

BioEstolides – OSI Oxidative Stability Study

Biosynthetic® Technologies is a specialty product company that supplies BioEstolides™ to the Beauty and Personal Care industry. We produce non-toxic, eco-friendly, sustainable, biobased, biodegradable oils with enhanced performance properties available in commercial volumes. Our vision at Biosynthetic Technology is to deliver high performing, sustainable solutions for a sustainable future.

Oxidative Stability

When formulating quality personal care products, oxidative stability is an important property to understand. The oxidative stability of the ingredients in the formulation will impact shelf life and how long products last over time. Working with more stable ingredients reduces the risk of having materials expire before they can be used or end up in formulations with short shelf-lives. It also eliminates the need for additional preservatives and antioxidants that are used to stabilize bio-based oils.

Consumers continue looking for more sustainable, bio-based, natural products. While there are many natural oils on the market, not all bio-based products are still able to offer the benefit of enhanced oxidative stability comparable to what is found in mineral oil or synthetic products. BioEstolides™ are bio-based and come with excellent oxidative stability so formulators no longer need to pick between using ingredients that are either bio-based or shelf stable.

To measure oxidative stability, a standardized method was used in which a stream of purified air is passed through a sample at a specified flowrate and at an elevated temperature. The air and temperature degrade the test sample into volatile organic acids which are captured in deionized water filled conductivity cell that dissolves the acids. The acidity changes the conductivity of the water. The rapid rise in conductivity corresponds to the induction point which gives an oxidative failure as a function of time.

Method: Oil Stability Index Testing (AOCS Cd 12b-92)

Products Tested:

- BioEstolide 30 (BE30)
- BioEstolide 250 (BE250)
- BioEstolide 1300 (BE1300)
- Sunflower Oil
- Castor Oil
- Mineral Oil
- Petrolatum
- Dimethicone

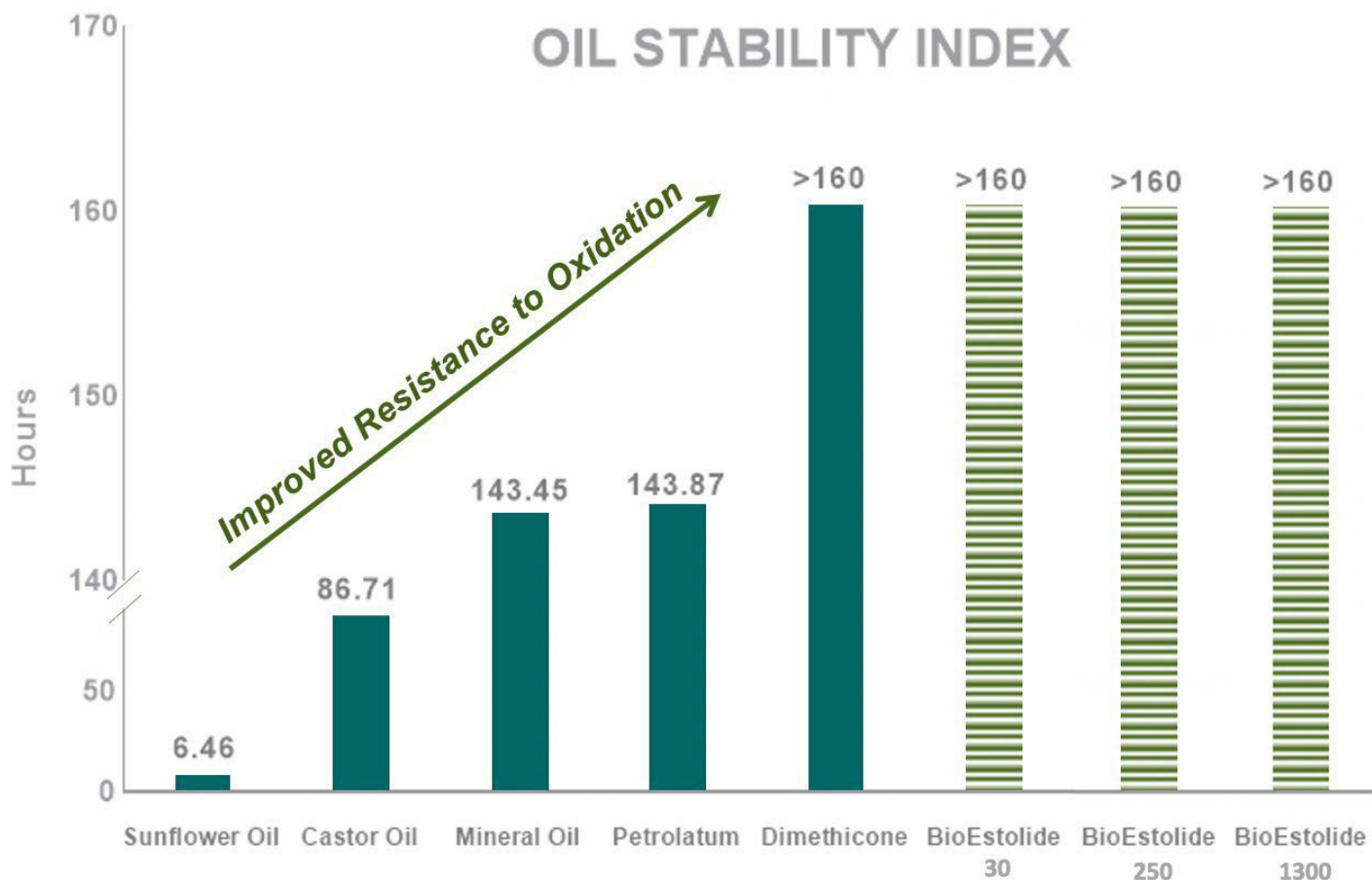
Procedure:

All products are individually heated to 110°C and monitored until sufficient oxidation has taken place as specified per AOCS Cd 12b-92.

Results and Discussion:

All products were tested using the same conditions and testing was stopped at 160 hours. As products oxidized during the test, any materials that went rancid prior to the completion of the test were removed from the testing and the timeframe for how long they lasted was documented.

Results for all samples are shown below. All BioEstolide samples reached the maximum 160 hours so they are shown in one bar for simplicity on the graph.



Only the BioEstolides and Dimethicone lasted the full 160 hours, far outlasting the other natural products and even outlasting mineral oil and petrolatum. This enhanced oxidative stability is a strong performance benefit that enhances the overall stability and shelf life of a formulation and allows industry to move toward more bio-based products that do not require a sacrifice on stability. In addition, no additional preservatives or antioxidants are needed to stabilize BioEstolides™.

Conclusion

BioEstolides offer the personal care market a stable bio-based alternative to mineral oil and petrolatum that can outlast other bio-based products. BioEstolides are bio-based, biodegradable, gentle on the skin, non-toxic, and non-bioaccumulative. It's becoming more and more important to ensure the personal care industry is able to offer the market safe sustainable products that still meet the performance expectations that consumers have come to expect from their personal care products.

BioEstolide™ Performance and Applications

BioEstolides™ are suitable for use in skin care, hair care, sun care and color cosmetics. Using castor based fatty acids as the base of our product lines, we have developed a class of molecules that offer exceptional moisturization, are easy to apply, and have ample playtime. BioEstolides™ offer enhanced oxidative, hydrolytic, and thermal stability. The BioEstolide line is available in multiple viscosity grades to offer the formulator the latitude to create products. Lower viscosity grades offer excellent solubility while the higher viscosity grades disperse heavier particles and can be used as thickener.

BioEstolides™ are used to formulate creams, lotions, balms, gels, serums, aerosols, solids, and solid and gel sticks. In color cosmetics, they are used in tinted moisturizers, foundations, blush, bronzer, highlighters, lip balms, oils and sticks, mascara, and eye make-up. In sun care formulations, they solubilize chemical sunscreens or aid in the dispersion of physical sunscreens for reef-safe products. In haircare, they are used to improve manageability, create shine, and protect the hair cuticle in shampoos, rinse-out conditioners, leave-in conditioners, thermal protectants, hair dyes, hair lighteners, hair relaxers and other styling aids.

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