Axygen® 1000 µL Automation Tips for Tecan® Freedom EVO® 200 with LiHa head – Precision and Accuracy

Sn*APP*Shots

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 has a line of Axygen® 1000 µL pipet tips, which have been specifically designed for applications using the Tecan® Freedom EVO® 200 with LiHa head automation platform (Tecan Cat. No. 298).

The focus of this study was to evaluate the quality, dispensing volume accuracy, and precision of the Axygen 1000 µL tips on the Tecan Freedom EVO 200 with LiHa head automation platform as compared to Competitor 1000 µL tips. These criteria were measured using the Artel Multichannel Verification System (Artel MVS®), which calculates the volume of dispensed samples with an absorbance-based measurement system. The results demonstrate that Axygen 1000 µL tips are comparable to Competitor 1000 µL tips using the Tecan Freedom EVO 200 with LiHa head automation platform to dispense volumes as low as 100 µL and as high as 1000 µL.

Materials and Methods

Materials

Tips evaluated: Axygen 1000 µL tips (Corning Cat. No. TT-1000-CBK-HTR) and Competitor 1000 µL tips.

Methods

The Tecan Freedom EVO 200 with LiHa head automation platform 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 dispense accurately and precisely, a column of 8 tips was arranged so that each tip aspirated from an Axygen low profile reservoir (Corning Cat. No. RES-SW96-LP) and dispensed into a Corning® 96-well black clear-bottom microplate (Corning Cat. No. 3631). For the 100 µL test volume, each tip aspirated 100 µL of Range A solution (Artel Cat. No. MVS-203) and dispensed 100 µL into 100 µL of diluent solution (Artel Cat. No. MVS-202) in each well of 1 column. For the 1000 µL test volume, each tip aspirated 1000 µL of Range HV solution (Artel Cat. No. MVS-214) and dispensed 250 µL into each well across 4 columns. To determine the volume of liquid dispensed into each well, absorbance readings for the solutions: diluted Range A solution for 100 µL dispense and Range HV solution for 1000 µL dispense were measured using an Artel ELx800NB® Plate Reader (Artel Cat. No. 1311197). For the 100 µL test volume, studies were performed 6 independent times for each brand of tips, for a total of 48 replicates. For the 1000 µL test volume, studies were performed 3 independent times for each brand of tips, for a total of 24 replicates. Evaluation criteria include percent deviation from the set dispense volume (% D), and the variability in dispense volume (% CV) for the 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 100 µL and 1000 µL accurately and precisely was determined through the analysis of the mean volume across 48 replicates for the 100 µL dispense and across 24 replicates for the 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 that the accuracy of liquid dispense may vary depending on the method and liquid chosen when using the automation platform. However, the method and liquid used for these studies were identical for Axygen 1000 µL tips and Competitor 1000 µL tips.

Table 1. Evaluation Criteria for 100 µL Dispense Volume

100 µL	Axygen	Competitor
n	48	48
Target Volume (µL)	100.00	100.00
% CV	0.87% ± 0.12%	1.00% ± 0.11%
% D	1.56% ± 0.30%	2.36% ± 0.23%
Total No. of Outliers	0	0

Table 2. Evaluation Criteria for 1000 µL Dispense Volume

1000 µL	Axygen	Competitor
n	24	24
Target Volume (µL)	1000.00	1000.00
% CV	0.57% ± 0.15%	0.76% ± 0.38%
% D	0.64% ± 0.19%	0.89% ± 0.53%
Total No. of Outliers	0	1

Data in tables show ± standard deviation.

As demonstrated in Figure 1, Axygen® 1000 µL tips displayed comparable precision to Competitor 1000 µL tips using the Tecan® Freedom EVO® 200 with LiHa head automation platform. There was no significant difference in the precision of each brand of tips when dispensing 100 µL (Figure 1A) or 1000 µL (Figure 1B).

As demonstrated in Figure 2, Axygen 1000 µL tips displayed higher accuracy than Competitor 1000 µL tips using the Tecan Freedom EVO 200 with LiHa head automation platform to dispense 100 µL (Figure 2A). There was no significant difference in the accuracy between each brand when dispensing 1000 µL (Figure 2B).

Conclusions

◗ Axygen 1000 µL tips demonstrate comparable precision to Competitor 1000 µL tips using the Tecan Freedom EVO 200 with LiHa head automation platform to dispense volumes as low as 100 µL and as high as 1000 µL.

◗ Axygen 1000 µL tips demonstrate comparable accuracy to Competitor 1000 µL tips using the Tecan Freedom EVO 200 with LiHa head automation platform to dispense 1000 µL and higher accuracy to dispense 100 µL.
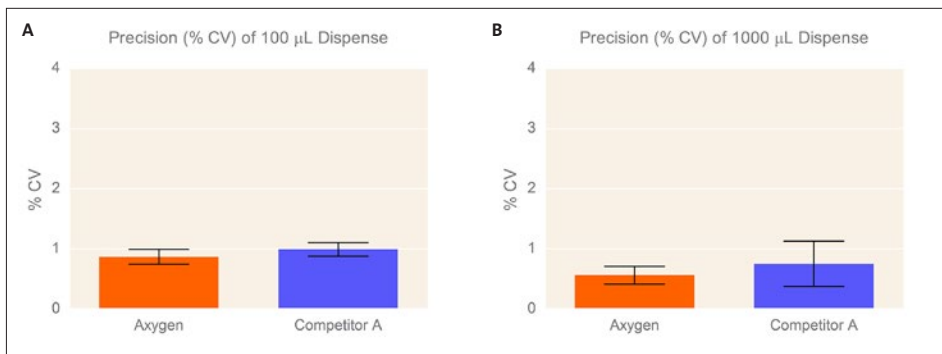

Figure 1. Precision (% CV) Analysis of 1000 µL Tips. The % CV of Axygen and Competitor 1000 µL tips dispensing (A) 100 µL and (B) 1000 µL volume using the Tecan Freedom EVO 200 with LiHa head automation platform was determined using the Artel MVS System. There was no significant difference in the % CV between each brand. Data shown with Standard Deviation (SD). n = 48 for 100 µL dispense. n = 24 for 1000 µL dispense.
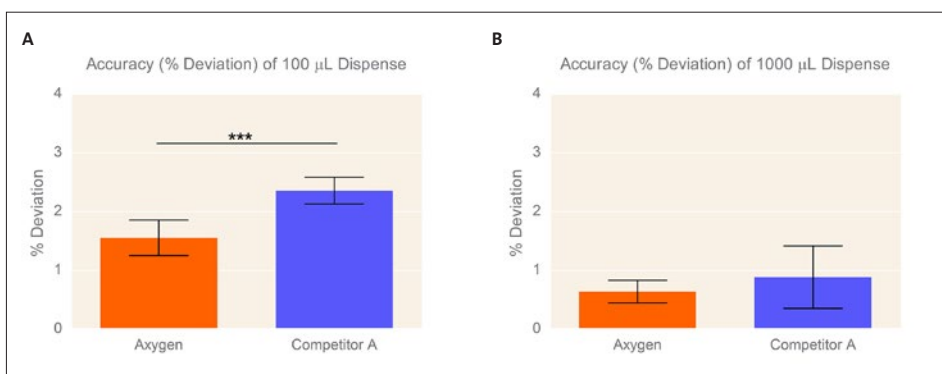

Figure 2. Accuracy (% D) Analysis of 1000 µL Tips. The % D of Axygen and Competitor 1000 µL tips dispensing (A) 100 µL and (B) 1000 µL volume using the Tecan Freedom EVO 200 with LiHa head automation platform was determined using the Artel MVS System. Axygen tips displayed significantly lower % D and, thus, higher accuracy than Competitor tips dispensing 100 µL. ***P<0.001 (B) There was no significant difference in the % D between each brand dispensing 1000 µL. Data shown with SD. n = 48 for 100 µL dispense. n = 24 for 1000 µL dispense.

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