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Case Study:

Nitrogen Dryer Improves Efficiency of PFAS Analysis by 400%

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APPLICATION

Microbac Laboratories, a life-science and environmental testing lab located in Marietta, OH, has been utilizing Organomation's nitrogen evaporators to dry down their PFAS extracts ahead of LC-MS/MS for years. They typically use the sample dryer to evaporate excess methanol from their samples. Like many environmental labs involved with per- and polyfluoroalkyl substances (PFAS), they started with our N-EVAP design as the sample concentrator cited in the major PFAS analysis methods - EPA 537.1 and 533.

THE SWITCH

Due to an increase in sample throughput needs and a lack of benchtop space, they began looking for a larger batch evaporator to replace their two 24 position N-EVAPs. Offering over double the sample capacity for almost the same footprint, the lab decided to go with the 64 position MULTIVAP - a compact evaporator that offers the same nitrogen blowdown and heated water bath capabilities that they were used to.



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RESULTS

After using the MULTIVAP for a couple months, the Microbac team noticed a significant increase in efficiency and productivity to their workflow. Anthony Canter, Microbac's Operations Manager stated...

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Overall, the experience has been very positive. **The MULTIVAP has provided a substantial increase in productivity, turning what was a bottleneck in our process to a highly efficient workflow.**

The MULTIVAP immediately requires less bench top space and can handle at least 100% more samples per unit area. The design of the sample rack and water bath seems to transfer thermal energy more efficiently. This coupled with the consistent flow across all samples blowing down at the same rate provides a finished sample in approximately **half the time of the N-EVAP.**

The timer functionality for the water bath and nitrogen flow also allows the progress of sample blow down to occur after normal working hours, utilizing more of the day without requiring staff overnight....

In summary, the MULTIVAP has provided at least a 400% increase in efficiency on the blow down step of our PFAS analysis, and Microbac intends to continue its use for the foreseeable future.

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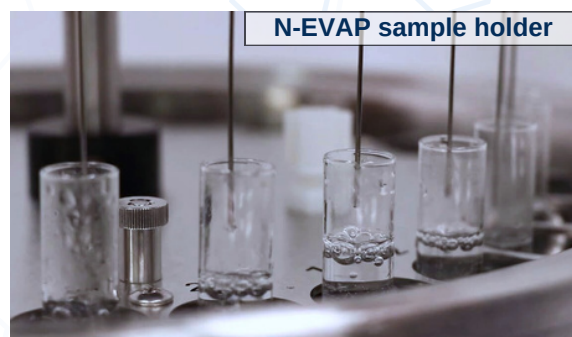
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RESULTS CONTINUED

To estimate the actual time savings that the MULTIVAP generated for the Microbac team, let's do a head-to-head comparison of the 24 position N-EVAP and the 64 position MULTIVAP for a hypothetical situation. Let's say Microbac Labs needs to dry down a batch of 64 PFAS extract samples to prepare them for their LC-MS system. Each 10 mL methanol sample will be evaporated to dryness.

To complete 64 samples, the N-EVAP will require three separate batches. It takes about 5 minutes to load a batch of samples and lower the individual needles into each test tube. At the recommended bath temperature of 63 °C (a few degrees lower than the boiling point of methanol), the 10 mL of solvent will take ~40 minutes to dry completely. However, since the N-EVAP is designed for flexibility and allows you to control gas flow to each individual position, some samples will receive less gas flow than others, causing variation in dry down times. Although some samples will be dry in 40 minutes, it's estimated that the last sample to dry will take closer to 1 hour. It then takes another 5 minutes to raise the needles out of the tubes, and unload the samples from the unit. In this scenario, it takes about 70-75 minutes to complete a batch of samples. To complete 3 batches and dry down all 64 samples, **the N-EVAP will take about 3.75 hours.**



In comparison, the MULTIVAP is able to dry down all 64 samples at once. Let's again estimate that it takes about 5 minutes to load all your samples into the evaporator. Only this time, that 5 minutes allows you to load all of your samples and lower all needles into the tubes at once due to the MULTIVAP's singular gas manifold design. You don't have to maneuver each individual valve tube like the N-EVAP. Using the same bath temperature of 63 °C, evaporation time for 10 mL of methanol is ~40 minutes. Because of the gas manifold design, each sample will receive the same amount of gas flow, allowing all samples to evaporate at the same rate. Then, it takes another 5 minutes to unload your samples. To dry down the same batch of 64 samples, **the MULTIVAP will take just 50 minutes – almost a quarter of the time as the N-EVAP.**



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MULTIVAP VS N-EVAP

So when should the MULTIVAP be used instead of the N-EVAP? This ultimately comes down to two things: desired sample capacity and tube sizes being used.

For labs that need minimal sample capacity, the small 6, 12, or 24 position N-EVAPs are the perfect size, so you aren't wasting bench space on unused sample positions. For commercial testing labs like Microbac that require lots of capacity, the MULTIVAPs provide a compact array format that's designed to maximize the number of samples within a small space.

The N-EVAP was designed with versatility in mind. Its spring-style sample holder allows a wide variety of tube sizes to be held at once, and the separate needle valves provide the individualized sample control that academic and core laboratories require. The MULTIVAP, on the other hand, was designed with uniformity in mind. For environmental or commercial labs that work with large batches of identical samples, the uniform heat and gas flow that the MULTIVAP offers is ideal. The manifold allows the user to start or stop evaporation to all samples at once with just one switch, saving a considerable amount of time, as proven by Microbac Labs.

Thinking about switching from an N-EVAP to a MULTIVAP? Talk with one of Organomation's experts today by contacting sales@organomation.com or try our free [sample evaporator product finder](#) to determine which model is best for your needs.

