



PhytoCide Elderberry OS

Active Micro Technologies

Technical Data Sheet



BACKGROUND

The superfruit trend is one of the largest growing segments in the cosmetics industry. These fruits are recognized not only for their health benefits, but also for their unique marketing appeal. Elderberry certainly fits the description of a superfruit. Several species of *Sambucus* produce this type of berry. Two common varieties of *Sambucus* are the American elder (*S. Canadensis*) and the European elder (*S. nigra*), which has also been naturalized to the Americas. These two are often discussed simultaneously in the literature given that they have several components in common and therefore provide similar benefits.

SCIENCE

Elderberries have traditionally been used for making wine, syrup, and confectionaries. The flowers and berries of these plants have been used most often for medicinal purposes. Elderberries are rich in a variety of phytonutrients that exhibit both antioxidant and anti-inflammatory properties, such as caffeic acid, chlorogenic acid, ferulic acid, and quercetin. The fruit also contains anthocyanins, which have been shown to help boost the immune system.

BENEFITS



Antioxidants, like those found in elderberries, are excellent additions to skin care regimens as they provide protection from free radicals that contribute to cell damage, aging, and wrinkle formation. Bioflavonoids, which can also be found in elderberries, exhibit astringent properties that help tighten the skin and provide additional anti-wrinkle benefits. This unique superfruit is also an excellent source of undecylenic acid, an organic fatty acid that provides broad antimicrobial benefits, but is especially effective against fungal microorganisms.

To capture both the cosmetic and the antimicrobial benefits of elderberry, **Active Micro Technologies** developed **PhytoCide Elderberry OS**, an efficacious, multi-functional natural alternative to the traditionally used preservatives in cosmetic and personal care applications. This product is oil-soluble, and therefore, can be used in a variety of anhydrous and oil-containing formulations. The effectiveness of **PhytoCide Elderberry OS** was evaluated to determine Minimum Inhibitory Concentrations (MIC), as well as its performance in Challenge testing.



PhytoCide Elderberry OS

Active Micro Technologies

A modified Minimum Inhibitory Concentration (MIC) test was performed to evaluate the antifungal benefits of **PhytoCide Elderberry OS**. The results demonstrate that concentrations between 1% and 5% are capable of inhibiting the growth of the test organisms.

| Organism | Time | 1.0% | 5.0% | + Control | - Control |
|-------------|----------|------|------|-----------|-----------|
| C. albicans | 24 Hours | G | G | G | NG |
| | 48 Hours | NG | NG | G | NG |
| | 5 Days | NG | NG | G | NG |
| | 7 Days | NG | NG | G | NG |
| A. niger | 24 Hours | G | G | G | NG |
| | 48 Hours | G | G | G | NG |
| | 5 Days | G | NG | G | NG |
| | 7 Days | NG | NG | G | NG |

Figure 1. Minimal Inhibitory Concentrations, G=Growth, NG=No Growth

A Double Challenge test against Gram(+) and Gram(-) bacteria, as well as yeast and mold was completed to further elucidate the broad antimicrobial efficacy of **PhytoCide Elderberry OS**.

| | <i>E. coli</i> | <i>P. aeruginosa</i> | <i>S. aureus</i> | <i>C. albicans</i> | <i>A. niger</i> |
|--------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Inoculum level (initial) | 7.5 X 10 ⁵ | 2.7 X 10 ⁵ | 7.2 X 10 ⁵ | 2.4 X 10 ⁵ | 2.1 X 10 ⁵ |
| Day 1 | >99.999% | 99.997% | >99.999% | 99.996% | 99.996% |
| Day 7 | >99.999% | 99.997% | >99.999% | 99.996% | 99.996% |
| Day 14 | >99.999% | 99.997% | >99.999% | 99.996% | 99.996% |
| Day 21 | >99.999% | 99.997% | >99.999% | 99.996% | 99.996% |
| Day 28 | >99.999% | 99.997% | >99.999% | 99.996% | 99.996% |
| Inoculum (re-inoculated) | 8.3 X 10 ⁵ | 5.2 X 10 ⁵ | 6.8 X 10 ⁵ | 2.3 X 10 ⁵ | 2.4 X 10 ⁵ |
| Day 7 | >99.999% | 99.998% | >99.999% | 99.996% | 99.996% |
| Day 14 | >99.999% | 99.998% | >99.999% | 99.996% | 99.996% |
| Day 21 | >99.999% | 99.998% | >99.999% | 99.996% | 99.996% |
| Day 28 | >99.999% | 99.998% | >99.999% | 99.996% | 99.996% |

Figure 2. Percent reduction in viable microorganism concentration.

USE RECOMMENDATIONS

PhytoCide Elderberry OS is temperature stable up to 75°C and its antimicrobial properties are most effective between a pH of 3 and 8. The suggested use levels are between 1% and 5%. This unique, multi-functional ingredient delivers antioxidant and anti-aging skin conditioning benefits, while providing natural antimicrobial efficacy for cosmetic formulations.