

# Silicone Replacement in Hair Care Using BioEstolides™: Hair Shine Study #1

**Biosynthetic® Technologies** supplies specialty additives 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 Technologies is to deliver high performing, sustainable solutions for a sustainable future.

Consumers and manufacturers are looking for bio-based alternatives to silicones and petroleum-based products. BioEstolides™ have been designed to offer enhanced oxidative, hydrolytic, and thermal stability to help protect the cuticle of the hair during processing and styling. In addition, BioEstolides™ have been found to help detangle wet or dry, enhance shine, provide moisture, and reduce frizz.

## Products Discussed:

- BioEstolide™ 30 (BE30)
- BioEstolide™ 250 (BE250)
- BioEstolide™ 250-100 (BE250-100)
- BioEstolide™ 1300 (BE1300)
- BioEstolide™ 1300-100 (BE 1300-100)

## Hair Care Study

A blind study was performed using BioEstolides™ in place of a Silicone Quat Microemulsion. Simple formulations were used based on water, an emulsifier and one test ingredient (a BioEstolide™ or silicone) at the same treat rate. The test was performed on textured hair that varied from coarse, heavy to fine, thin hair.

Category	Silicone	BioEstolide™ 30	BioEstolide™ 250	BioEstolide™ 1300
Shine	3.17	5	5	4.5
Combing	4.33	3.5	4.5	3.5
Smoothness	4.5	3.5	4	3.5
Initial Weight	4.5	2.5	3.5	3
Ease of Blow Drying	4.5	3.5	4.5	3.5
Ease of Flat Ironing	4	4.5	4.5	3.5
Residual Weight on Hair	4.5	2	3.5	3
Dry Hair Smoothness	4.17	4.5	4.5	3.5
Dry Hair Combing	4.5	4.5	4.5	3.5

<b>Body</b>	<b>4.5</b>	<b>3.5</b>	<b>4</b>	<b>3.5</b>
<b>Volume</b>	<b>4.5</b>	<b>3.5</b>	<b>4</b>	<b>3.5</b>
<b>Overall Performance</b>	<b>4.5</b>	<b>3.5</b>	<b>4.5</b>	<b>3</b>

### Suggested Uses in Hair Care:

**BioEstolide™ 30** is our lightest oil and can be used in hair products replacing low thermal stability natural oils, mineral oils or silicones. It can also be used in leave-in conditioners or styling aids as it does not leave a sticky film on the hair. It imparts a nice shine and smooths the hair and is far less volatile than similar viscosity oils. BioEstolide™ 30 has a Natural Origin Index of 0.68.

**BioEstolide™ 250** is a slightly heavier product. It can be used in rinse off and leave in conditioners and hair masks for dry damaged hair where additional moisturization is needed. It imparts a nice shine and helps protect the hair from thermal damage. In some applications it can be used as a silicone replacement as shown above where it outperformed the silicone quat in shine, smoothing, wet and dry combing, and with the use of hot tools. BioEstolide™ 250 has a Natural Origin Index of 0.86.

**BioEstolide™ 250-100** is similar to the BE250 but with a Natural Origin Index of 1.0.

**BioEstolide™ 1300** is the heaviest of our oils. It can be used in conditioners and hair masks. It is a viable silicone replacement in any hair care product. It imparts a nice shine and helps protect the hair from thermal damage. It can also be suitable for pomades or gels where slight hold is expected. The Natural Origin Index of BioEstolide™ 1300 is 0.94

**BioEstolide™ 1300-100** is similar to the BE1300 but with a Natural Origin Index of 1.0.

### BioEstolide™ 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.