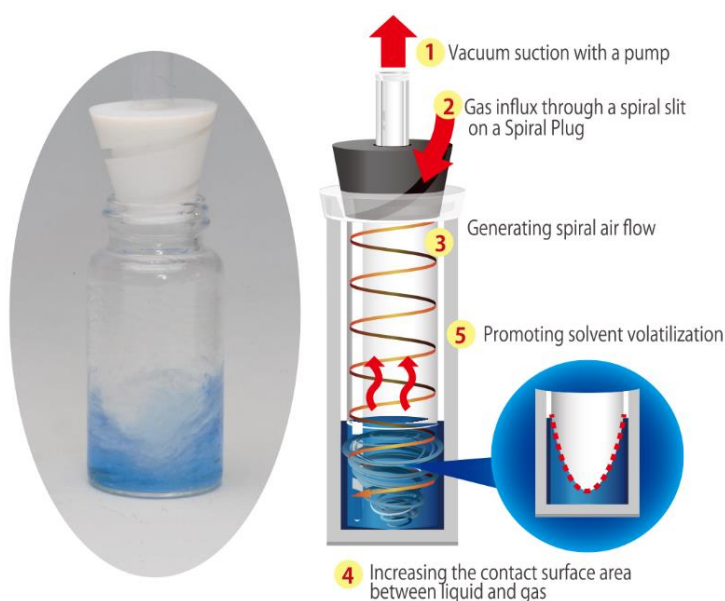


Improved Evaporation of Aqueous Samples

Evaporating or concentrating samples is a common step in many sample preparation methods. Concentration of the sample happens when the sample solution is evaporated and is often required as a final step before analysis. Although there is a wide variety of laboratory equipment that evaporate samples in different ways, this report looks at the advantages of Smart Evaporation technology for concentrating or removing water to dry aqueous samples.

What is Smart Evaporation technology?

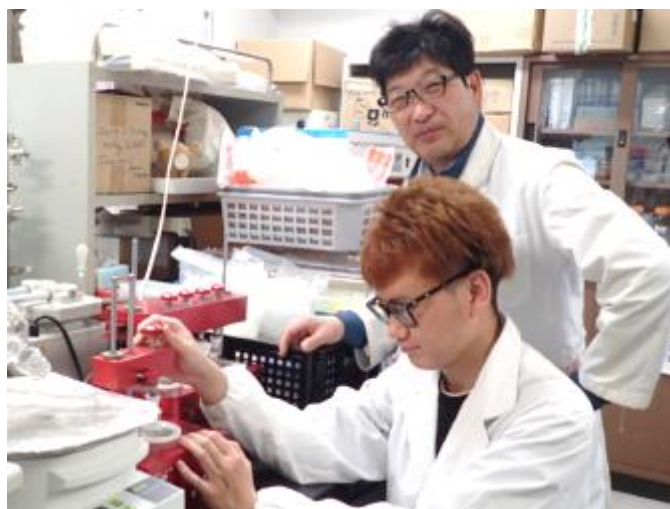


At the heart of each BioChromato Smart Evaporator is a highly efficient spiral airflow created by a special concentrator plug or “Spiral Plug”. This novel Spiral Plug technology generates a helical flow of air or inert gas agitating the surface of the solvent, increasing its surface area and thereby greatly improving the effectiveness and speed of evaporation. Beneficially since the evaporation vessel on a Smart Evaporator isn’t under high vacuum, there is no risk of bumping or splashing. Using Vacuum Vortex Concentration (VVC) methodology – Smart Evaporators increase efficiency by eliminating the time-consuming task of cleaning apparatus, potential loss of precious samples and the need to repeat the drying down process that can result from solvent bumping or splashing.

For a more in-depth technical introduction to Smart Evaporation technology please visit <https://biochromato.com/smart-evaporator/>

One of the reasons for researchers choosing the Smart Evaporator is its ability to remove high-boiling point solvents such as DMSO, DMF, or **water**. Please find below some feedback from Smart evaporator users routinely concentrating or fully drying aqueous samples.

Dr. Takashi Watanabe, Professor, Department of Medicinal Botany, Kumamoto University Graduate School of Pharmaceutical Sciences



- We are elucidating the mechanism of immunosuppressive tumor environment induced by cancer-associated fibroblasts (CAFs), screening CAFs-derived chemokine suppression by using plant-derived components, and searching for natural compounds that lead the stroma to be normal.
- Our Smart Evaporator is used for the removal of water and organic solvents. The complete removal of water is very important for the long-term storage of plant extracts.
- We really appreciate being able to remove water directly from aqueous samples rather than having to azeotrope with organic solvents and risk solvent bumping at atmospheric pressure when we evaporate the solvent. Drying 15 mL of aqueous plant extract, in a 20 ml screw top vial, took less than an hour (by adjusting the temperature setting) to concentrate and then dry completely.

For further information please visit

<https://biochromato.com/testimonials/smart-evaporator/37/>

Dr. T, Senior Researcher at a National Research Organization

- My research theme is to understand and control the dynamics of persistent organic compounds such as pesticides in the environment, especially in soil.

- For the elucidation of the dynamics of persistent organic pollutants, it is essential to determine the chemical structure of trace amounts of degraded metabolites.

Our Smart Evaporator is used to dry down the microbial degradation culture medium as a pre-treatment prior to analysis by single crystal X-ray structure analysis system or LC/MS.

- Previously, we used a rotary evaporator to evaporate the culture medium while azeotroping it with acetonitrile. Using our old method, there was a risk of contaminating samples with steam from the warm rotary evaporator water bath. We don't have to worry about this problem with our Smart Evaporator as it does not need messy water baths for heating and removing solvents.

- we have also found microbial liquid culture media tends to become more viscous as it is concentrated, so it was necessary to keep a close eye on the rotary evaporator to prevent bumping. By comparison, using our Smart Evaporator, the water can be directly evaporated without azeotroping with organic solvents. Since now there is no risk of bumping at normal pressure, we can leave the evaporation of our microbial liquid culture media samples unattended.

- it took less than 55 minutes (using the Spiral Plug made of Viton material) to concentrate and dry-solidify 10 mL of cultivation solution in a 50 mL vial. Not only did we save the time I used to spend, but we were able to do other work in the meantime since we didn't have to worry about solvent bumping.

For further information please visit

<https://biochromato.com/testimonials/smart-evaporator/30/>

Please find below a summary of a new technical report comparing the use of different evaporation technologies for drying aqueous samples.

Verification of Enzyme Activity

	1	2	3	4	5
Concentration method	None	Nitrogen blown	Smart Evaporator C1 (with Spiral Plug "for Water")		
Conditions	-		Nitrogen flow	Nitrogen circulation	Atmospheric circulation
Flow rate	None	5L/min	10L/min	10L/min	10L/min



**Spiral Plug
SP-V series**

Table 1: Sample preparation conditions

In this report we compare concentration of an aqueous papain solution on a Smart Evaporator and a nitrogen blowdown evaporator before redissolving the dried sample and measured its enzyme activity.

The results showed that the enzyme activity of the sample concentrated by Smart Evaporator C1 was the same or higher than samples concentrated by the nitrogen blowdown (which can sometimes thermally degrade sensitive samples). It was also found that the concentration speed with Smart Evaporator C1 was about three times faster than that of the nitrogen blowdown evaporator.

To download and read this technical report in full please visit

https://biochromato.com/wp-content/uploads/Smart-Evaporator-Verification-of-Enzyme-Activity_No.02_211013.pdf