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Comparison of BioCassette & Andersen N6 SIDE-BY-SIDE SIMULTANEOUS SAMPLING

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OBJECTIVE

The objective of this study was to compare the performance of the BioCassette™ to that of the Andersen N6 sampler by comparing the results from side-by-side simultaneous sampling.

MATERIALS AND METHODS

A total of 50 pairs of simultaneous samples from 5 different outdoor locations in Northern San Diego were taken with the BioCassette™ and Andersen N6 samplers. The devices were calibrated per the manufacturers' recommendations. The media used in each device was 2 % Malt Extract Agar with 0.01% Chloramphenicol, had the same formulation and was supplied by the same manufacturer.

Pairs of samples were taken simultaneously (one each of BioCassette™ and Andersen) for a duration of four minutes. The goal was to achieve between 20 and 50 colonies per plate. The physical spacing of the devices during sampling was maintained at around 12 inches.

The samples were incubated for 5 days and then analyzed. Analysis comprised of identification and quantification in terms of colony forming units per cubic meter (cfu/m³). The appropriate positive hole correction factor was used in each case.

RESULTS

Statistical analysis was carried out on the results to compare performance of the two devices and this is presented in the following section.

As a simple comparison, Table 1 reports the average cfu/m³ for each species as well as the average total cfu/m³, for each device. On average, the BioCassette™ results are higher by 0.5 cfu/m³ per species per sample.

STATISTICAL ANALYSIS

Firstly, the data was tested for its distribution to decide the appropriate statistical test. Using Quantile/Quantile plots it was quickly evident that the data was neither normally nor log-normally distributed. That suggested a non-parametric test was appropriate.

The Mann-Whitney test was selected to compare the Andersen device and the BioCassette™. The null-hypothesis was that there was no difference between the data from the two sampling devices. There were 1,850 data points for each sampling device. The test had a confidence level of 95% and a power equal to or greater than 80%. The *p* value of the test was 0.195, thus the null hypothesis was not rejected. There is no statistically significant difference between the two sampling devices.



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As a comparison point, the paired *t*-test was run on the data. There is some doubt about the appropriateness of this test due to the underlying frequency distributions which are neither normal nor log-normal. There is also some question regarding the assumption of independence. Both of these issues may have an effect on the outcome of the paired *t*-test in a significant loss of power. That said, the paired *t*-test delivered the same conclusion. The *p* value was 0.395. Thus with a confidence level of 95%, the null-hypothesis of no difference between the data from the two sampling devices was not rejected. Therefore, there is no statistically significant difference between the two sampling devices as per the paired *t*-test.

CONCLUSION

There is no statistically significant difference between the two sampling devices.

These results are very robust and are found for both the Mann-Whitney test and the paired *t*-test.

	Average cfu/m ³ for Andersen and BioCassette™	
	Andersen	BioCassette™
<i>Acremonium</i>	1.1	0.5
<i>Alternaria</i>	0.9	1.4
<i>Aphanocladium</i>	0.2	0.0
<i>Aspergillus candidus</i>	0.0	0.4
<i>Aspergillus flavus</i>	0.2	0.0
<i>Aspergillus fumigatus</i>	0.0	1.1
<i>Aspergillus glaucus</i>	0.0	0.2
<i>Aspergillus nidulans</i>	0.0	0.0
<i>Aspergillus niger</i>	0.2	0.9
<i>Aspergillus ochraceus</i>	0.9	1.1
<i>Aspergillus sydowii</i>	0.2	0.2
<i>Aspergillus versicolor</i>	0.2	0.2
<i>Aspergillus, other</i>	0.5	0.5
<i>Aureobasidium</i>	3.1	2.7
<i>Basidiomycetes</i>	0.0	0.0
<i>Bipolaris/Drechslera</i> group	0.0	0.0
<i>Botrytis</i>	3.1	2.3
<i>Chaetomium</i>	0.4	0.0
<i>Cladosporium</i>	192.5	201.5
<i>Curvularia</i>	0.0	0.0
<i>Epicoccum</i>	0.5	1.4
<i>Fusarium</i>	0.5	0.7
<i>Geomyces</i>	0.0	0.2
<i>Mucor</i>	0.4	0.2
Non-sporulating fungi	6.1	7.4
<i>Oidiodendron</i>	0.0	0.2
<i>Paecilomyces</i>	0.4	0.4
<i>Penicillium</i>	102.4	99.7
<i>Phoma/coelomycetes</i>	1.1	2.2
<i>Stachybotrys chartarum</i>	0.0	0.0
<i>Thamnidium</i>	0.0	1.1
<i>Trichoderma</i>	0.2	0.0
<i>Ulocladium</i>	1.3	1.1
Yeasts	4.0	6.1
Species1	0.0	0.2
TOTAL cfu/m ³	320.1	333.7