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Thermoacidophilic bacterial (TAB) spore removal by 0.45 µm membrane cartridge filters

Overview

Spore-forming microbes, such as *Alicyclobacillus* species, negatively affect product quality and provide risks to manufacturers of fruit juice and ingredients utilized in beverage production (*e.g.* sugars, flavors and colors). *Alicyclobacillus* species, though nonpathogenic and not a risk for consumption, do cause economic damage.

The membrane capability study detailed below provides the rationale by which Oenopure™ (GB grade) and MEMBRAcart XL II (0.45 micron grade) should be utilized for this application.

Supporting Data

A study of *A. acidoterrestris* spore removal (bacteria in the TAB spoilage group) shows that the Supor® membrane from Oenopure (GB grade) and MEMBRAcart XL II (A045 grade) filters provides complete retention of the TAB spores in different fluids tested under laboratory conditions. In this same testing it was shown that the Supor membrane from MEMBRAcart XLII (A065 grade) filters retained spores completely whilst only the Supor membrane 0.8 µm membrane showed slight passages of spores. The challenge test results are summarized in Table 1.

Table 1: Results of TAB Spore Challenge Tests

Membrane from filter type	Challenge Fluid	LRV*
Oenopure GBW and MEMBRAcart XLII 419A045	1/15mol phosphate buffer	>7.8, >7.8, >7.8
	100% clear apple juice	>7.0, >7.0, >7.0
	High fructose corn syrup	>7.8, >7.3, >7.3
Supor EBW Control	1/15mol phosphate buffer	>7.3
	100% clear apple juice	>6.4 and >6.5
	High fructose corn syrup	>6.8 and >7.3
Oenopure GKW and MEMBRAcart XLII 419A065	1/15mol phosphate buffer	>7.9, >7.9, >7.9
	100% clear apple juice	>7.0, >7.0, >7.0
	High fructose corn syrup	>7.8, >7.8, 7.8
Supor 800	1/15mol phosphate buffer	6.6 and 6.7
	100% clear apple juice	5.3 and 5.7
	High fructose corn syrup	5.7 and 6.3

* Data shown in the table represent the log reduction value (LRV) of three filter membrane disks with TAB spores. The total challenge was at least 10^6 up to more than 10^7 CFU per filter disk.

Recommendation

Oenopure (GB grade) and MEMBRAcart XLII (419A045) are recommended for use in applications for TAB spore removal.

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