



Merck cites EnWave's REV™ Technology as a Faster, Viable Drying Alternative to Vial-Based Lyophilization for Vaccines and Biologics

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EnWave Corporation (TSX-V:ENW | FSE:E4U) ("EnWave", or the "Company" <https://www.commodity-tv.com/ondemand/companies/profil/enwave-corp/>) announces today that Merck & Co. Inc ("Merck") published a research paper citing EnWave's freezeREV® process as a viable manufacturing alternative to vial-based lyophilization for vaccines and biologics. The research article entitled "*Evaluation of Microwave Vacuum Drying as an Alternative to Freeze-Drying of Biologics and Vaccines: The Power of Simple Modeling to Identify a Mechanism for Faster Drying Times Achieved with Microwave*" was published in the January 19, 2021 edition of PharmSciTech, the official journal of the American Association of Pharmaceutical Scientists.

Merck's nine-month evaluation used a lab-scale freezeREV® unit manufactured by EnWave specifically for the dehydration of pharmaceutical products. The goal of the study was to determine the uniformity and repeatability of Microwave Vacuum Drying (MVD) when used to dry liquid vaccines in vials. This evaluation is the first of its kind to scientifically document the efficacy of microwave-vacuum drying, more specifically freezeREV®, for the drying of vaccines.



The authors of the research article note that both the global pandemic and the rapid spread of COVID-19 have emphasised the need for accelerated vaccine development and on-demand, flexible manufacturing options. The published evaluation results stated that “Microwave vacuum drying serves as a faster alternative to freeze drying of biologically active materials such as vaccines, proteins, and microorganism cultures”. Data from the study shows that EnWave’s *freezeREV*[®] process reduces drying cycle times by 80% to 90% while maintaining product activity and stability when compared to lyophilization. Lyophilization drying times are seen as a significant bottleneck for vaccine manufacturing. The research article also confirmed that EnWave’s *freezeREV*[®] process demonstrates “comparability between EnWave’s *freezeREV*[®] and freeze-dried samples” for drying uniformity and repeatability. The significant decrease in drying times was also accompanied by increased manufacturing flexibility.

Merck has been an EnWave research partner since 2015.

EnWave plans to continue collaborating with GEA Lyophil through a Joint Development Agreement to further refine its *freezeREV*[®] technology to potentially benefit Merck’s ongoing work regarding vaccine dehydration.

The full research article can be found at [Springer Link](#).

About EnWave

EnWave Corporation, a Vancouver-based advanced technology company, has developed a Radiant Energy Vacuum (“REV[™]”) – an innovative, proprietary method for the precise dehydration of organic materials. EnWave has further developed patent-pending methods for uniformly drying and decontaminating cannabis through the use of REV[™] technology, shortening the time from harvest to high-quality, marketable cannabis products.

REV[™] technology’s commercial viability has been demonstrated and is growing rapidly across several market verticals in the food, and pharmaceutical sectors, including legal cannabis. EnWave’s strategy is to sign royalty-bearing commercial licenses with innovative, disruptive companies in multiple verticals for the use of REV[™] technology. The company has signed over forty royalty-bearing licenses to date in twenty countries world-wide. In addition to these licenses, EnWave established a Limited Liability Corporation, NutraDried Food Company, LLC, to manufacture, market and sell all-natural dairy snack products in the United States, including the Moon Cheese[®] brand.

EnWave has introduced REV[™] as a disruptive dehydration platform in the food and cannabis sectors: faster and cheaper than freeze drying, with better end product quality than air drying or spray drying. EnWave currently offers two distinct commercial REV[™] platforms:

1. *nutraREV*[®] which is a drum-based system that dehydrates organic materials quickly and at low-cost, while maintaining high levels of nutrition, taste, texture and colour; and,
2. *quantaREV*[®] which is a tray-based system used for continuous, high-volume low-temperature drying.

More information about EnWave is available at www.enwave.net.

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