



AESTHETICS



THE SCIENCE BEHIND THE ESSE AESTHETICS  
RANGE

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# Introduction to the Esse Aesthetics

Aesthetic beauty treatments have grown in popularity in the past decade. These treatments damage the skin in order to reduce wrinkle depth and smooth the skin's appearance upon healing. Uneven pigmentation and scarring can also be targets for these procedures.

The controlled damage done to skin during an aesthetic treatment has the purpose of recruiting fibroblasts to deposit collagen and remodel tissue. This goal is intrinsic to wound healing, in which a series of processes occur in turn:

- › **Haemostasis** initiates first and involves vasoconstriction and blood clotting to control blood flow to the site of the wound. Cytokines produced during haemostasis also start to attract immune cells to the site.
- › **Inflammation** follows, in which immune cells of multiple types clear debris in the wake of the wound, while eliminating unwanted microbes. The inflammatory response involves the production of growth factors and signalling compounds that recruit fibroblasts for collagen production. This means that inflammation is a crucial element of wound healing, upon which collagen deposition and the results of an aesthetic treatment are dependent.
- › Cell **proliferation** then initiates. Here, keratinocytes proliferate to re-epithelialize, fibroblasts produce extracellular matrix proteins including collagen (mostly type-III) and elastin, and endothelial and smooth muscle cells form new vascular networks.
- › The final stage of the wound healing process is that of tissue **remodelling**. Here, type-I collagen is deposited to replace the type-III collagen that was produced during the proliferative stage. Type -I collagen is stronger and more organised than type-III, so the deposition of type-I collagen during restructuring is essential for regaining tissue strength and resilience.

It is important to note that all of these stages of wound healing are crucial for achieving optimal results from an aesthetic treatment. It is therefore within the best interests of both the client and the practitioner for the client to move through each of the respective stages of wound-healing as quickly as possible, without attenuating any of the stages.

Esse has adapted its probiotic technology to prepare the skin for these treatments and to aid in rapid recovery that will maximise the desired results while protecting against pathogens that might slow the healing process or cause adverse reactions.

The Esse Aesthetic range leverages the well-established utility of topical probiotics in wound healing to speed up the healing process, allowing a smooth progression through each stage of wound healing. It achieves this without disrupting any of the processes necessary for fibroblast recruitment

and collagen deposition, while protecting skin from potential pathogens. This is an approach that optimises the treatment outcomes and minimises the risk associated with such treatments.

The range consists of three products – the Pre-Care Oil, the Post-Care Oil, and the Activator. In the two weeks prior to an aesthetic treatment, the Pre-Care Oil is used with the Activator to improve barrier function and reduce the chance of an unbalanced inflammatory response. The Post-Care Oil and the Activator supports the skin with post-treatment care to protect it from infection and allow the skin's microbiome to re-establish homeostasis.

In preparation for an aesthetic treatment, we have used minimalist formulations that introduce the skin's immune system to low doses of the actives that we will be using post-treatment in higher doses. It is risky to introduce new ingredients once the skin's barrier function has been compromised. We introduce the skin to live probiotics, Sapienic Acid, Hyaluronic Acid, and Vitamin E in low doses before the treatment to ensure that the immune system has become habituated to these ingredients when the client uses these actives post-treatment

Following the treatment, we boost the levels of these ingredients to speed up healing and maximise the efficacy of the treatment. The probiotics are increased to levels that allow them to protect against pathogens by competitive exclusion. Sapienic Acid is used at a level that is highly selective nutrient source for the skin's commensal microbes and Vitamin E is used at a high level to protect from reactive oxygen species and reduce inflammation.

The range is fragrance-free, and we have excluded any ingredients that may trigger an inflammatory response post-treatment.

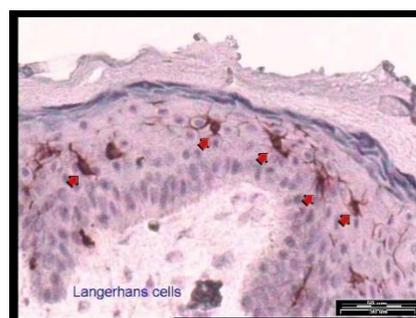
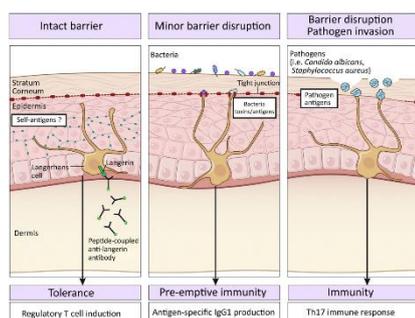
- › Low dose **live probiotics** to improve barrier function and habituate skin's immune system
- › **Sapientic Acid** to reduce populations of potential pathogens
- › **Lipid structures** that mimics sebum's metabolic hurdles for protection against pathogenic bacteria.
- › Low-dose **Vitamin E** to ensure the skin's habituation to the ingredient before Post-Care

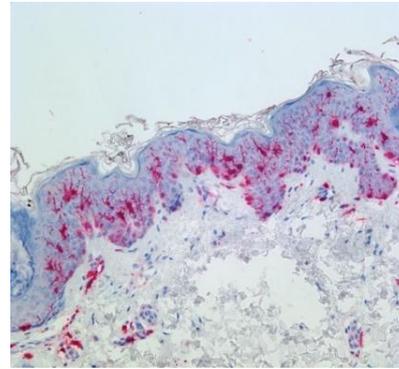
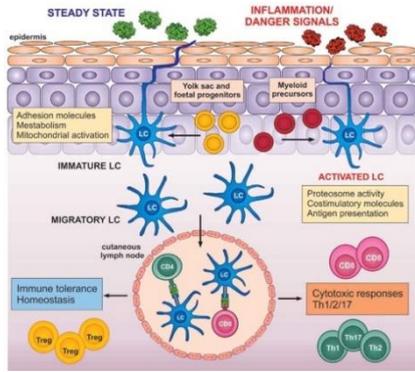
## Live Probiotics

The Pre-Care Oil contains **1 million live probiotic bacteria per millilitre**. This is a low dose that will habituate the skin's immune system to *Lactobacillus* to ensure that there isn't an inflammatory response with the application of the Post-Care Oil which contains a higher dose of live probiotics.

The probiotics are spray-dried into a vacuum to encapsulate them in microspheres that have a water-soluble coating. These spheres are passed through extremely fine sieves to remove any particles large enough to be perceivable on application. The absence of water is a trigger that causes *Lactobacillus* probiotics to enter a dormant state that maintains their viability at room temperature for at least 18 months. Water absorbed from the air is a risk to the long-term viability of the probiotics, so we distribute them in an oil base under a Nitrogen atmosphere in airless packaging to ensure that they are protected from air until use. Upon mixing the Pre-Care Oil with the Activator in the palm of the hand, mild emulsifiers in the Activator allow the release of the microcapsules from the oil base. These then dissolve in the pH-buffered solution to release the probiotics onto skin.

Langerhans cells in the skin have dendrites that can detect microbes in the stratum corneum and above. Information about the potential danger associated with these microbes is then passed to the rest of the immune system. The Pre-Care Oil contains the same three strains of *Lactobacillus* probiotics as the Post-Care Oil, only in far lower numbers. The aim is to allow the skin's immune system to sense these three strains in the two weeks preceding an aesthetic treatment and to initiate a tolerance response as it identifies the probiotics as beneficial members of the skin's microbiome.





*Lactobacillus* probiotics have been shown to boost the skin's barrier function by improving the quality and quantity of tight-junctions in the stratum granulosum<sup>1-4</sup>. This improved barrier function will prepare the skin for the upcoming aesthetic treatment which often has an impact on the skin barrier

## Sapienic Acid

To reduce the populations of potential pathogens on skin, we have used low-dose **Sapienic Acid** in the Pre-Care Oil.

This is the most abundant fatty acid in human sebum, and it is unique to our species, *Homo sapiens*, hence the name Sapienic Acid. This acid is not found in meaningful concentrations in our internal tissues, so it really is unique to human skin. It is toxic to pathogenic species like *Staphylococcus aureus* as depicted in

Figure 1 below. More importantly, Sapienic Acid can alter the behaviour of *S. aureus*, reducing its virulence<sup>5</sup>. It has been shown to alter the expression of over 500 genes in *S. aureus*, involved in many aspects of virulence and cellular physiology, and also to reduce the expression of toxins in this troublesome species.

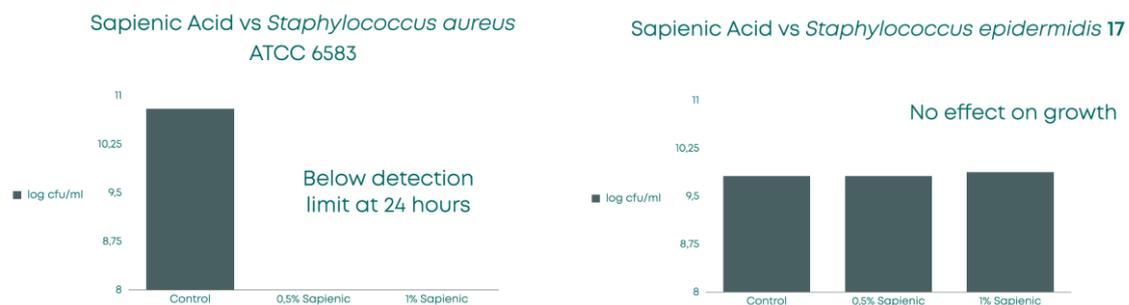


Figure 1 : Sapienic Acid vs *S. aureus* Figure 2 : Sapienic Acid vs *S. epidermidis*

Figure 2 shows that members of a normal skin microbiome, like *Staphylococcus epidermidis*, are much less susceptible to the effects of Sapienic Acid. This is expected as these species have co-evolved with humans over hundreds of thousands of years.

The Pre-Care Oil uses Sapienic Acid at low levels that inhibit the growth of pathogens while leaving the rest of the skin microbiome unaffected.

## Vitamin E

The Pre-Care Oil also contains low-dose Vitamin E. This is largely to habituate skin to this ingredient.

## The Oils

The base oils are Ximenia, Jojoba and Squalane, mimic sebum's unique metabolic hurdles for microbes.

Ximenia contains eclectic fatty acids like Ximenynic Acid and ultra-long chain fatty acids that are difficult for microbes to metabolise unless they have an appropriate enzyme set.

Jojoba contains ~97% long-chain fatty acid esters and alcohols with a high percentage (~73%) being 11-Eicosenoic Acid (C20:1).

Squalane is a C<sub>30</sub> hydrocarbon derived from olive oil. It has been included in the product to mimic squalene, which makes up around 20% of sebum.

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Pre-Care Oil – ESPO22052

**Ximenia Americana Seed Oil, Simmondsia Chinensis (Jojoba) Seed Oil\*, Squalane, Hydrogenated Vegetable Oil, Hexadecenoic (Sapienic) Acid, Lactobacillus, Tocopherol, Helianthus Annuus (Sunflower) Seed Oil, Vanillin, Ascorbyl Palmitate**

100% natural origin of total

26% of the total ingredients are from organic farming

# The Post-Care Oil

- › Increased dose of **live probiotics** to **improve barrier function** and **protect** compromised skin **by competitive exclusion**
- › **Sapienic Acid** to defend against infection by **killing potential pathogens**
- › Lipid structure that mimics sebum's metabolic hurdles to protect against pathogens.
- › High dose **Vitamin E** to **boost healing**

## Live Probiotics

This oil contains **100 million live probiotic bacteria per ml**. At these higher doses, *Lactobacillus* probiotics can help to protect skin from pathogens by competitive exclusion. This means that the probiotics will occupy all the binding sites and consume all the available nutrients on the skin, making it difficult for invading species to find a niche.

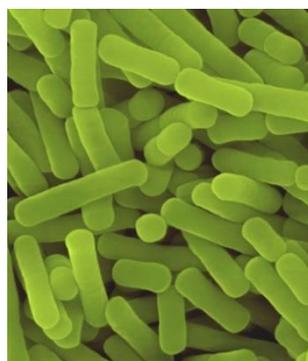
The Activator is needed to release the probiotics by dissolving the microcapsules in a buffered solution containing a curated nutrient mix that will favour the probiotics.

We have chosen probiotic strains that produce high levels of Anti-Microbial Peptides (AMPs). These selective antimicrobials protect against opportunistic species like *Staphylococcus aureus*.

Probiotics have also been shown to repair barrier function by calming the immune response and improving the quality and quantity of tight-junctions.

### *Lactobacillus crispatus*

- > Inhibits the growth of *Staphylococcus aureus* and other pathogens to **reduce potential for infection**
- > **Improves barrier function** and **reduces inflammation**
- > Produces Lactic Acid to **reduce skin pH**



*Lactobacillus* makes up a meaningful part of the skin microbiome<sup>6</sup>.

This product provides millions of colony forming units of *Lactobacillus crispatus* in each ml. With a combination of DNA sequencing studies and culture studies, we have shown that these bacteria can shift the skin microbiome by introducing *Lactobacilli* as a part of the skin microbiome.

This particular species has been shown to possess impressive defence mechanisms. It can produce a diverse array of Anti-Microbial Peptides (AMPs), providing a useful barrier to opportunistic invasion. These AMPs can help to prevent infection post treatment.

*Lactobacillus crispatus* is capable of producing compounds that eradicate pathogens that are already present on the skin, and these compounds can enter epithelial cells to deal with pre-internalised pathogens<sup>7</sup>.

This species inhibits the association of pathogenic microbes with epithelial cells, constantly keeping threats at bay<sup>7</sup>. An additional benefit of live *L. crispatus* is that it accelerates the re-epithelialisation process, which is particularly beneficial for healing post treatment and maximising the improvement in the appearance of the skin. This effect was not observed with heat-killed *L. crispatus*<sup>8</sup>.

Application of *Lactobacillus* on skin has shown improvement in the quantity and quality of tight-junctions, leading to improved barrier function. This will reduce inflammation as fewer microbes cross the barrier and the cytokine cascade is avoided. *Lactobacilli* have also been shown to stimulate the skin's own immune defenses<sup>9,10</sup>, boosting AMP production in keratinocytes.

### *Lactobacillus rhamnosus*

- › **Anti-inflammatory** - alleviates the effects of pro-inflammatory cytokines on epithelial barriers<sup>11</sup>. Reduces production of inflammatory cytokines<sup>12-14</sup>
- › **Increases the expression of Tight-junction proteins** in epidermal keratinocytes. This means better barrier function, leading to a reduced inflammatory response<sup>1,4,9</sup>
- › Inhibits the effects of pathogenic infection (*Staphylococcus aureus*) on skin cells by competitive exclusion and adhesion inhibition<sup>15-19</sup>

### *Lactobacillus plantarum*

- › By reducing the production of inflammatory cytokines it is **anti-inflammatory**<sup>20-24</sup>
- › Improving the quality and quantity of tight-junctions<sup>4,25</sup>
- › Improved pathogen inhibition<sup>24,26-29</sup> by reducing pathogenic biofilms and competitive exclusion

- › Enhanced wound-healing<sup>23,24,26-28,30</sup> by increasing re-epithelisation of affected areas
- › Improves skin hydration<sup>31</sup> and induces increased Hyaluronic Acid production in skin cells<sup>32</sup>
- › Enhanced collagen synthesis<sup>33,34</sup>
- › Exerts antifungal<sup>35</sup> effects

*L. plantarum* also improves re-epithelialisation and wound-healing<sup>23,24,26-28,30</sup>. This species also induces increased production of Hyaluronic Acid by skin cells, improving hydration<sup>31,32</sup>.

*L. plantarum* has been shown to exert antifungal activity, which is useful in controlling *Candida* populations<sup>35</sup>

All three species have been shown to attenuate inflammatory responses by reducing production of inflammatory cytokines, and by downregulating the expression of matrix metalloproteinases (MMPs)<sup>12-14,20-24,36-38</sup>. All three species have been shown to increase the production of tight-junction proteins, increasing the number and quality of tight-junctions between epithelial cells. This improves the ability of these cells to regulate the passage of pathogens and substances<sup>1,4,9,25,39,40</sup>. Re-establishing barrier function post treatment is pivotal to healthy skin recovery.

*Lactobacillus* species are capable of inhibiting the growth of pathogenic microbes by competitive exclusion, inhibition of pathogen adhesion and by secretion of antimicrobial substances<sup>15-19,24,26-29,41,42</sup>.

## Sapienic Acid

To help the probiotics to protect vulnerable skin after a treatment, we have included **Sapienic Acid**.



Sebum is the primary nutrient source for the microbes that constitute the skin microbiome. Human sebum is eclectic in comparison to other mammals and supports tightly co-evolved commensal microbes that are integral to optimal skin health. Sapienic Acid is the most abundant fatty acid in human sebum, and it is unique to human skin, occurring nowhere else in the animal kingdom. The acid is toxic<sup>5,43</sup> to skin pathogens like *S. aureus* and our laboratory has shown that it is well tolerated by skin commensals like *S. epidermidis*. This allows us to protect skin from potential infection without

destroying the endogenous microbes that are essential for optimal barrier function.

We produce Sapienic Acid by enzymatic cleavage from plant source and have run independent trials in Bonn, Germany to demonstrate its safety and efficacy. At this point, our laboratory is the only one in the world that produces Sapienic Acid at a meaningful scale.

The ecosystem of the skin microbiome is intractably complex. The manipulation of the nutrient source is the most reliable way to shift this ecosystem toward the balance that has been optimised by hundreds of thousands of years of evolution.

## Vitamin E

Vitamin E is the most abundant oil-soluble antioxidant found in human skin. The Post-Care Oil contains a high dose of **Vitamin E** (Tocopherol) to boost the healing capacity of the skin.

Vitamin E is normally provided to the skin through sebum. It accumulates in the sebaceous gland and is secreted into the stratum corneum, where it accumulates in the extracellular matrix before being distributed into the lower layers of skin. It helps with photoprotection by preventing UV-induced free radical damage. Topical application helps to protect skin from reactive oxygen species and from UV light. Vitamin E also has many anti-inflammatory roles in skin.

Vitamin E on its own is easily lost from the skin, especially when exposed to UV which is why we stabilise it with oil-soluble Vitamin C (Ascorbyl Palmitate). In human subjects, the use of Vitamin E on skin lowers peroxidation of skin surface lipids<sup>44</sup>, decreases erythema<sup>45</sup>, and limits immune cell activation after UV exposure<sup>46</sup>.

Vitamin E has anti-inflammatory properties and has been used successfully in the treatment of chronic inflammatory skin conditions<sup>47</sup>.

Vitamin E is a family of eight molecules with similar structures.  $\alpha$ -Tocopherol is the predominant form found in the skin and it is by far the most biologically active form.  $\beta$ -Tocopherol has half the biological availability and,  $\gamma$ -, and  $\delta$ -tocopherol have little activity but have extremely high antioxidant capacity. In the Post-Care Oil (as with the Pre-Care Oil), we use a majority  $\alpha$ -tocopherol with small amounts of the others to aid in protection from free radicals. Use of unesterified Vitamin E, similar to that found in natural sources, has provided the most consistent data concerning its topical efficacy.

Vitamin E levels decrease rapidly at the site of a cutaneous wound along with other skin antioxidants<sup>48</sup>. Topical supplementation is an effective way to

replenish antioxidants in compromised skin. Environmental pollutants like ozone can also decrease Vitamin E levels in skin<sup>49</sup>.

## Base Oils

The base oil mix draws from years of experience with sensitive skin products. Ximenia and Jojoba are eclectic in their fatty acid composition and present skin microbes with a nutrient source that resembles sebum as closely as possible. This favours the growth of commensal skin microbes over potential pathogens. Squalane mimics squalene, which is a major component of human sebum.

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Post-Care Oil – ESPO22053

**Ximenia Americana Seed Oil, Simmondsia Chinensis (Jojoba) Seed Oil\*, Squalane, Hydrogenated Vegetable Oil, Hexadecenoic (Sapienic) Acid, Lactobacillus, Tocopherol, Helianthus Annuus (Sunflower) Seed Oil, Vanillin, Ascorbyl Palmitate**

100% natural origin of total

26% of the total ingredients are from organic farming

# The Activator

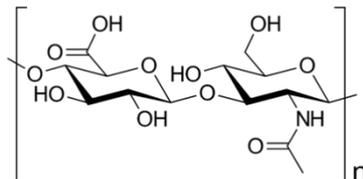
- › The Activator contains a **mild emulsifier** - (Polyglyceryl-6 Caprylate, Polyglyceryl-4 Caprate) - that will **release the probiotics** from the oil when the client mixes the two products in the palm of their hand.
- › The Activator is a **buffer solution** balanced at **pH 5**. It will **dissolve the water-soluble probiotic capsules** and create an optimal pH for growth.
- › It also contains a selective **prebiotic nutrient mix**. Each of the oils seeds the skin with live probiotics and the prebiotic nutrient mix in the Activator feeds the beneficial microbes.
- › **Hyaluronic Acid** helps to interrupt the cytokine cascade and **reduce inflammation**, while **boosting moisture** levels in skin.

The client should keep the amount of Activator constant at 2 pumps per application and tailor the amount of oil to the needs of their skin. More oil can be added for a dry skin and less for an oily skin.

## Hyaluronic Acid

- › **Aids in wound healing** and scar treatment
- › **Reduces inflammation** by interrupting the cytokine cascade
- › **Holds moisture in the skin** to increase hydration

Hyaluronic Acid (HA) has seen application in the area of wound-healing and scar treatment<sup>50,51</sup>.



When Hyaluronic Acid of the correct molecular size is used, it is capable of reducing inflammation, by reducing inflammatory cytokine secretion<sup>52,53</sup>. Hyaluronic Acid is, in fact, an important mediator for inflammatory responses throughout the body. The sizes of Hyaluronic Acid polymers used in Esse products (60 to 80 kDa) are specifically selected to maximize penetration and reduce inflammation<sup>54</sup>.

We source the Hyaluronic Acid from bacteria rather than the usual source which is animal cartilage or rooster combs.

## Prebiotics

- › Gluco and Fructo-oligosaccharides
- › Yacon juice
- › Inulin

Gluco- and Fructo-oligosaccharides are complex chains of sugar molecules, which humans are not able to metabolise<sup>55,56</sup>. Opportunistic pathogens are not able to access these nutrients, but some of the commensal microbes on your skin are able to break down these complex chains and use them to replicate. The metabolites that these microbes produce activate your skin's natural defence systems. This makes life very difficult for invading species, which are not only fending off your skin's immune response, but also do not have easy access to the nutrient supply.

Yacon tubers have been found to be very rich in Fructo-oligosaccharides and other prebiotics<sup>57</sup>. Esse uses cold-pressed juice from the Yacon tubers to provide food for beneficial microbes. The varied prebiotic content in Yacon juice supports a range of commensal microbes.

This combination is geared towards activating your skin's own defence systems, both by activating immune responses and tight-junction formation in skin cells, and by empowering your beneficial microbes to form healthy and strong populations, keeping harmful competitors at bay.

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### Activator Serum - ESPP33054

Aqua (Water), **Alpha-Glucan Oligosaccharide**, Glycerin, **Sodium Hyaluronate**, Polyglyceryl-6 Caprylate, Polyglyceryl-4 Caprate, **Polymnia Sonchifolia Root Extract**, **Inulin**, Xanthan Gum, Levulinic Acid, Sodium Levulinate, Glyceryl Caprylate, Dehydroacetic Acid, Vanillin, **Lactic Acid**, **Tocopherol**, Sodium Phytate, Helianthus Annuus (Sunflower) Seed Oil, Ascorbyl Palmitate  
99.9% natural origin of total

1% of the total ingredients are from organic farming

The organic percentage is low because we made the decision not to use Aloe vera extract. Our goal was to minimise the chance of adverse reactions by keeping the number of ingredients to a minimum. Compromised skin can be sensitised by even mild ingredients.

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