

BRAND Ultra Low Retention Tips

Comparison of various competitor products using photometric measurements

Summary

The wetting of pipette tips when pipetting non-aqueous liquids plays a critical role in the life sciences. Liquids, such as protein solutions, liquids which contain detergents or glycerin, wet the surface of untreated pipette tips. This leads to inaccurate fluid delivery often giving false results.

Based on photometric measurements, BRAND Ultra Low Retention tips were compared with low retention tips from various manufacturers. The measurements were taken at a conference in 2015 and were conducted by approximately 140 life science specialists in groups of 5 - 6 people.

The results clearly show that the BRAND Ultra Low Retention tips exhibit up to 16 times less residues, although the pipetting steps were performed by a variety of different people with various levels of experience in pipetting.



Introduction

When pipetting media containing detergents, for example, to keep proteins in solution or which contain glycerin to increase the density of the medium, residual amounts can adhere to the surface of the pipette tip. Detergents reduce the surface tension of liquids with the result that the liquids cannot dispense optimally and the pipetting results significantly deteriorate. The optimum delivery of the fluids also reduces costs by eliminating the residual amounts remaining in the tips. A typical example is the use of the master mix in the PCR. 200 μ l of master mix ideally results in 16 - 17 portions of 10 μ l each when using standard pipette tips; when using BRAND Ultra Low Retention tips, 19 pipettings can be performed.

BRAND ultra-hydrophobic Ultra Low Retention surfaces are produced by means of a physicochemical process. This is not a coating, but a chemical modification of the polypropylene. Through this treatment, the surface energy on the surface of the pipette tip is 2 x lower than that of PTFE and 3 x lower than for untreated polypropylene.

Table 1: Comparison of the surface tension

Surface	Surface tension
BRAND PP Ultra Low Retention	9 mN/m
PTFE	19 mN/m
Silicone	21.5 mN/m
Untreated PP	30 mN/m
Water	72 mN/m

Low Retention tips are being intensively promoted by many manufacturers because they have distinct advantages in several applications. To check the quality of different products, the corresponding products from different manufacturers were tested as part of a comparative study.

Material and methods

The trials were conducted with single-channel pipettes (Transferpette® S D200). The HandyStep® electronic was used to fill the cuvettes in combination with 10 ml PD tips.

Testing

Dye solution used:
McCormick® Culinary – green food color (water, propylene glycol, FD&C dye yellow 5 (tartrazine), FD&C dye blue 1 (Brilliant Blue FCF) and propylparaben (preservative).

Low Retention tips used

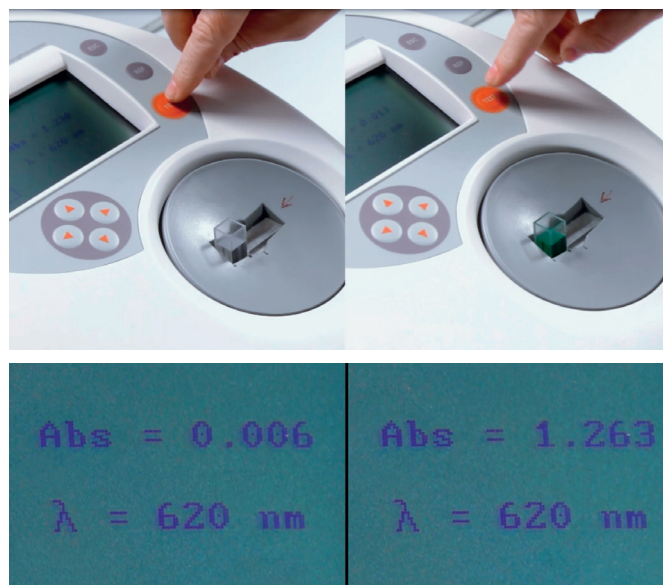
BRAND Ultra Low Retention tips 200 μ l
Eppendorf epT.I.P.S.® LoRetention,
PCRClean, 200 μ l
Rainin RT-250 LR
MBP HydroLix™ Pipet Tips HLT® 200
SoftFit-L (Low Retention Pipette Tips)
Axygen T-200-C-L-R
Photometer: WPA biowave
Cuvettes: BRAND PS macrocuvettes

Implementation

For each competitor 3 standard cuvettes (PS, 10 mm layer thickness) were each filled with 1 ml distilled water.

200 μ l each of the dye solution was aspirated dispensed with the Transferpette® S. The trials were conducted according to ISO 8655, i.e. liquid aspirated and dispensed vertically, pipette tip only immersed 1 mm into the dye solution, a waiting time of 1 s was observed before the tip was wiped on the vessel wall.

The residual liquid in the tip was then rinsed in the previously prepared cuvette. The process was repeated three times and in each case a new pre-filled cuvette was used. After appropriate comparison, the samples were measured at a wavelength of 620 nm.

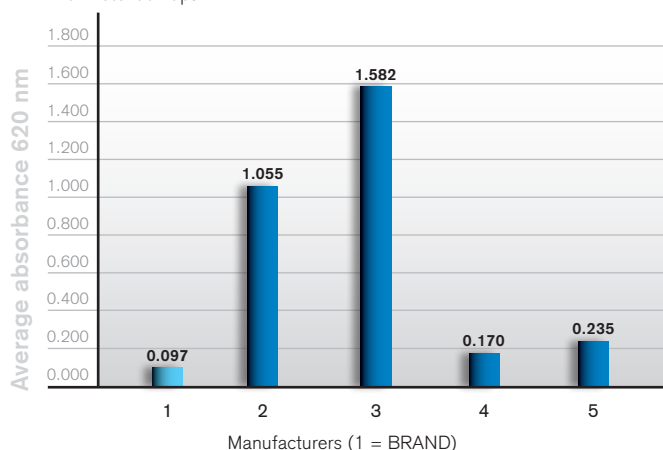


Results

For the evaluation of the results, the measured values of the various workshop groups were averaged.

Figure 1 shows that there are significant differences in the fluid retention of the various low retention tips from different manufacturers. The delivery behavior is, in part, poorer by a factor of 16 than in the corresponding BRAND Ultra Low Retention tips.

Fig.1: Averages of the absorbance of the residual amounts in 200 μ l low retention tips



Conclusion

The measurements show that there are very large differences in the delivery behavior of various pipette tips from different manufacturers, although these are all specified as Low Retention tips. It could be shown that the best values were obtained using BRAND Ultra Low Retention tips with the pipetting of the liquids tested regardless of the test user's pipetting experience.

It is evident that the liquids in the BRAND Ultra Low Retention tips dispensed very well with the least amount of residues remaining in the tips. With the low retention tips of competitor 4, the residue

amount was higher by a factor of 1.75 than that of BRAND. The worst low retention tip (competitor 3) showed a 16-fold higher residual amount in the tips.

Users should test the delivery behavior of the liquids used with low retention tips and standard tips for their specific applications. In this way, it can be determined and evaluated whether media loss and inaccurate pipetting results can be avoided.

The simple photometric test is shown in a product video at http://www.brand.de/fileadmin/user/BRAND/ULR_EN_720.mp4

Details about the BRAND Ultra Low Retention tips can be found at http://www.brand.de/fileadmin/user/pdf/Leaflets/Pipettenspitzen_EN.pdf

