

VELCORIN

VELCORIN® is the trade name for dimethyldicarbonate (DMDC), a microbial control agent produced by LANXESS. Since 1988, VELCORIN technology has been used in the United States in wine, low-alcoholic wine and juice, juice sparklers, sports drinks, and ready-to-drink teas. VELCORIN technology is very effective at low dosages against a broad range of yeast, bacteria and molds. Unlike other chemical preservatives, VELCORIN (DMDC) is non-persistent and does not affect wine taste, bouquet or color. In addition, DMDC can remain active for several hours (depending on hydrolysis rate), thereby helping to eliminate contamination from sources such as bottles, closures and filling equipment.



APPLICATIONS:^{*}

- **To help prevent refermentation in finished ciders and/or perries.**

Ciders and perries containing residual sugar are susceptible to fermentation in the bottle, which can lead to haze, off-odors, off-flavors and effervescence. Adding VELCORIN (DMDC) to cider and/or perry during bottling can help prevent refermentation.

- **To reduce or eliminate sorbic acid.**

The product VELCORIN can be used to replace or decrease sorbate, which is sometimes used in ciders and/or perries that contain residual sugar.

- **To decrease the amount of sulfur dioxide used in cider and/or perry.**

Sulfur dioxide, used in combination with VELCORIN technology, has been shown to achieve microbial stability at lower overall sulfur dioxide levels.

- **Expanded packaging options.**

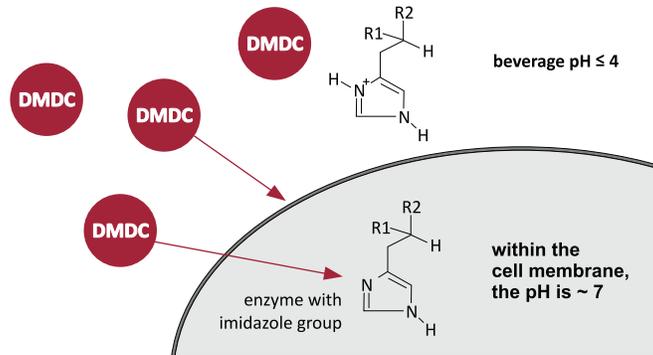
Packaging options are more diverse because the product, Velcorin (DMDC), is used with cold filling technology. Velcorin (DMDC) can be used with all known packaging types, including plastics (such as PET, PVC or HDPE), cans, glass, bag-in-box, and others.

**As with any product, use of VELCORIN, a microbial control agent, in a given application must be tested by the user in advance to determine suitability.*

FREQUENTLY ASKED QUESTIONS

How does VELCORIN work?

VELCORIN (DMDC) controls microorganisms by entering the cell and inactivating some of the key enzymes required for cell function. Specifically, DMDC is thought to react with the histidyl residues of proteins, including those involved in the active site of many enzymes. Susceptible enzymes are consequently rendered functionless due to blockage of the active site and/or conformational changes in structure. Excess DMDC then completely hydrolyzes in the presence of water.



What factors determine VELCORIN (DMDC) effectiveness?

The effectiveness of VELCORIN technology depends on microbial type, microbial load and other factors. At low doses, VELCORIN (DMDC) is very effective against yeast. At greater doses, DMDC is also effective against bacteria and certain fungi. Pretreatment of wine must reduce the microbial load to less than 500 CFU/mL. VELCORIN is not a replacement for good sanitation practices.

Organism	Inoculation (CFU/mL)	Minimum Lethal Concentration (mg DMDC/L beverage)
<i>Acetobacter aceti</i>	50	250
<i>Acetobacter pasteurianus</i>	250	80
<i>Botrytis cinerea</i>	500	100
<i>Brettanomyces intermedicus</i>	500	100
<i>Brettanomyces spp.</i>	360	<50
<i>Gluconobacter oxydans</i>	125-5,000	250
<i>Kloeckera apiculata</i>	500	25-50
<i>L. buchneri</i>	~500	30
<i>Lactobacillus brevis</i>	~500	200
<i>Pichia anomala</i>	500	25-50
<i>Pichia farinosa</i>	500	50-100
<i>Pichia membranefaciens</i>	500	30
<i>Saccharomyces bayanus</i>	890	150-200
<i>Saccharomyces cerevisiae</i>	500	25-100
<i>Saccharomyces uvarum</i>	500	20
<i>Zygosaccharomyces bailii</i>	500	50-150
<i>Zygosaccharomyces priorianus</i>	500	90

LANXESS
Dr. Marcus Taupp, 2011

The data presented in the table above is approximate values taken from several series of tests. Actual results will vary on a wine by wine basis.

How do I know that VELCORIN technology will work against my specific cider/perry microorganism?

While VELCORIN technology is effective against a wide array of microorganisms, the only way to know whether it will be effective in your specific environment is to run a VELCORIN Challenge test.

Do I have to list VELCORIN (DMDC) as an ingredient on the label?

No, the FDA lists dimethyldicarbonate (DMDC) as a direct secondary food additive and therefore no labeling is required (21 CFR 101.100).

How much VELCORIN (DMDC) can I use in my cider/perry?

The TTB allows up to 200 ppm total of DMDC to be used in cider and/or perry (27 CFR 24.246).

How do I determine VELCORIN product was dosed accurately?

The most common analytical method for determining whether the desired ppm amount of VELCORIN product was added is by methanol analysis. Methanol is a naturally occurring by-product of fermentation and baseline methanol concentrations vary in cider/perry. Therefore, samples for methanol analysis must be taken before and after VELCORIN product dosing to determine whether the desired level of VELCORIN product was achieved.

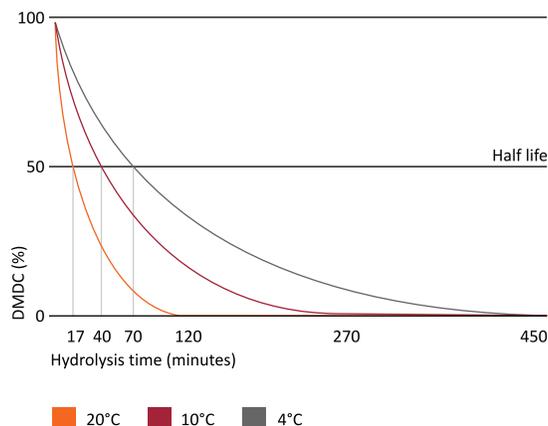
FREQUENTLY ASKED QUESTIONS

What type of packaging is compatible with VELCORIN technology?

VELCORIN technology can be used with all known packaging options, including plastics (such as PET, PVC or HDPE), aluminum cans and bottles, glass, bag-in-a-box, stainless steel kegs and others.

How long does VELCORIN (DMDC) remain active?

VELCORIN (DMDC) activity is based on its hydrolysis rate. Hydrolysis occurs when DMDC reacts with water to form methanol and carbon dioxide. The rate of this reaction is dependent on the temperature of the wine. At 10°C(50°F) it takes approximately four hours for DMDC to completely break down. At 20°C (68°F) breakdown occurs in about two hours.



Why do I have to use an approved dosing system?

Due to the unique physical properties of VELCORIN (DMDC) and to help assure safe handling, LANXESS Corp. requires the use of VELCORIN DT dosing machines. DMDC is hydrophobic and solidifies at 17°C (63°F). The dosing machines are engineered expressly for VELCORIN (DMDC) to prevent solidification and aid in DMDC solubility. Temperature controls, specific safety features and a special metering system, are also incorporated into the design.

I don't have a VELCORIN-dosing machine. How can I use VELCORIN technology to treat my wine?

There are now several companies that offer a mobile VELCORIN-dosing service. Please see our website (<https://scottlab.com/mobile-velcorin>) for a complete list of these companies.

Is VELCORIN-treated cider and/or perry approved in countries other than the U.S.?

VELCORIN approval is product and country specific. Please note that it is the exporter's responsibility to ensure the tradeability of products. For a current list of countries that allow VELCORIN-treated cider and/or perry, please contact Scott Laboratories, Inc.

For questions regarding efficacy of the product, specific applications, import and export regulations, and laboratory analysis, please contact Scott Laboratories, Inc. at (707) 765-6666 or velcorin@scottlab.com.

The information in this brochure is, to the best of our knowledge, true and accurate. The data and information, however, are not to be considered as a guarantee, expressed or implied, or as a condition of sale of our products. Furthermore, it is understood by both buyer and vendor that wine is a natural product. Circumstances such as fruit qualities and cellar conditions are infinitely variable. It is the responsibility of the buyer to adapt the use of our products to such circumstances. There is no substitute for good winemaking practices or ongoing vigilance.

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Health & Safety Information: Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling Velcorin®. Before working with this product, you must read and become familiar with the available information on its hazards, proper use, and handling. This cannot be overemphasized. Information is available in several forms, e.g. material data sheets and product labels. Consult your Scott Laboratories representative or contact the Product Safety and Regulatory Affairs Department at LANXESS Corporation.

