



Application Bulletin

Hard Seltzer Filtration Process Improved with Pall Solutions

Overview

Hard seltzer is experiencing a rise in popularity thanks to health-conscious consumers. Easier access to dietary information has led to consumers becoming increasingly aware of their nutritional needs, and purchasing decisions are no longer just based on taste, but on health factors too.

With a low-calorie count and a reduced alcohol content of between 4-5%, hard seltzer is attracting health-conscious men and women of all ages. Often gluten-free, it provides a cost-effective alternative to traditional alcoholic beverages. Its wide appeal continues to drive sales with market research company IWSR predicting this category will have a volume CAGR (compound annual growth rate) of 20.9% in the coming years.¹

The Challenge

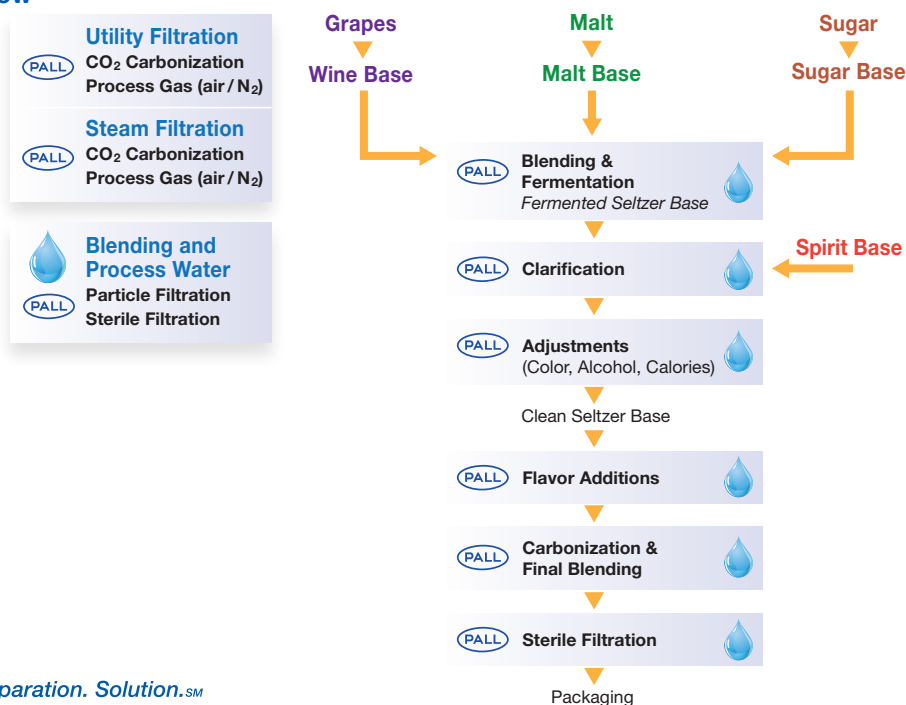
The base product of hard seltzer is usually from neutral spirits, wine, malt or sugar. While there is some variation among hard seltzers, most are a clear, usually colorless beverage. Getting a colorless, flavorless base is a crucial step that can pose some challenges. After fermentation,

hard seltzer can be hazy and have a slight color. As yeast behaves differently in this step than it would if fermenting a product like beer, it can create fermentation by-products, which can negatively affect flavor and odor. Powdered Activated Carbon (PAC) beds are the traditional method used in the food and beverage industry for adsorption applications, achieving odor removal, decolorization or removal of trace impurities. While this is effective, the handling of the powder, labor intensity, long contact time and associated handling and cleaning costs present some of the most significant drawbacks to this method.

The fruit taste is sensitive to heat but can also get lost with an improper decolorization or alcohol reduction. Low pH levels combined with CO₂ limits the possible contaminants, but the low alcohol level combined with the absence of hops or sulfur makes hard seltzer products receptive to spoilage microorganisms. Fruit sources create new and different yeast and bacteria as potential spoilers.

All these factors have a major impact on the taste profile of hard seltzer, and therefore selection of the right technology is important.

Process Flow





Clarification and Color Removal

Prior to color removal, a clarification step is first required to remove yeast, haze and other solids that might be present. Successful filtration of various bases can be achieved with Pall's SUPRA lenticular module solutions or crossflow filtration systems.

Pall's SUPRApak™ lenticular modules are the latest development in sheet-based filtration. The modules have a filter area higher than most lenticular modules and a unique flow configuration that maximizes filtration and adsorption. For higher solids applications, SUPRAdisc™ II modules may offer a better solution. The dual drainage plate design of these modules enables a robust construction that can accommodate high particle loads as well as superior resistance to back pressure.

For color removal, Pall's SUPRAdisc AKS Modules alleviate the PAC drawbacks with modules that fit directly into enclosed housings. In AKS modules, carbon is integrated into the filter matrix without the use of any binding agents to maintain the adsorptive capacity.

Pall customers have found that by utilizing the SUPRAdisc II K Series modules and SUPRAdisc AKS Series carbon impregnated modules, they can achieve highly effective decolorization of the malt base. A common arrangement is to position

the AKS step after a centrifuge and SUPRAdisc II Modules with the goal of removing color from their neutral base.

Customers choose this SUPRA clarification and AKS combined approach as they provide a cost-effective solution, quicker implementation and speedier delivery and low capex. This combination also provides a low risk, effective option for developing new product and selling them to test markets. For example, one customer, used two SUPRAdisc housings and modules resulting in production of around 25,000bbl of neutral base alcohol per year.

The SUPRA module formats are easy to use, enclosed assemblies providing a smaller footprint. Although the clarification step prior to AKS is not absolutely required, it is highly recommended to optimize the efficiency and service life of the AKS.

SUPRA modules benefits:

- Low maintenance, simplified handling and cleaning
- Compact filter design for limited floor space
- Low capex requirement, low risk for production of new products
- Adaptable to a wide variety of production demands



SUPRAdisc II Module



SUPRAdisc AKS Module



Enclosed Housing



For higher volume producers stepping into this market, Pall's crossflow membrane filtration systems can be coupled with downstream nano or RO filtration systems to offer an ideal solution for clarification and decoloring. These membrane systems minimize waste, water and utility consumption while increasing production efficiency. The systems are fully automated with membranes that can be regenerated for long service life resulting a short return on investment.

Flavor and Microbial Stabilization

Having only low amounts of carbohydrates, sugars, alcohol and protein levels means that developing the right taste profile can be a challenge with hard seltzer. Therefore, selection of relevant technology is important. Pall membrane filter cartridges can improve shelf life while preserving the original flavor. Microbial stabilization is achieved with filters can be installed in individual housings or in a system solution like the CFS NEO system positioned before packaging. With the PARE cartridge filter family, Pall provides a selection of specifically developed pre and final filters matching the individual demands of the products and microbial challenges. Avoiding thermal treatment like pasteurization reflects positively on the flavor of the packaged product.

Additionally, for quality control of the hard seltzer production process and release of the finished product, Pall offers Genedisc® technology. The



GeneDisc Cycler

GeneDisc system is a PCR method for fast, precise and simple microbial detection.

Ensuring quality of utility fluids like water, steam and gas is important for eliminating unwanted airborne particles and visible contaminants. Pall has proven experience in providing the highest level of protection through validated microbial and bacteriophage removal filters.

For more information on Pall's solution for hard seltzer production, please contact Pall.



CFS NEO System



About Pall Corporation

Pall Corporation is a global filtration, separation and purification leader providing solutions to meet the critical fluid management needs of customers across the broad spectrum of life sciences and industry. We work with our customers to advance health, safety and environmentally responsible technologies. Pall Food and Beverage provides products and services to ensure product quality and maintain process reliability in beverage and food production. Our solutions also assist in consumer protection, waste minimization and reduction of operating costs.

Reference

¹ https://www.theiwsr.com/wp-content/uploads/Press-Release-IWSR-Releases-New-Global-Data_29May19.pdf



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Please contact Pall Corporation to verify that the product conforms to your national legislation and/or regional regulatory requirements for water and food contact use.

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