
Total No. of Outliers	0	0

Data in tables shows ± standard deviation.

that the accuracy of liquid dispense may vary depending on the method and liquid class selection chosen when using the liquid handling platform. However, for these studies the method and liquid used for testing was identical for Axygen® 1000 µL tips and Competitor 1000 µL tips.

As demonstrated in Figure 1, Axygen 1000 µL tips displayed comparable precision to Competitor 1000 µL tips using the Hamilton MICROLAB® STAR automation system. There was no significant difference in the precision of each brand of tips when dispensing 50 µL (Figure 1A) or 1000 µL (Figure 1B).

As demonstrated in Figure 2, Axygen 1000 µL tips displayed comparable accuracy to the Competitor 1000 µL tips using the Hamilton MICROLAB STAR automation system. There was no significant difference in the accuracy of each brand of tips when dispensing 50 µL (Figure 2A) or 1000 µL (Figure 2B).

Conclusions

Axygen 1000 µL tips demonstrate precision and accuracy comparable to Competitor 1000 µL tips using the Hamilton MICROLAB® STAR Liquid Handling Workstation to dispense volumes as low as 50 µL and as high as 1000 µL.
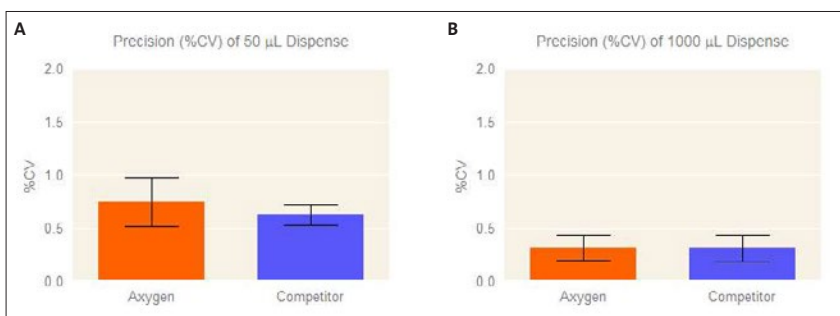
Figure 1. Precision (% CV) Analysis of 1000 µL Tips. The % CV of Axygen and Competitor 1000 µL tips dispensing (A) 50 µL and (B) 1000 µL volume using the Hamilton MICROLAB STAR liquid handling workstation was determined using the Artel MVS® System. There was no significant difference in the % CV between each brand. Data shown with standard deviation (SD). n = 6 for 50 µL dispense. n = 3 for 1000 µL dispense.
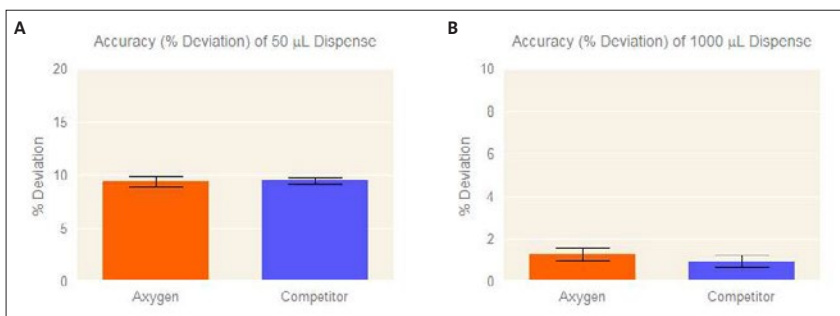
Figure 2. Accuracy (% D) Analysis of 1000 µL Tips. The % D of Axygen and Competitor 1000 µL tips dispensing (A) 50 µL and (B) 1000 µL volume using the Hamilton MICROLAB STAR liquid handling workstation was determined using the Artel MVS System. There was no significant difference in the % D between each brand. Data shown with SD. n = 6 for 50 µL dispense. n = 3 for 1000 µL dispense.

For additional product or technical information, please call 800.492.1110 or visit **www.corning.com/lifesciences**. Customers outside the United States, call +1.978.442.2200 or contact your local Corning sales office listed below.

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