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FORMULATING
Body Serums

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1. FORMULATING BODY SERUMS

1. FORMULATING BODY SERUMS

In this lesson, we will cover:

1. What is a body serum?
2. Different types of body serum.
3. Functions/benefits and properties/qualities of body serums.
4. Ingredients used in body serums.
5. Packaging.
6. Shelf-life.
7. Examples on the market.
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9. Factors to consider when creating your formula.

WHAT IS A BODY SERUM?

Just like facial serums, body serums provide specific benefits and high-performance ingredients to the skin on our bodies. We normally spend more time taking care of our facial skin, but the skin on the rest of the body is just as complex. While it is true that our faces get much more sun and air exposure, which affects the condition of the skin, many people experience problems with the skin on their body as well. Extremely dry, sensitive, aging or dull skin on the body requires just as much attention and care, with well-formulated products to address these issues. Body serums are more advanced body care products that go beyond the basic moisturizing benefits of lotions and body creams. With the right choice of active ingredients, they can address the issues of many skin types.

From a marketing point of view, body serums are an interesting, novel product that grabs the attention of a consumer more than just a regular body lotion. Many big and innovative brands are launching body serums in their cosmetic lines.

DIFFERENT TYPES OF BODY SERUM

Body serums can be any of these formula types:

- Anhydrous body serums.
- Emulsion-based body serums.
- Gel-based body serums.
- Bi-phase body serums.

The choice of product type will depend on the desired product properties and the ingredients you wish to include.

FUNCTIONS/BENEFITS AND PROPERTIES/ QUALITIES OF BODY SERUMS

Body serums can address many different skin issues and can be formulated to suit different skin types. The functions and benefits offered by a body serum will depend on the skin type it is formulated for and the particular solution it is aiming to provide, for example:

- moisturizing/anti-dryness
- soothing
- antioxidant
- anti-aging
- repairing
- rejuvenating
- protective
- exfoliating/resurfacing

Properties of body serums can vary a lot, depending on the product type – from more nourishing anhydrous serums to light and refreshing gel serums.

INGREDIENTS USED IN BODY SERUMS

Body serums can contain various ingredient types, depending on the product type. Body serums, just like facial serums, can include:

Water soluble ingredients (except for anhydrous serums), including:

- Water/hydrosols (solvent).
- Water-phase thickeners.
- Humectants.
- Water soluble actives, vitamins and extracts.

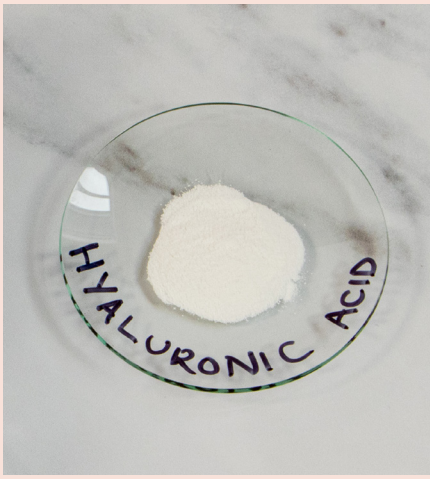
Oil soluble ingredients, including:

- Carrier oils.
- Esters.
- Oil soluble active ingredients (eg Vitamin E, coenzyme Q10).
- CO_2 extracts.
- Oil-phase thickeners.
- Emulsifiers (in emulsion-based serums).

Above: Purified water

WATER/HYDROSOLS/ALCOHOL (SOLVENTS)

Gel-based, emulsion-based and bi-phase body serums contain water (or other aqueous ingredients such as hydrosols) as the main ingredient. Water is the solvent because other ingredients are dissolved in it. Purified water should be used in cosmetics (usually distilled or deionized). Hydrosols (flower waters) can also be used. They are a natural byproduct of the production of essential oils; a distilled product that contains the water soluble and volatile part of the plant. They are mild and non-irritating.



Above: Hyaluronic acid

WATER-PHASE THICKENERS

Natural thickeners like xanthan gum, konjac gum, guar gum, etc, are used in gels and emulsions to increase the viscosity and stabilize the formulations.

HUMECTANTS

Humectants attract water to the skin and bind it there. Examples are glycerin, sodium lactate and hyaluronic acid. An alternative to glycerin are glycerites/botanical glycerol extracts which are botanical extracts in glycerin. Plant material is extracted into a glycerin base, which is a great way of getting the beneficial properties of the plants into your products. Examples are licorice root and horse chestnut extract.

WATER SOLUBLE ACTIVE INGREDIENTS

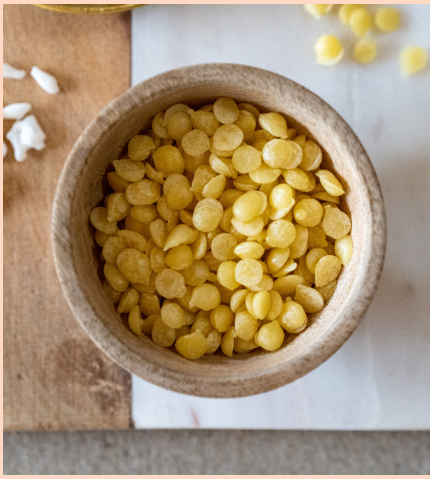
Many different water soluble active ingredients can be used and they offer a variety of different properties. Examples are AHA complex for exfoliating and moisturizing benefits, Vitamin B3 for brightening benefits, aloe vera for soothing properties, and green tea extract for antioxidant properties.

CARRIER OILS

Carrier oils (also known as vegetable oils, plant oils or fixed oils) are made of fatty acids and other beneficial ingredients such as phytosterols, vitamins, carotenoids and squalane. Fatty acids in the oils are in the form of triglycerides. They penetrate the upper layers of the epidermis and help the skin to function properly, plus they improve its condition and appearance.

Other components, often referred to as 'unsaponifiables' can have different beneficial effects on the skin – they can protect from moisture loss, they can soften the skin or even have a rejuvenating effect on it. When oils are applied to the skin they fill up the small spaces between epidermal cells, which is seen and felt as smoother, healthier and softer skin. This is a property of emollients.

Above: Coenzyme Q10



Above: Beeswax

ESTERS (ALTERNATIVES TO SILICONE)

Esters can be used as silicone alternatives to give the products a silky slip and a very light skin feel, commonly referred to as a 'dry oil' feeling. Naturally derived esters, for example EcoSilk (INCI: Isoamyl Laurate, Isoamyl Cocoates) are great for combining with heavier oils to make the overall formulation less greasy. They are also very good solvents for lipophilic active ingredients; they improve the spreadability of the formula and create a very light, elegant feel.

LIPOPHILIC ACTIVE INGREDIENTS

To make serums even more potent, we can also include lipophilic active ingredients in the formulation. High-performance ingredients like lipophilic vitamins (E and A) alpha lipoic acid, coenzyme Q10 or carotenoids will add even more benefits to your serum formulations.

OIL SOLUBLE BOTANICAL EXTRACTS

Botanical extracts that are soluble in oil can also be used in many serum types. CO_2 extracts can be used for fragrancing the products or for their active components to bring certain benefits to the skin (eg the soothing effects of calendula CO_2 extract). Essential oils will add fragrance to the product along with other components beneficial to the skin.

OIL SOLUBLE THICKENERS/VISCOSITY MODIFIERS

Viscosity modifiers change the texture of the product, increase the viscosity and stabilize emulsions. Ingredient examples are various plant butters (eg shea butter), waxes (eg beeswax or plant waxes), fatty alcohols (eg cetyl alcohol) and other special ingredients like cera bellina (modified beeswax) or hydrogenated vegetable oil.

EMULSIFIERS

Emulsifiers are key ingredients in emulsion-based serums. They hold the oils and water together.

PACKAGING

The packaging of body serums will depend on their type, ingredients and viscosity. Generally, they use similar containers as body lotions and creams but in larger volumes than facial serums (100ml and up). Since many serums contain ingredients that are sensitive to light, oxygen and high temperatures, it is best to choose protective packaging, eg amber glass bottles. Airless pumps are also a good option, especially for thicker serums, as they prevent air contact with the product. For thinner serums, bottles with a lotion pump are commonly used, while thicker body serums can use jars.

SHELF-LIFE

The shelf-life of body serum depends on the overall formulation, packaging type and manufacturing process. If the serums contain water they require a broad-spectrum preservative to prevent microbial spoilage. Which preservative and how much of it will be needed depends on the formulation (the ingredients it contains, the pH, etc). Generally speaking, most of the preservatives we cover in this course can provide a shelf-life of six-12 months.

The only way of knowing how well your product is preserved is by getting it challenge tested. This is a lab-performed test that checks how well the preservatives protect your formula. Challenge and stability tests will give you reliable information on the shelf-life of your product.

If the serums contain very sensitive ingredients, eg ascorbic acid (Vitamin C) they may become ineffective sooner, even if they are still microbiologically safe. Ascorbic acid, for example, oxidizes quickly, and even if the serum is not yet spoiled, the Vitamin C will lose most of its properties.

Emulsifiers are key ingredients in emulsion-based serums.

Body serums can also contain oils and other lipid ingredients that can go rancid if they oxidize. Generally, oils with a high content of saturated fatty acids (coconut oil, cocoa butter) will have a long shelf-life (about two years) as those fatty acids are not prone to oxidation. Oils with lots of monounsaturated fatty acids (eg avocado oil, sweet almond oil, hazelnut oil, macadamia nut oil) will have a shorter shelf-life of about one year, while oils rich in polyunsaturated fatty acids (eg borage oil, evening primrose oil, hemp seed oil, rosehip oil) will have a very short shelf-life of a maximum six months. Please note that combining short shelf-life and long shelf-life oil will not extend the shelf-life of the short life oil.

The shelf-life of the oils in the serum can be extended beyond their 'natural' expiry date. Add an antioxidant (either Vitamin E at 0.1% or rosemary extract at 0.2-0.4%) to your carrier oils when you open them. Alternatively you can include an antioxidant (either Vitamin E at 0.1% or rosemary extract at 0.2-0.4%) to your product formula.

EXAMPLES ON THE MARKET

REN CLEAN SKINCARE AHA SMART RENEWAL BODY SERUM

£35 per 200ml

www.renskincare.com

Product highlights/description:

"A moisturizing body serum containing AHAs that works with the skin to naturally exfoliate, leaving skin radiant with a natural glow. This 10 percent AHA exfoliating body serum delivers a full-body exfoliation without scrubbing. This lightweight body moisturizer has a lotion-like texture that boosts the skin's natural exfoliation process while deeply hydrating. The results? Softer, smoother skin with a more even tone. Now you can glow from head-to-toe. The body serum is rich in lactic acid and xylitol, which are able to draw water molecules within the skin to the surface (hello, hydration!). This game-changing body moisturizer also contains probiotics, which boost the skin's defense barrier, instantly hydrating and smoothing. Stronger, healthier skin is only an application away."

INCI: Water, Butyrospermum Parkii (Shea) Butter, Lactic Acid, Sodium Lactate, Lactococcus Ferment Lysate, Lysolecithin, Sclerotium Gum, Xylitylglucoside, Xanthan Gum, Anhydroxylitol, Pullulan, Parfum* (Fragrance), Mannitol, Xylitol, Sodium Benzoate, Citrus Aurantium Dulcis (Orange) Flower Oil, Citrus Grandis (Grapefruit) Peel Oil, Citrus Nobilis (Mandarin) Peel Oil, Citrus Tangerina (Tangerine) Peel Oil, Tocopheryl Acetate, Potassium Sorbate, Faex (Yeast) Extract, Glucose, Silica, Sodium Chloride, Glycogen, Magnesium Ascorbyl Phosphate, Citric Acid, Citral, Limonene, Linalool. *100% natural fragrance.

Our analysis:

This is a light emulsion (probably a gel-cream) type of serum that uses natural polysaccharides (sclerotium gum, xanthan gum and pullulan) and a natural emulsifier (lysolecithin) to bind water and oils (shea butter) together. The emulsifier thickener is most likely Ecogel, judging by the INCI list. It contains AHA (lactic acid) for exfoliating and moisturizing properties. It moisturizes the skin with the use of humectants like mannitol, xylitol and its derivatives (xylitylglucoside, anhydroxylitol – a blend with the commercial name Aquaxyl). It helps skin renewal with a prebiotic ingredient lactococcus ferment lysate, which is a complex ingredient made from bacterial cells. The serum uses citrus essential oils (orange, grapefruit, mandarin and tangerine) for fragrance. It is preserved with a mixture of sodium benzoate and potassium sorbate. It also contains a Vitamin C derivative, but at a very low percentage.

ONE LOVE ORGANICS GARDENIA + TEA ANTIOXIDANT BODY SERUM

$39 per 120ml

https://oneloveorganics.com

Product highlights/description:

"One Love Organics Gardenia + Tea Antioxidant Body Serum hydrates, firms and smooths your skin for a radiant glow from head to toe. Packed with antioxidants, this intensely nourishing body treatment protects your skin from damaging free radicals. With a lightweight formula that absorbs quickly, it can be used alone or layered with your favorite body lotion for skin that's soft and supple."

INCI: Capric/Caprylic Triglyceride, Helianthus Annuus (Sunflower) Seed Oil*, Camellia Sinensis (Green Tea) Seed Oil*, Cucurbita Pepo (Pumpkin) Seed Oil*, Fragrance/Parfum*, Laminaria Ochroleuca (Kelp) Extract, Hippophae Rhamnoides (Sea Buckthorn) Oil*, Salvia Hispanica (Chia) Seed Extract* (and) Rosmarinus Ocinalis (Rosemary) Leaf Extract*, Calendula Officinalis Flower Extract*, Aspalathus Linearis (Rooibos Tea) Extract*, Limnanthes Alba (Meadowfoam) Seed Oil. *Ingredients from organic farming.

Our analysis:

This is an anhydrous serum that provides antioxidant benefits with the use of high-performance oils (green tea seed oil, pumpkin seed oil, sea buckthorn oil, meadowfoam oil) and extracts (kelp extract, chia seed extract, calendula extract, rooibos tea extract) in a light base of fractionated coconut oil and sunflower oil.

TRACIE MARTYN RESCULPTING NECK AND BODY SERUM

US $98 per 1.8fl oz

www.traciemartyn.com

Product highlights/description:

"A lightweight serum for tightening and firming the most delicate areas of your skin. Formulated for the delicate areas of your skin where extra elasticity and firming are desired, this natural serum energizes your skin with Electriol, a proprietary complex with amino acids, enzymes, and seaweed extract. Lightweight, it glides on like silk and immediately starts to make your skin feel tighter and smoother. Snow Mushroom Extract acts like an even better version of Hyaluronic Acid, binding moisture to the skin without weighing it down. Light-diffusing minerals also help minimize the appearance of fine lines and wrinkles and leave you with a beautiful glow."

INCI: Aqua (Water), Glycerin, Hydrolyzed Pumpkin Seedcake, Carnitine, Coenzyme A, Laminaria Digitata Extract, Avena Sativa (Oat) Kernel Extract, Tremella Fuciformis Polysaccharide, Caffeine, Carnosine, Hamamelis Virginiana (Witch Hazel) Water, Microcrystalline Cellulose, Silica, Cellulose Gum, Glyceryl Caprylate, Glyceryl Undecylenate, Citric Acid, Malic Acid, Xanthan Gum, Potassium Sorbate.

Our analysis:

This is a gel-based serum that uses water as the main solvent. It contains glycerin as a humectant and various natural extracts (pumpkin seed, brown algae, oat kernel) for tightening and firming properties along with naturally derived thickeners (fungal polysaccharide, cellulose, xanthan gum). Its active ingredients (carnitine, coenzyme A, caffeine, carnosine) have antioxidant and toning properties. It is preserved with a mixture of glyceryl caprylate, glyceryl undecylenate and potassium sorbate.

KAYO REMODELLING SERUM

$42 per 118ml

https://kayobodycare.com

Product highlights/description:

"This multifunctional hydrating serum is instilled with Copper Peptides to help improve the appearance of skin. Skin is saturated with long lasting hydration from the Copper Peptides, Hyaluronic Acid and Kayo's Omega Oil Blend, while skin is further layered with Kayo's antioxidant rich extracts of Acai, Noni, Green Tea, Pomegranate, Gogi, and Mangosteen leaving skin radiant."

INCI: Water, Sodium Hyaluronate (Hyaluronic Acid Sodium Salt), Macadamia Nut Oil, Kukui Nut Oil, Crambe Abyssinica Oil, Acai Oil, Glycerin (Vegetable Derived), Avocado Oil, Coconut Oil, Erythritol, Homarine HCL, Goji (Lycium Barbarum), Coffee Seed (Coffea Arabica), Acai (Euterpe Oleracea), Noni (Morinda Citrifolia), Pomegranate (Punica Granatum), Green Tea (Camellia Sinensis), Mangosteen (Garcinia Mangostana), Vitamin E Acetate, Copper PCA, Zemea Propandiol, Essential Oil Blend, Xanthan Gum, Sodium Acrylates, Lecithin, DL-Panthenol, Ethylhexylglycerin, Potassium Sorbate.

Our analysis:

This is a light gel-serum thickened with hyaluronic acid, xanthan gum and sodium acrylates. It also contains a small amount of luxury carrier oils (macadamia nut oil, kukui nut oil, crambe oil, acai oil, avocado oil and coconut oil). It contains a wide range of botanical extracts (goji, coffee seed, acai, noni, pomegranate, green tea, mangosteen) for antioxidant benefits, and copper PCA for antioxidant and astringent properties. It contains glycerin, erythritol and propanediol as humectants. The serum is preserved with a mix of ethylhexylglycerin and potassium sorbate.

AURELIA PROBIOTIC SKINCARE FIRM & REPLENISH BODY SERUM

£48 per 250ml

www.aureliaskincare.com

Product highlights/description:

"Aurelia Probiotic Skincare's body serum is an intensive treatment formulated to replenish and protect your skin. Unlike some lotions, it has a lightweight texture that absorbs immediately, leaving no greasy residue and delivering a nourishing blend of omegas, essential fatty acids and vitamin E. For a soothing therapeutic experience, steam-distilled essential oils are expertly layered to balance the mind and body, including uplifting Mandarin, calming Angelica Root and invigorating Chamomile."

INCI: Aqua/Water/Eau, Coco-Caprylate, Glyceryl Caprylate/Caprate, Cetearyl Alcohol, Prunus Amygdalus Dulcis (Sweet Almond) Oil, Glyceryl Stearate, Arachidyl Alcohol, Butyrospermum Parkii (Shea) Butter, Cetearyl Glucoside, Argania Spinosa Kernel (Argan) Oil, Angelica Archangelica Root Oil, Anthemis Nobilis (Chamomile) Flower Oil, Boswellia Carterii (Olibanum) Oil, Cananga Odorata (Ylang Ylang) Flower Oil, Citrus Aurantium Bergamia (Bergamot) Fruit Oil, Citrus Grandis (Grapefruit) Peel Oil, Citrus Nobilis (Mandarin Orange) Peel Oil, Cymbopogon Citratus (Lemongrass) Oil, Juniperus Virginiana Wood Oil (Cedarwood), Lavandula Angustifolia (Lavender) Herb Oil, Tocopherol (Vitamin E), Salicylic Acid, Hibiscus Sabdariffa Flower Extract, Kigelia Africana Fruit Extract, Sodium Phytate, Adansonia Digitata (Baobab) Fruit Extract, Glycerin, Sorbic Acid, Citric Acid, Dehydroacetic Acid, Behenyl Alcohol, Glyceryl Caprylate, Hydroxyacetophenone, Benzyl Alcohol, Arachidyl Glucoside, Dehydroxanthan Gum, Sodium Hydroxide, Limonene*, Linalool*, Citral*, Geraniol*, Benzyl Benzoate*, Benzyl Salicylate*, Farnesol*, Eugenol, Isoeugenol*.
*Naturally occurring in essential oils.

Our analysis:

This is an emulsion-based serum that uses glyceryl stearate, glyceryl caprylate/caprate, cetearyl glucoside and cetearyl alcohol as the emulsifying system. Ester coco-caprylate gives a non-oily skin feel to the oil phase, which also contains almond oil, shea butter and argan oil. The serum contains a complex blend of essential oils (angelica, chamomile, frankincense, ylang ylang, bergamot, grapefruit, mandarin, lemongrass, cedarwood and lavender). It contains botanical extracts (hibiscus, kigelia, baobab) and exfoliating salicylic acid. It is preserved with the mixture of sorbic acid, dehydroacetic acid, benzyl alcohol and glyceryl caprylate, and it uses sodium phytate as a chelating agent.

FORMULATION TEMPLATES

Below we have provided four formulation templates for:

- Liquid, anhydrous serum.
- Gel-based serum.
- Emulsion-based serum.
- Bi-phase serum.

The templates provided here show the different ingredients that can be included in the different types of serum and the typical percentages at which they are used. You can use them as a guideline to create your own formulations. You can see examples of these templates put into action in the lessons that follow, where we share some formulation examples created by our tutors.

Different active ingredients and essential oils have different recommended usage rates which you should check before using them. You can refer to the supplier, the IFRA, and any relevant regulations.

Formulation template for liquid, anhydrous serum

Ingredient type	Function	w/w%
Carrier oils	Emollient, active	up to 100%
Esters	Emollient	up to 100%
Active ingredients, botanical extracts	Specific skin benefit	up to 10%
Essential oils	Active ingredient, fragrance	up to 2%*
Vitamin E (or rosemary extract)	Antioxidant	up to 0.4%

Formulation template for gel-based serum

Ingredient type	Function	w/w%
Water	Solvent	up to 100%
Hydrosol	Solvent, active, fragrance	up to 50%
Thickeners	Thickener	up to 2%
Humectants	Moisturizing	up to 5%
Active ingredients, botanical extracts	Specific skin benefit	up to 10%
Solubilizers	Solubilizing oil soluble ingredients	up to 5%
Lipid ingredients	Emollient, nourishing	up to 5%
Essential oils	Active ingredient, fragrance	up to 2%*
Preservative	Preventing microbial spoilage	q.s.**
pH adjusters	Bring pH to optimal levels	q.s.**

Formulation template for emulsion-based serum

Ingredient type	Function	w/w%
Water	Solvent	up to 100%
Hydrosol	Solvent, active, fragrance	up to 50%
Thickeners	Thickener, stabilizer	up to 2%
Humectants	Moisturizing	up to 5%
Active ingredients, botanical extracts	Specific skin benefit	up to 10%
Emulsifier	Combining oils and water	up to 7%
Lipid ingredients	Emollient, nourishing	up to 20%
Essential oils	Active ingredient, fragrance	up to 2%*
Preservative	Preventing microbial spoilage	q.s.**
pH adjusters	Bring pH to optimal levels	q.s.**

Formulation template for bi-phase serum

Ingredient type	Function	w/w%
Water	Solvent	up to 90%
Hydrosol	Solvent, active, fragrance	up to 50%
Water-phase thickeners (optional)	Thickener, stabilizer	up to 0.5%
Humectants	Moisturizing	up to 5%
Salt	Separating layers/phases	up to 1%
Active ingredients, botanical extracts	Specific skin benefit	up to 10%
Lipid ingredients (carrier oil, esters)	Emollient, nourishing	up to 50%
Essential oils	Active ingredient, fragrance	up to 2%*
Preservative	Preventing microbial spoilage	q.s.**
pH adjusters	Bring pH to optimal levels	q.s.**

*The amount of essential oil you include is dependent on the oils chosen and IFRA guidelines.

**The abbreviation q.s. stands for “quantum satis” or “quantum sufficit”, meaning an amount which is enough, or an amount which suffices. This is a term used in template formulas because the amount of preservative/pH adjuster depends on the ingredient itself and the formula.

FACTORS TO CONSIDER WHEN CREATING YOUR FORMULA

We have provided you with four different **product development briefs**, one for each formula type, that will help you develop your body serum formula based on who the product is for and the main benefits you want it to offer.

A product development brief is essentially a series of questions that help you get clear about what you are creating, for whom and why. This means you have a clearly defined outcome before you start formulating. You are more likely to create a wonderful product that customers love if you design it with them in mind. Equally, if you are creating a product for yourself, you are also much more likely to create a successful product if you consider the product development questions first.

These are the main areas to consider:

- Target audience.
- Product positioning and target cost.
- Skin type.
- Purpose or function of product.
- Desired properties and qualities of product.
- Packaging.

Getting clear on these factors will help you choose the ingredients to use. The second part of the product development brief is a **formulation worksheet** where you can start to create your formula on paper.

OUR EXAMPLE FORMULAS

The lessons that follow contain a variety of example formulations created by our tutors. They take you through the product development process by answering product development questions and then creating a product formula. You could make these formulations exactly as we have presented them to practice the techniques required and use ingredients you might not be familiar with. You could then make adjustments to them or move on to creating your own formulations from scratch.

USING A ‘HERO’ OR STAR INGREDIENT

Before you create your formula or are in the process of developing it you may have one ingredient in mind that will be the ‘star’ ingredient in your formula (sometimes also known as the ‘hero’ ingredient).

It may be one that offers certain benefits you are looking for or it may form part of your brand or product story. For example, you might feature the same ingredient in every product in your brand or range. Or it might be an ingredient with a certain story that you can tell about it and this becomes part of your marketing and the story of your product. You might choose a hero ingredient based on current market trends.

An example of a hero ingredient could be Vitamin C. Look at serums on the market and the names and descriptions of the serum to see if you can identify hero ingredients chosen by other brands.

PERFECTING YOUR FORMULA

Once you have created a formula on paper, it is time to create a small batch to test it out. You can evaluate factors such as how the product feels, how the product smells and how easily the product spreads. Based on your observations you may wish to make adjustments to the formula until you are satisfied. Professional efficacy testing and user trial reports can be arranged through cosmetic labs if you want data on the effectiveness of your product.

SUMMARY

In this lesson we learned what body serums are. We looked at the functions, benefits, properties and qualities of body serums, the typical ingredients they contain and suitable packaging. We analyzed five serums currently on the market to see what ingredients they contain and the benefits they offer. We provided four formulation templates and suggested factors to consider when creating your own formulations.

2. FORMULATION EXAMPLE: ANTI-AGING HAND SERUM

2. FORMULATION EXAMPLE: ANTI-AGING HAND SERUM

In this lesson, we will cover:

1. **Product development questions.**
2. **Formula.**
3. **Instructions.**
4. **Product specifications.**
5. **Application/usage instructions.**

PRODUCT DEVELOPMENT QUESTIONS

Product type:
Soft emulsion-based hand serum.

Are you formulating to meet a particular standard or certification?
We are using mainly natural ingredients, although some of the active ingredients (eg Tetra C, coenzyme Q10) might not be permitted in certifications. Some suppliers sell ingredients that are approved in certifications, some do not. If you wish to adhere to Ecocert/COSMOS standards, check with the supplier about certifications.

Who is your target audience?
People of all ages who wish to delay the signs of aging on their hands.

What skin type is it for?
It is suitable for every skin type.

What is the purpose/function of your product?
To provide powerful antioxidants that will help the skin fight oxidative stress due to exposure to environmental factors (sun, air, pollution).

What properties and qualities do you want your product to have?
Soft, yellow-cream, floral-fruity scent, quick to absorb.

Packaging type and aesthetics.
Airless pump.

Which solvents are you using and why?
Water – inexpensive.

Which emulsifiers are you using and why?
Xyliance – naturally derived, suitable for light emulsions.

Which humectants are you using and why?
Glycerin – inexpensive, easily available; panthenol – aids in skin regeneration.

Which thickeners/stabilizers are you using and why?
Xanthan gum – easy to find.

Which oils are you using and why?
Coco caprylate – to make sure the emulsion will not feel heavy or greasy on the skin; shea butter – due to its highly nourishing properties; poppy seed oil – due to its linoleic acid and phytosterol content, and its regenerating and protective properties.

Which active ingredients and/or essential oils are you using and why?
Tetra C and coenzyme Q10 – both are strong antioxidants that will provide anti-aging benefits; panthenol – for its regenerative properties; mandarin and geranium essential oils for their pleasant fragrance.

Which other ingredients specific to this product type are you using and why?
Vitamin E as an antioxidant to protect the oils from rancidity and Preservative Eco as the preservative.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FORMULA

Phase	INCI name	Trade name	Function	w/w%
A	Glycerin	Glycerin	Humectant	2.0
A	Xanthan Gum	Xanthan gum	Thickener	0.3
B	Aqua	Purified water (deionized)	Solvent	69.6
C	Coco Caprylate	Coco caprylate	Emollient	6.0
C	Cetearyl Wheat Straw Glycosides (and) Cetearyl Alcohol	Xyliance	Emulsifier	4.0
C	Butyrospermum Parkii (Shea) Butter	Shea butter	Emollient	4.0
C	Papaver Somniferum (Poppy) Seed Oil	Poppy seed oil	Emollient	3.0
C	Tocopherol	Vitamin E (95% mixed tocopherols)	Antioxidant	0.1
D	Caprylic/Capric Triglyceride	Fractionated coconut oil	Emollient	5.0
D	Ascorbyl Tetralsopalmitate	Tetra C	Active, antioxidant	1.0
D	Ubiquinone	Coenzyme Q10	Active, antioxidant	0.5
E	Citrus Reticulata (Mandarin) Peel Oil	Mandarin essential oil	Active, fragrance	1.0
E	Pelargonium Graveolens (Geranium) Flower Oil	Geranium essential oil	Active, fragrance	0.5
E	Panthenol	Panthenol	Active, humectant	2.0
E	Benzyl Alcohol (and) Salicylic Acid (and) Glycerin (and) Sorbic Acid	Preservative Eco	Preservative	1.0

INSTRUCTIONS

1. Mix together phase A ingredients to create a slurry.
2. Add phase A to phase B while mixing, then stir thoroughly or homogenize (with a stick blender/homogenizer) until the liquid thickens up slightly.
3. Combine phase C ingredients.
4. Separately heat phases A+B and C to 70°C. To account for water evaporation during heating, weigh the container with phase A+B ingredients before heating and take note of the weight. Once the phases have reached the required temperature, weigh the container again to see how much water evaporated. Add the appropriate amount of purified water to compensate for any water lost during heating.
5. Add phase C to phase A+B while stirring and homogenize again until an emulsion forms.
6. Combine phase D ingredients and stir until the coenzyme powder is dissolved (to speed this process up, heat the oil to 40°C).
7. After the emulsion cools down to below 40°C, mix in phase D and phase E ingredients.
8. Adjust the pH to 4.0-4.5. For information on testing and adjusting pH, see our pH Masterclass.

Optional: Record the amount of pH adjuster solution used. Calculate the amount of solid/pure pH adjuster used and amend your formula to include this.

PRODUCT SPECIFICATIONS

Appearance: Medium-thick cream.

Odor: Spicy floral.

Color: Dark yellow-pale orange.

pH: 3.81 before adjustments. We adjusted the pH to 4.30 with 0.63% sodium hydroxide (10% solution).

APPLICATION/USAGE INSTRUCTIONS

Apply on your hands two to three times per day.

SUMMARY

In this lesson we explored a formulation for an Anti-aging Hand Serum. We learned about the ingredients it includes and the manufacturing process.

FORMULATION EXAMPLE: SOOTHING BODY SERUM

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3. FORMULATION EXAMPLE: SOOTHING BODY SERUM

In this lesson, we will cover:

1. **Product development questions.**
2. **Formula.**
3. **Instructions.**
4. **Product specifications.**
5. **Application/usage instructions.**

PRODUCT DEVELOPMENT QUESTIONS

Product type:
Anhydrous oil-based serum.

Are you formulating to meet a particular standard or certification?
We are using natural ingredients, permitted in COSMOS certification.

Who is your target audience?
People of all ages who wish to soothe irritated skin on their bodies.

What skin type is it for?
It is suitable for every skin type, especially for sensitive and irritated skin.

What is the purpose/function of your product?
To soothe redness, sensitivity and inflammation in the skin.

Above: Chia seed oil

Above: Calendula CO_2 extract

What properties and qualities do you want your product to have?
Orange oil, and a soft, warm, herbal scent.

Packaging type and aesthetics.
Bottle with lotion pump closure.

Which oils are you using and why?
Fractionated coconut oil – to make sure the serum will not feel heavy or greasy on the skin; chia seed oil – due to its highly nourishing, soothing and calming properties; evening primrose oil – due to high linoleic acid content; carrot macerated oil – for its antioxidant carotene content and sea buckthorn oil – for its regenerative and protective benefits.

Which active ingredients and/or essential oils are you using and why?
Soothing and anti-inflammatory bisabolol and calendula CO_2 extract.

Which other ingredients specific to this product type are you using and why?
Vitamin E as an antioxidant to protect the oils from rancidity.


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FORMULA

Phase	INCI name	Trade name	Function	w/w%
A	Caprylic/Capric Triglyceride	Fractionated coconut oil	Emollient	38.0
A	Salvia Hispanica Seed Oil	Chia seed oil	Emollient	25.0
A	Squalane	Squalane	Emollient	20.0
A	Oenothera Biennis (Evening Primrose) Seed Oil	Evening primrose oil	Emollient	10.0
A	Helianthus Annuus Seed Oil (and) β-Carotene	Carrot macerated oil	Emollient	5.0
A	Bisabolol	Bisabolol	Soothing	0.7
A	Calendula Officinalis Extract	Calendula CO_2 extract	Soothing	0.2
A	Hippophae Rhamnoides (Sea Buckthorn) Oil	Sea buckthorn oil	Emollient	1.0
A	Tocopherol	Vitamin E (95% mixed tocopherols)	Antioxidant	0.1

INSTRUCTIONS

1. Mix together all of the ingredients and stir until homogenous. Calendula CO_2 extract can solidify in cooler temperatures. If this happens, heat it gently to soften it, and then add to your oils.

PRODUCT SPECIFICATIONS

Appearance: Low viscosity oil.

Odor: Warm citrus.

Color: Golden/orange.

pH: N/A as this is an anhydrous product.

APPLICATION/USAGE INSTRUCTIONS

Apply to your body twice a day or as needed.

SUMMARY

In this lesson we explored a formulation for a Soothing Body Serum.
We learned about the ingredients it includes and the manufacturing process.

4. FORMULATION EXAMPLE: INTENSIVE MOISTURIZING BODY SERUM

4. FORMULATION EXAMPLE: INTENSIVE MOISTURIZING BODY SERUM

In this lesson, we will cover:

1. **Product development questions.**
2. **Formula.**
3. **Instructions.**
4. **Product specifications.**
5. **Application/usage instructions.**

PRODUCT DEVELOPMENT QUESTIONS

Product type:
Rich emulsion-based serum.

Are you formulating to meet a particular standard or certification?
We are using mainly natural ingredients, although some of the active ingredients (ceramide) might not be permitted in certifications. Some suppliers sell ceramides that are approved in certifications, some do not. If you wish to adhere to Ecocert/COSMOS standards, check with the supplier about certifications.

Who is your target audience?
People of all ages who wish to deeply moisturize the skin on their bodies.

What skin type is it for?
Dry to very dry and flaky skin, and damaged skin.

What is the purpose/function of your product?
To moisturize dry skin with the help of humectants and to lower TEWL with the help of barrier supporting ingredients.

What properties and qualities do you want your product to have?
Rich nourishing cream, fruity scent.

Packaging type and aesthetics.
Dark glass jar with screw-on closure.

Which solvents are you using and why?
Water – inexpensive; lavender hydrosol – for its soothing properties and pleasant fragrance.

Which emulsifiers are you using and why?
Olivem 1000 – naturally derived, suitable for rich emulsions.

Which humectants are you using and why?
A mixture of humectants to provide strong moisturization – glycerin, sodium PCA, hyaluronic acid, allantoin, sodium lactate and betaine.

Which thickeners/stabilizers are you using and why?
High molecular weight hyaluronic acid – it doubles as a stabilizer and humectant.

Which oils are you using and why?
Rice bran oil – to support the barrier function with unsaponifiables; soybean oil – for its light skin feel and regenerative properties; oat oil – to strengthen the skin barrier; squalane – a light emollient and occlusive suitable for all skin types.

Which active ingredients and/or essential oils are you using and why?
Humectants; ceramide – to help restore the barrier function; Avocadin – to support the barrier function; panthenol – to regenerate and moisturize the skin.

Which other ingredients specific to this product type are you using and why?
Vitamin E as an antioxidant to protect the oils from rancidity; Preservative Eco as the preservative.


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FORMULA

Phase	INCI name	Trade name	Function	w/w%
A	Glycerin	Glycerin	Humectant	2.0
A	Hyaluronic Acid	Hyaluronic acid HMW	Thickener	0.4
B	Aqua	Purified water (deionized)	Solvent	37.2
B	Lavandula Angustifolia (Lavender) Flower Water	Lavender hydrosol	Solvent	20.0
B	Sodium PCA	Sodium PCA	Humectant	1.0
B	Allantoin	Allantoin	Humectant	0.2
B	Sodium Lactate	Sodium lactate	Humectant	2.0
C	Cetearyl Olivate, Sorbitan Olivate	Olivem 1000	Emulsifier	6.0
C	Oryza Sativa (Rice Bran) Seed Oil	Rice bran oil	Emollient	5.0
C	Glycine Soja Oil	Soybean oil	Emollient	5.0
C	Avena Sativa Oil	Oat oil	Emollient	4.0
C	Tocopherol	Vitamin E (95% mixed tocopherols)	Antioxidant	0.1
D	Squalane	Squalane	Emollient	4.0
D	Persea Gratissima (Avocado) Oil (and) Phytosterols (and) Olea Europaea (Olive) Fruit Oil	Avocadin HU25	Active	2.0
D	Ceramide NP	Ceramide NP	Active	0.1
E	Aqua	Purified water (deionized)	Solvent	5.0
E	Betaine	Betaine	Humectant	2.0
E	Panthenol	Panthenol	Humectant	1.0
E	Benzyl Alcohol (and) Salicylic Acid (and) Glycerin (and) Sorbic Acid	Preservative Eco	Preservative	1.0
E	Citrus Sinensis Dulcis (Orange) Fruit Oil	Sweet orange essential oil	Fragrance	2.0

INSTRUCTIONS

1. Mix together phase A ingredients to create a slurry.
2. Mix together phase B ingredients, stir until all the powders are dissolved.
3. Add phase A to phase B while mixing, then stir thoroughly or homogenize (with a stick blender/homogenizer) until the liquid thickens up slightly.
4. Combine phase C ingredients.
5. Combine phase D ingredients and heat to 100°C until the powders are melted and dissolved.
6. Add phase D to phase C.
7. Separately heat phases A+B and C+D to 70°C until the desired temperature is reached. To account for water evaporation during heating, weigh the container with phase A+B ingredients before heating and take note of the weight. After heating is complete, weigh the container again to see how much water evaporated. Add the appropriate amount of purified water to compensate for any water lost during heating.
8. Add phase C+D to phase A+B while stirring, and homogenize again until an emulsion forms.
9. In a separate beaker, mix the water and betaine together until all the powder is dissolved. Once your emulsion has cooled down to below 40°C, add the betaine mixture to the main emulsion. Then mix in the remaining ingredients.
10. Adjust the pH to 4.0-4.5. For information on testing and adjusting pH, see our pH Masterclass.

Optional: Record the amount of pH adjuster solution used. Calculate the amount of solid/pure pH adjuster used and amend your formula to include this.

PRODUCT SPECIFICATIONS

Appearance: Medium-thick cream.

Color: Off-white.

Odor: Sweet citrus.

pH: Our pH was 4.22. No adjustment was needed.

APPLICATION/USAGE INSTRUCTIONS

Apply on your body two times per day.

SUMMARY

In this lesson we looked at an example formulation for Intensive Moisturizing Body Serum. We learned about the ingredients it includes and the manufacturing process.

5. TROUBLESHOOTING BODY SERUMS

5. TROUBLESHOOTING BODY SERUMS

How to troubleshoot issues with your serums will depend on which type of serum it is.

Please refer to the relevant troubleshooting guide below:

Troubleshooting anhydrous serums.

Troubleshooting gel-based serums.

Troubleshooting emulsion-based and gel-cream serums.

Troubleshooting bi-phase serums.

TROUBLESHOOTING ANHYDROUS SERUMS

In this lesson, we will cover:

1. Common problems you may encounter when making a liquid oil serum and how to solve them.

2. Common problems you may encounter when making a pressed serum and how to solve them.

COMMON PROBLEMS YOU MAY ENCOUNTER WHEN MAKING A LIQUID OIL SERUM AND HOW TO SOLVE THEM

MY SERUM FEELS TOO OILY/ABSORBS SLOWLY, WHAT CAN I DO?

Some carrier oils feel heavier and oilier on the skin than others. If you feel that your serum is not absorbing as quickly as you would like it to, you can adjust the recipe to lower the amount of slow-absorbing oils and add lighter oils or even esters to the formulation. It is a good idea to take some time to get to know the oils (color, scent, skin feel, absorption rate, spreadability) before you start formulating.

MY SERUM HAS A GRITTY TEXTURE, WHAT CAN I DO?

Undissolved dry ingredients can cause a gritty texture in anhydrous serums. Firstly, check that all your dry ingredients are oil soluble. Including a water soluble ingredient, for example powdered green tea extract, in an anhydrous serum will result in the extract not dissolving and causing a gritty texture. If the culprit is an oil soluble active that did not dissolve, check the course materials and/or manufacturer's instructions on how to dissolve them – do they need heating to high temperatures? Do they require gentle heating and stirring to dissolve?

COMMON PROBLEMS YOU MAY ENCOUNTER WHEN MAKING A PRESSED SERUM AND HOW TO SOLVE THEM

MY SERUM IS GOING GRAINY, WHAT SHOULD I DO?

A common problem with pressed serums is that the texture can go grainy. This is often due to butters in the formula. Butters can go grainy during the process of heating and cooling them, which can in turn create a feeling of graininess in your product.

One explanation for this is that butters contain various fatty acids that solidify at different temperatures. This means that when the product cools, the different fatty acids solidify at different times, creating the grains.

There is nothing wrong with the grains that form; they will melt on contact with the skin. However, it is understandable if you would prefer a nice smooth texture.

You may have to experiment with a few approaches. Try the following if you are experiencing trouble with graininess. We have personally found method 2 to be the most helpful.

1. **Cool the mixture or product quickly in the fridge or freezer**

- Melt all the ingredients (oils, butters, waxes) together. Remove from the heat. Pour your mixture into your containers (leave the lid off).

- Cool the mixture/products quickly by placing them in the fridge or freezer (or over ice packs). Only apply the lids once the product has cooled.

2. **Cool your product to room temperature whilst stirring, and then once the mixture starts to thicken, place in the fridge or freezer**

- Stirring the balm during cool down will ensure an even temperature throughout the balm, which can help to prevent uneven solidification of fatty acids. Setting the balm in the fridge or freezer will further help to combat fatty acid crystalization.

3. **Try reformulating your product using other thickeners that help reduce the graininess**

Try replacing 5% of your butter with cera bellina, an ingredient derived from beeswax (INCI: Polyglycerol-3 Beeswax). Cera bellina inhibits crystallization and prevents the formation of granules, which can help eliminate graininess in anhydrous butters and balms. Another thickener that also prevents graininess is Dermofeel Viscolid (INCI: Hydrogenated Rapeseed Oil). It resembles wax granules and it thickens liquid oils into oily gels.

So for example, if your original recipe was:
80% shea butter, 20% liquid oils

You could change this to:
5% cera bellina
75% shea butter, 20% liquid oils

MY SERUMS SOLIDIFY WITH A DIP IN THE MIDDLE, WHAT CAN I DO?

Upon cooling and solidifying it is very common to see a dip (also known as a sinkhole) in the center of your pressed serum. This is especially true for serums that are completely solid, not semi-solid jellies. Although this is common during the cooling down stage of the formulation, it is not pleasing to the eye. Therefore, a way in which you can achieve a smooth even surface is by pouring another layer of the formula over the initial, cooled balm layer.

I LIVE IN A HOT CLIMATE AND THE PRESSED SERUMS ARE TOO SOFT, WHAT CAN I DO?

1. **Include more wax/oil thickener**

Add 1-3% wax or thickener of your choice to the formula and decrease the quantity of liquid oils or soft butters by the same percentage. The waxes will help to solidify your product.

2. **Increase the quantity of solid butters (like cocoa butter) and decrease the quantity of liquid oils in the recipe**

Start by replacing 2% of liquid oils with a hard butter, to make the consistency of the product stiffer.

TROUBLESHOOTING GEL-BASED SERUMS

In this lesson, we will cover:

1. Common problems you may encounter when making gel-based serums and how to solve them.

COMMON PROBLEMS YOU MAY ENCOUNTER WHEN MAKING GEL-BASED SERUMS AND HOW TO SOLVE THEM

MY GEL IS TOO THIN, WHAT CAN I DO ABOUT IT?

To make the gel thicker, you will need to amend your formulation to include a higher percentage of thickener. We suggest you increase the thickener amount by 0.2% until you reach your desired viscosity.

MY GEL IS TOO THICK, WHAT CAN I DO ABOUT IT?

To make the gel softer and more fluid, you will need to amend your formulation to include a lower percentage of thickener. We suggest you decrease the thickener amount by 0.2% until you reach your desired viscosity.

MY GEL FEELS STICKY AND SLIMY, WHAT CAN I DO ABOUT IT?

Certain thickeners, especially natural gums like xanthan gum, can feel sticky and slimy. You can use a different gum in your formula, or you can add another thickener and decrease the amount of the first thickener. This often helps with improving the sensorial properties of gels. For example, if you are using xanthan gum, you can add acacia gum (gummi arabicum) to it – it will not increase the viscosity by much, but it will make the gel feel nicer on the skin.

MY GEL IS NOT CLEAR, WHAT CAN I DO ABOUT IT?

Natural gelling agents often form gels that are not completely transparent. There are natural thickeners that make clear gels, for example transparent xanthan gum, high molecular weight hyaluronic acid, konjac gum, carrageenan, etc. If you are using those, and still noticing your gel serum is milky, it could be due to other ingredients in your formula. Adding non-water soluble ingredients like Vitamin E and essential oils with the help of solubilizers often results in a milky/cloudy appearance. There is nothing wrong with the product, it is just the appearance that is affected. If you are trying to formulate crystal clear gel, use clear thickeners and only water soluble ingredients.

MY GEL TURNS TO LIQUID AFTER I ADD ALL THE INGREDIENTS TO IT, WHAT SHOULD I DO?

Sometimes gels lose their viscosity after adding certain ingredients. This is due to incompatibility between ingredients. Some thickeners have certain ingredients they are incompatible with, eg electrolytes, salt, extreme pH ranges, etc. Check the usage guidelines for your thickener of choice and if there are any incompatible ingredients in your formula. Then amend the formulation to resolve any incompatibilities.

SUMMARY

In this lesson we looked at five common issues you may encounter when creating gel-based serums and how to solve them.

TROUBLESHOOTING EMULSION-BASED AND GEL-CREAM SERUMS

In this lesson, we will cover:

1. Common problems you may encounter when making emulsion-based serums and how to solve them.
2. Common problems you may encounter when making gel-cream serums and how to solve them.

COMMON PROBLEMS YOU MAY ENCOUNTER WHEN MAKING EMULSION-BASED SERUMS AND HOW TO SOLVE THEM

MY SERUM SEPARATES, WHAT CAN I DO?

In Lesson 5.2 Creating emulsions, we talked about the three steps to successful emulsification: chemical, heat and mechanical. It is important to check you have each of these steps covered.

1. Check you are using an all-in-one or complete emulsifier.
Check that the emulsifier you are using is a complete or all-in-one emulsifier. Check with the supplier or look back at Lesson 5.2 Creating emulsions. Some emulsifiers are much easier to work with than others, so if you are still having problems we recommend trying a different one. Beeswax and cetyl alcohol are not emulsifiers.

2. Check you are using the emulsifier at the correct quantity.
Try increasing the quantity by 1-2%. Also check the size of your oil phase; the larger your oil phase, the more emulsifier you will require. There will be a limit to how big your oil phase can be, often around 25% of your recipe/formula, although you will need to check what this is for your emulsifier, as it can vary.

3. Add a thickener/stabilizer.
Try adding 0.2-0.3% xanthan gum in the water phase and/or a co-emulsifier or thickener in the oil phase (eg 1-2% glyceryl stearate or cetyl alcohol). If you are already using one, try increasing the amount. If you are just using one in the oil phase, include xanthan gum in the water phase too, and vice versa.

4. Mix the two phases together well with an electric stick blender.
If you have been mixing by hand with a hand whisk, change to an electric stick blender.

5. Check that you have put the correct ingredients in the correct phase.
Oil soluble in the oil phase, water soluble in the water phase.

6. Check the oil and water phase are at the same temperature before they are mixed together and that the oil and water phase are at the temperature recommended by the manufacturer of your chosen emulsifier.

7. Check your emulsifier for any special instructions for use.
This includes checking the pH range it will work within.

8. Some preservatives can also destabilize creams!
Geogard Ultra (INCI: Gluconolactone (and) Sodium Benzoate) can destabilize fragile emulsions.

9. Check the electrolyte tolerance of your emulsifier.
If you are experiencing emulsion instability when using ingredients that contain electrolytes (eg aloe vera juice, salt), check what the electrolyte tolerance of your emulsifier is. If it has low tolerance, you might need to either remove problematic ingredients from the recipe or use a different emulsifier.

10. Use a blend of emulsifiers
Commercially available emulsifiers either come as single emulsifying agents or blends of two or more emulsifying ingredients. Often they also contain a fatty alcohol that thickens and stabilizes the emulsion. The blends that combine two emulsifying agents will often create more stable emulsions as each emulsifier has its own qualities and abilities. If you have trouble with stability you can change to an emulsifier blend that combines two emulsifying agents together, or you can pair up two emulsifiers.

MY SERUM IS TOO THIN, WHAT CAN I DO?

1. Check the emulsion has cooled to room temperature.
An emulsion will thicken naturally until it reaches room temperature. The warmer it is, the thinner or runnier it will be. Most emulsions will thicken once they reach room temperature, but some will reach their final consistency after 24 hours.

2. Adjust the amount of emulsifier used.
Check the suggested usage rates with your supplier and/or **Lesson 2.4.3 Functional ingredients: natural emulsifiers**, and increase the amount used in your recipe/formula.

3. Add a thickener.
If you wish to create a thicker cream, 1-2% of cetyl alcohol may be added to the oil phase (the amount of carrier oils should be reduced by the same amount).

4. With some emulsifiers, including Xyliance and Olivem 1000, the method of mixing affects the viscosity (thickness) of the product.
High-speed mixing (homogenizer, stick blender) creates thicker creams, low-speed mixing (hand whisk) creates thinner creams and lotions.

MY SERUM IS TOO THICK, WHAT CAN I DO?

1. Check the percentage of emulsifier you used.
Check the suggested usage rates with your supplier and/or **Lesson 2.4.3 Functional ingredients: natural emulsifiers**. Decrease the amount used in your recipe/formula.

2. Use less thickener.

3. Does your recipe include a butter or wax?
These will produce a thickening effect so try reducing the amount or replacing them with a liquid oil instead.

4. With some emulsifiers, including Xyliance and Olivem 1000, the method of mixing affects the viscosity (thickness) of the product.
High-speed mixing (homogenizer, stick blender) creates thicker creams, low-speed mixing (hand whisk) creates thinner creams and lotions.

COMMON PROBLEMS YOU MAY ENCOUNTER WHEN MAKING GEL-CREAM SERUMS AND HOW TO SOLVE THEM.

MY GEL-CREAM SERUM SEPARATES, WHAT CAN I DO?

Emulsifiers that create gel-creams are usually able to emulsify lower quantities of oil than regular emulsifiers. If you are experiencing separation, make sure you have not included too high a percentage of oils in your formulation. Check the supplier's guidelines regarding the size of the oil phase and the quantity of emulsifier needed.

The manufacturing process also plays an important role in emulsion stability. Polymer emulsifiers require longer periods of homogenizing to create a stable gel-cream. Check the supplier's guidelines regarding the optimal manufacturing process.

MY GEL-CREAM IS TOO THIN, WHAT CAN I DO?

Polymeric emulsifiers have different thickening abilities, and the resulting emulsion might have a lower viscosity than you wanted. Since gel-creams usually do not contain a heated oil phase, adding lipophilic thickeners, like cetyl alcohol, is not an option. If you wish to include lipid thickeners, you will need to change the manufacturing process to include a heating step (both water and oil phases need to be heated). If you wish to follow a cold process method, you will need to use gums or other aqueous thickeners, like xanthan gum or konjac gum. Disperse them in your water phase.

SUMMARY

In this lesson we looked at three common issues you may encounter when creating emulsion-based serums and two issues you may encounter when creating gel-cream serums and how to solve them.

TROUBLESHOOTING BI-PHASE SERUMS

In this lesson, we will cover:

1. Common problems you may encounter when making a bi-phase serum and how to solve them.

COMMON PROBLEMS YOU MAY ENCOUNTER WHEN MAKING A BI-PHASE SERUM AND HOW TO SOLVE THEM

THE OIL PHASE IS FLOATING ON THE TOP, CAN I REVERSE THE PHASES?

Which phase is going to be on the top and which one on the bottom depends on the density of the phases. Density describes how much a volumetric unit of a material weighs and is usually expressed in kg/m^3 or g/ml. The phase with lower density will float on the top of the phase with higher density. Carrier oils (and most esters as well) have a lower density than water, which means the oil phase will be on the top of a bi-phase serum.

MY PHASES HAVE MIXED A LITTLE; THERE ARE DROPLETS OF ONE PHASE MIXED IN WITH THE OTHER PHASE

Even though oil and water do not mix, after shaking a bi-phase product some droplets can remain visible in the opposite phase. This is common, especially if you are using ingredients that have some degree of emulsifying capability, for example lecithin in oils, sterols in oils, or surfactants. Make sure you avoid using those ingredients. You can also increase the amount of salt in your formulation. If your serum is left to settle undisturbed, the droplets will disappear eventually.

THE COLOR OF MY PRODUCT IS NOT STRONG OR STABLE OVER TIME

Many natural colorants are not as stable or strong as the synthetic colorants. Carotenoids, which give a yellow to red color to the oil phase, are one of the most stable options, but if they are constantly exposed to sunlight they will fade in one to two years. Water soluble plant pigments (like anthocyanins) are even less stable – most of them fade within a couple of weeks of exposure to light. Their shade also depends on the pH and can be different in an acidic or alkaline pH.
To see how stable a colorant is, it is best to perform a stability test at an elevated temperature and exposure to light and oxygen. Some large-scale suppliers manufacture stabilized pigments that can be used in natural cosmetics. If you are a small-scale manufacturer, those might not be available to you. One way to achieve color is to take advantage of ingredients that have a color, for example by using green unrefined avocado oil, blue chamomile essential oil, orange coenzyme Q10, etc. Another way is to use synthetic colorants.

SUMMARY

In this lesson we looked at three issues you may encounter when creating bi-phase serums and how to solve them.

6. PRODUCT DEVELOPMENT BRIEF: BODY SERUMS

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6. PRODUCT DEVELOPMENT BRIEF: BODY SERUMS

Product development brief questions and template formulations will depend on the product type you are creating. Please refer to the relevant product development briefs below:

Product development brief: anhydrous serums.

Product development brief: gel-based serums.

Product development brief: emulsion-based and gel-cream serums.

Product development brief: bi-phase serums.

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PRODUCT DEVELOPMENT BRIEF: ANHYDROUS SERUMS

Formulator's name	
Product name and reference code (optional) For your own reference and record keeping.	
Product type Eg liquid, anhydrous serum, pressed serum, lip serum, eye serum, day or nighttime serum.	
Benchmark product (optional) This is a product on the market that you really like, which has characteristics you would like to match with your product.	
Are you formulating to meet a particular standard or certification? Organic, vegan, cruelty-free, fair trade? Which certifying body's standards will you meet? COSMOS, Ecocert, Vegan Society, etc?	
'Hero' or star ingredient Is there a particular ingredient that you want to use for the benefits it offers or for your brand/product story or marketing purposes?	

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Who is your target audience? Be as specific as possible, eg age, gender, lifestyle, values.	
What is the product positioning? Mass market/high-end? Target cost price per product? Retail price per product (RRP)?	
What skin type is it for? What problems are you solving?	
What is the purpose/ function of your product? Where will it be used? Outcome/benefits.	
What properties and qualities do you want your product to have? Consider texture, appearance, odor, mode of application.	
Packaging type and aesthetics Consider jars, bottles, glass/ plastic, opaque/transparent.	

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Which oils are you using and why? Consider if they are liquid/solid, their properties/qualities, if they are accepted by organic standards, etc.	
Which esters are you using and why (if you are using them)? Consider their properties/ qualities, if they are accepted by organic standards, etc.	
Which waxes/thickeners are you using and why (if you are using them)? Consider their properties/ qualities, if they are accepted by organic standards, etc.	
Which active ingredients are you using and why? For example, vitamins or botanical extracts.	
Which essential oils/fragrance oils are you using and why? Consider what overall fragrance you want, eg uplifting, relaxing, floral, etc. Beneficial properties of the oils.	
Which other ingredients specific to this product type are you using and why?	

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FORMULATION WORKSHEET: ANHYDROUS SERUMS

Product formulation: anhydrous serums					
	Phase	INCI	Trade name	Function	w/w%
Carrier oils/ butters (0-100%)					
Esters (0-100%)					
Waxes/ thickeners (0-20%)					

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Active ingredients (0-10*%) eg lipophilic vitamins, extracts *dependent on the ingredient chosen.					
Essential oils/ fragrance oils (0-2*%) *dependent on the oils chosen, and IFRA guidelines.					
Antioxidant (up to 0.4%) Eg Vitamin E/ rosemary extract					
					TOTAL 100%

FORMULATION WORKSHEET:
ANHYDROUS SERUMS

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PRODUCT SPECIFICATION:

After you have made your formula make a note of these product characteristics.

Appearance	
Odor	
Color	
Viscosity	
pH	

INSTRUCTIONS FOR MAKING:

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PRODUCT DEVELOPMENT BRIEF: GEL-BASED SERUMS

Formulator's name	
Product name and reference code (optional) For your own reference and record keeping.	
Product type Eg liquid, anhydrous serum, pressed serum, lip serum, eye serum, day or nighttime serum.	
Benchmark product (optional) This is a product on the market that you really like, which has characteristics you would like to match with your product.	
Are you formulating to meet a particular standard or certification? Organic, vegan, cruelty-free, fair trade? Which certifying body's standards will you meet? COSMOS, Ecocert, Vegan Society, etc?	
'Hero' or star ingredient Is there a particular ingredient that you want to use for the benefits it offers or for your brand/product story or marketing purposes?	
Who is your target audience? Be as specific as possible, eg age, gender, lifestyle, values.	

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What is the product positioning? Mass market/high-end? Target cost price per product? Retail price per product (RRP)?	
What skin type is it for? What problems are you solving?	
What is the purpose/ function of your product? Where will it be used? Outcome/benefits.	
What properties and qualities do you want your product to have? Consider texture, appearance, odor, mode of application.	
Packaging type and aesthetics Consider jars, bottles, glass/ plastic, opaque/transparent.	
Which solvents are you using and why? Water, hydrosol, propanediol, alcohol. Consider their evaporation rate, scent, color.	

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Which thickeners are you using and why? Consider their properties/ qualities, skin feel, thickening capability, if they are accepted by organic standards, etc.	
Which humectants are you using and why (if you are using them)? Consider their properties/ qualities, if they are accepted by organic standards, etc.	
Which lipid ingredients are you using and why (if you are using them)? Consider their properties/ qualities, amounts that can be added, if they are accepted by organic standards, etc.	
Which active ingredients are you using and why? For example, vitamins or botanical extracts.	
Which essential oils/fragrance oils are you using and why? Consider what overall fragrance you want, eg uplifting, relaxing, floral, etc. Beneficial properties of the oils.	
Which other ingredients specific to this product type are you using and why?	

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FORMULATION WORKSHEET: GEL-BASED SERUMS

Production formulation: gel-based serums					
	Phase	INCI	Trade name	Function	w/w%
Solvent (water) (0-100%)					
Thickeners (0-2%)					
Humectants (0-5%)					
Active ingredients (0-10*%) eg hydrophilic vitamins, extracts *dependent on the ingredient chosen.					

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FORMULATION WORKSHEET: GEL-BASED SERUMS

Lipid ingredients optional (0-5%)					
Essential oils/ fragrance oils (0-2*%) *dependent on the oils chosen, and IFRA guidelines.					
Solubilizers optional (up to 5%)					
Preservative (q.s.)**					
PH adjuster (q.s.)**					

**The abbreviation q.s. stands for “quantum satis” or “quantum sufficit”, meaning an amount which is enough, or an amount which suffices. This is a term used in template formulas because the amount of preservative/pH adjuster depends on the ingredient itself and the formula.

Total 100%

FORMULATION WORKSHEET:
GEL-BASED SERUMS

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PRODUCT SPECIFICATION:

After you have made your formula make a note of these product characteristics.

Appearance	
Odor	
Color	
Viscosity	
pH	

A NOTE ON pH AND pH ADJUSTER

Include the product pH before adjustment and if you adjusted it include how much adjustment solution you used and what that equates to in its pure form. Refer to the formulation examples provided for an example of how to record this information. See lesson **0.5 Testing and adjusting pH** for details of how to calculate the amount of solid/pure pH adjuster used.

Usually when making the first batch of the formula the pH is adjusted at the end and the amount of pH adjuster is recorded as part of the product specification. For subsequent batches, especially if they will be large batches or will be outsourced to a manufacturer, the amount of pH adjuster in its pure form can be included in the formula. See lesson **0.5 Testing and adjusting pH** for details of how to rewrite a formula to include the amount of solid/pure pH adjuster used. We still advise testing the pH of every batch as different batches of raw material can affect the pH of the product slightly and further adjustments may still be necessary. Alternatively, if you prefer (and especially for small batches and personal use) you can continue to only add pH adjusters to your product at the end.

FORMULATION WORKSHEET:
GEL-BASED SERUMS

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International

INSTRUCTIONS FOR MAKING:

SCHOOL of NATURAL SKINCARE
International

PRODUCT DEVELOPMENT BRIEF: EMULSION-BASED AND GEL-CREAM SERUMS

Formulator's name	
Product name and reference code (optional) For your own reference and record keeping.	
Product type Eg liquid-fluid serum, thicker cream-like serum, gel-cream serum, eye serum, day or nighttime serum.	
Benchmark product (optional) This is a product on the market that you really like, which has characteristics you'd like to match with your product.	
Are you formulating to meet a particular standard or certification? Organic, vegan, cruelty-free, fair trade? Which certifying body's standards will you meet? COSMOS, Ecocert, Vegan society, etc?	
'Hero' or star ingredient Is there a particular ingredient that you want to use for the benefits it offers or for your brand/product story or marketing purposes?	
Who is your target audience? Be as specific as possible, eg age, gender, lifestyle, values.	

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What is the product positioning? Mass market/high-end? Target cost price per product? Retail price per product (RRP)?	
What skin type is it for? What problems are you solving?	
What is the purpose/ function of your product? Where will it be used? Outcome/benefits.	
What properties and qualities do you want your product to have? Consider texture, appearance, odor, mode of application.	
Packaging type and aesthetics Consider jars, bottles, glass/ plastic, opaque/transparent.	
Which solvents are you using and why? Water, hydrosol, propanediol, alcohol. Consider their evaporation rate, scent, color.	

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Which emulsifiers are you using and why? Will you use a surfactant-based or polymeric emulsifier? Consider their properties/ qualities, skin feel, how much oil they can emulsify, if they are accepted by organic standards, etc.	
Which humectants are you using and why (if you are using them)? Consider their properties/ qualities, if they are accepted by organic standards, etc.	
Which stabilizers are you using and why (if you are using them)? Consider their properties/ qualities, solubility, thickening properties, if they are accepted by organic standards, etc.	
Which oils are you using and why (if you are using them)? Consider their properties/ qualities, amounts that can be added, if they are accepted by organic standards, etc.	
Which active ingredients are you using and why? For example, vitamins or botanical extracts.	
Which essential oils/fragrance oils are you using and why? Consider what overall fragrance you want, eg uplifting, relaxing, floral, etc. Beneficial properties of the oils.	
Which other ingredients specific to this product type are you using and why?	

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FORMULATION WORKSHEET: EMULSION-BASED AND GEL-CREAM SERUMS

Product formulation: Emulsion-based and gel-cream serums					
	Phase	INCI	Trade name	Function	w/w%
Solvent (water, hydrosol) (0-100%)					
Humectants (0-5%)					
Thickeners/ stabilizers (0-2%)					
Emulsifier (0-7%)					

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Lipid ingredients (2-20%)					
Active ingredients (0-10*%) eg hydrophilic vitamins, extracts *dependent on the ingredient chosen.					
Essential oils/ fragrance oils (0-2*%) *dependent on the oils chosen, and IFRA guidelines.					
Preservative (q.s.)**					
pH adjuster (q.s.)**					
					TOTAL 100%

**The abbreviation q.s. stands for “quantum satis” or “quantum sufficit”, meaning an amount which is enough, or an amount which suffices. This is a term used in template formulas because the amount of preservative/pH adjuster depends on the ingredient itself and the formula.

FORMULATION WORKSHEET:
EMULSION-BASED AND GEL-CREAM SERUMS

SCHOOL of NATURAL SKINCARE International

PRODUCT SPECIFICATION:

After you have made your formula make a note of these product characteristics.

Appearance	
Odor	
Color	
Viscosity	
pH	

A NOTE ON pH AND pH ADJUSTER

Include the product pH before adjustment and if you adjusted it include how much adjustment solution you used and what that equates to in its pure form. Refer to the formulation examples provided for an example of how to record this information. See lesson **0.5 Testing and adjusting pH** for details of how to calculate the amount of solid/pure pH adjuster used.

Usually when making the first batch of the formula the pH is adjusted at the end and the amount of pH adjuster is recorded as part of the product specification. For subsequent batches, especially if they will be large batches or will be outsourced to a manufacturer, the amount of pH adjuster in its pure form can be included in the formula. See lesson **0.5 Testing and adjusting pH** for details of how to rewrite a formula to include the amount of solid/pure pH adjuster used. We still advise testing the pH of every batch as different batches of raw material can affect the pH of the product slightly and further adjustments may still be necessary. Alternatively, if you prefer (and especially for small batches and personal use) you can continue to only add pH adjusters to your product at the end.

FORMULATION WORKSHEET:
EMULSION-BASED AND GEL-CREAM SERUMS

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INSTRUCTIONS FOR MAKING:

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PRODUCT DEVELOPMENT BRIEF: BI-PHASE SERUMS

Formulator's name	
Product name and reference code (optional) For your own reference and record keeping.	
Product type Eg eye serum, day or nighttime serum.	
Benchmark product (optional) This is a product on the market that you really like, which has characteristics you'd like to match with your product.	
Are you formulating to meet a particular standard or certification? Organic, vegan, cruelty-free, fair trade? Which certifying body's standards will you meet? COSMOS, Ecocert, Vegan society, etc?	
'Hero' or star ingredient Is there a particular ingredient that you want to use for the benefits it offers or for your brand/product story or marketing purposes?	
Who is your target audience? Be as specific as possible, eg age, gender, lifestyle, values.	

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What is the product positioning? Mass market/high-end? Target cost price per product? Retail price per product (RRP)?	
What skin type is it for? What problems are you solving?	
What is the purpose/ function of your product? Where will it be used? Outcome/benefits.	
What properties and qualities do you want your product to have? Consider texture, appearance, odor, mode of application.	
Packaging type and aesthetics Consider bottles and closures.	
Which solvents are you using and why? Water, hydrosol, propanediol, alcohol. Consider their evaporation rate, scent, color.	

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Which humectants are you using and why (if you are using them)? Consider their properties/ qualities, if they are accepted by organic standards, etc.	
Which oils or esters are you using and why (if you are using them)? Consider their properties/ qualities, amounts that can be added, if they are accepted by organic standards, etc.	
Which active ingredients are you using and why? For example, vitamins or botanical extracts.	
Which essential oils/fragrance oils are you using and why? Consider what overall fragrance you want, eg uplifting, relaxing, floral, etc. Beneficial properties of the oils.	
Which other ingredients specific to this product type are you using and why?	

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FORMULATION WORKSHEET: BI-PHASE SERUMS

Product formulation: Bi-phase Serums					
	Phase	INCI	Trade name	Function	w/w%
Solvent (water, hydrosol) (50-95%)					
Humectants (0-5%)					
Water-phase thickeners (optional) (up to 0.5%)					
Salt (up to 1%)					

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Lipid ingredients (5-50%)					
Active ingredients (0-10*%) eg hydrophilic vitamins, extracts *dependent on the ingredient chosen.					
Essential oils/ fragrance oils (0-2*%) *dependent on the oils chosen, and IFRA guidelines.					
Preservative (q.s.)**					
pH adjuster (q.s.)**					
					TOTAL 100%

**The abbreviation q.s. stands for “quantum satis” or “quantum sufficit”, meaning an amount which is enough, or an amount which suffices. This is a term used in template formulas because the amount of preservative/pH adjuster depends on the ingredient itself and the formula.

FORMULATION WORKSHEET:
BI-PHASE SERUMS

SCHOOL of NATURAL SKINCARE International

PRODUCT SPECIFICATION:

After you have made your formula make a note of these product characteristics.

Appearance	
Odor	
Color	
Viscosity	
pH	

A NOTE ON pH AND pH ADJUSTER

Include the product pH before adjustment and if you adjusted it include how much adjustment solution you used and what that equates to in its pure form. Refer to the formulation examples provided for an example of how to record this information. See lesson **0.5 Testing and adjusting pH** for details of how to calculate the amount of solid/pure pH adjuster used.

Usually when making the first batch of the formula the pH is adjusted at the end and the amount of pH adjuster is recorded as part of the product specification. For subsequent batches, especially if they will be large batches or will be outsourced to a manufacturer, the amount of pH adjuster in its pure form can be included in the formula. See lesson **0.5 Testing and adjusting pH** for details of how to rewrite a formula to include the amount of solid/pure pH adjuster used. We still advise testing the pH of every batch as different batches of raw material can affect the pH of the product slightly and further adjustments may still be necessary. Alternatively, if you prefer (and especially for small batches and personal use) you can continue to only add pH adjusters to your product at the end.

FORMULATION WORKSHEET:
BI-PHASE SERUMS

SCHOOL of NATURAL SKINCARE
International

INSTRUCTIONS FOR MAKING:

7. LABORATORY TEST REPORTS: BODY SERUMS

In this lesson, we will cover:

1. **Interpreting challenge test results.**
2. **Preservative Efficacy Test results for our body serum formulas.**

If you are interested in the reports from the PETs we had carried out on formulas featured in this class, you can find them in this lesson.

This class contains three body serum formulations. We have carried out PETs for two of these serums. The third serum, Soothing Body Serum, is an anhydrous product meaning it does not contain water. Water-free products are not susceptible to microbial contamination and therefore, PET testing is not required.

Please note: The results and reports only apply to the samples that we made and had tested. These reports are not transferable to products made by anyone else as your manufacturing conditions and ingredients will be different. You cannot use these reports as part of your product documentation.

INTERPRETING CHALLENGE TEST RESULTS

THE CHALLENGE TEST

In order to ensure your product is safe to use and store, you must submit it for experimental assessments. These tests will reveal whether the product displays microbial stability and effective preservation during its shelf-life.

Challenge testing checks how effective a preservative system is and whether it is capable of withstanding contamination. It simulates a consumer's use and storage of the product, at room temperature, by contaminating the finished cosmetic product. Calibrated inocula incorporates relevant strains of microorganisms into the product, which is then monitored. The reaction of the product allows you to evaluate the adequacy of its preservation.

After the product has been contaminated, the number of surviving microorganisms in the mixture is recorded at predetermined intervals over a 28 day period. For each time and strain, a log reduction value is calculated. This figure is compared to the minimum values required to pass the test.

There are various protocols for challenge tests (ISO standard and European Pharmacopoeia are commonly used), and most of the protocols utilize the microorganisms listed below. However, some protocols use additional species. For a comparison of two protocols, please see: www.teknoscienze.com/Contents/Riviste/PDF/HPC2_2013_RGB_34-41.pdf

The following strains of microorganisms are most commonly used to contaminate the samples:

- *Pseudomonas aeruginosa*.
- *Staphylococcus aureus*.
- *Candida albican*.
- *Aspergillus brasiliensis* (previously *A. niger*).

Log reductions

The difference of CFUs (Colony Forming Unit; it basically means 'viable microorganisms') – if any – between the start and the time of recordings (ie at 14 and 28-day intervals) determines whether the preservative system is working properly. This is then stated as a log reduction.

The larger the log reduction, the more effective the product's preservation properties.

In order to pass the challenge test, both of the following requirements have to be met:

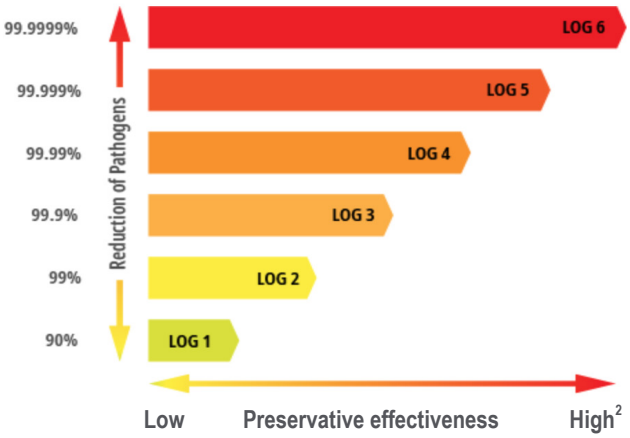
1. A 2 log reduction in the number of microorganisms, after 14 days, compared to the count at the start of testing.
2. A 0.5 log reduction in the number of microorganisms, after 28 days, compared to the count after 14 days[1].

It is key that the log reduction meets these minimum values.

Interpretation of log reductions[2]

Log reduction	Number of CFUs	Percentage reduction (%)	Times smaller
0 log (Log0)	1,000,000	0	N/A
1 log (Log1)	100,000	90	x10
2 log (Log2)	10,000	99	x100
3 log (Log3)	1,000	99.9	x1,000
4 log (Log4)	100	99.99	x10,000
5 log (Log5)	10	99.999	x100,000
6 log (Log6)	1	99.9999	x1,000,000

Represented graphically:



To better demonstrate a log reduction, below is one of our creams which has passed the preservative efficacy test with a high level of log reduction[3]

FRANKINCENSE FACE CREAM FOR MATURE SKIN WITH COENZYME Q10

Formula

Phase	INCI name	Trade name	Function	w/w%
A	Aqua	Purified water (deionized)	Solvent	66.85
A1	Gluconolactone (and) Sodium Benzoate	Geogard Ultra	Preservative	1.00
A2	Aloe Barbadensis Leaf Juice Powder	Aloe vera powder 200:1	Humectant, soothing	0.05
A2	Hydrolyzed Wheat Protein	Hydrolyzed wheat protein	Humectant, skin conditioning	2.00
A2	Sodium Phytate (and) Aqua (and) Alcohol	Dermofeel PA-3	Chelating agent	0.10
A3	Glycerin	Glycerin	Humectant	2.00
A3	Xanthan Gum	Xanthan gum	Thickener	0.20
B	Butyrospermum Parkii (Shea Butter)	Shea butter	Emollient	4.00
B	Triticum Vulgare (Wheat) Germ Oil	Wheatgerm oil	Emollient	4.00
B	Rosa Canina Fruit Oil	Rosehip oil	Emollient	3.00
B	Cetyl Alcohol	Cetyl alcohol	Thickener, stabilizer	2.00
B	Cetearyl Olivate (and) Sorbitan Olivate	Olivem 1000	Emulsifier	6.00
C	Squalane (Olive)	Squalane	Water loss prevention, anti-aging	5.00
C	Ubiquinone	Coenzyme Q10 (pure powdered form)	Active, antioxidant	1.00
D	Potassium Sorbate	Potassium sorbate	Preservative booster	0.20
D	Boswellia Carterii (Frankincense) Oil	Frankincense essential oil	Fragrance, active	0.50
D	Tocopherol	Vitamin E (95% mixed tocopherols)	Antioxidant	0.10
D	Panthenol	D panthenol	Humectant, moisturizing, cell regeneration	2.00

Test Strains:			Total viable counts per g of product
Staphylococcus aureus	ATCC	6538	152000
Pseudomonas aeruginosa	ATCC	9027	161000
Candida albicans	ATCC	10321	88000
Aspergillus brasiliensis	ATCC	16404	97000

Procedure

1. The sample was inoculated with the reference inocula according to the test method above.
2. Total viable counts were performed at 7,14 and 28 days after inoculation.

Results after inoculation

Test Strains:		Colony forming units (CFU) per g		
	Inoculum	7 Days	14 Days	28 Days
Staphylococcus aureus	152000	0	0	0
Pseudomonas aeruginosa	161000	0	0	0
Candida albicans	88000	0	0	0
Aspergillus brasiliensis	97000	12	0	0

Test Strains:	Logarithmic decrease of plate counts			Result
	7 Days	14 Days	28 Days	ISO 11930*
Staphylococcus aureus	5.182	5.182	5.182	A, NIL
Pseudomonas aeruginosa	5.207	5.207	5.207	A, NIL
Candida albicans	4.944	4.944	4.944	A, NIL
Aspergillus brasiliensis	3.908	4.987	4.987	A, NIL

Interpretation of results:

The first highlighted area shows the change in the colonies: there are 12 colonies of *Aspergillus brasiliensis* after seven days of inoculation.

The second highlighted area represents how the 12 colonies of *A. brasiliensis* affected the plate count (the number of actively growing cells) after seven days of inoculation. The increase from 3.908 to 4.987 reflects a decrease of 12 CFUs between the 7 and 14 day report in plate counts of *A. brasiliensis*.

Overall, the study report from the lab indicates a 5 log reduction, which corresponds to a percent reduction between 99.999 and 99.99, which is a high pass, also known as an 'A' pass.

As you will see on the following pages, both of the emulsion-based body serum formulas included in this class passed preservative efficacy testing with an A pass as indicated by A, NIL in the last row of the final column of each test report.

PRESERVATIVE EFFICACY TEST RESULTS FOR OUR BODY SERUM FORMULAS

Anti-aging Hand Serum

Preservative Efficacy Testing

Test in analogy to ISO 11930 2.013-05-01

Test performed for:

Customer:

Material Tested: SERB215

ID: OB PET 2956 Date: 10/08/2021

Test Strains:			**Total viable counts per g of product**
Staphylococcus aureus	ATCC	6538	6,410,000
Pseudomonas aeruginosa	ATCC	9027	5,490,000
Candida albicans	ATCC	10321	198,000
Aspergillus brasiliensis	ATCC	16404	485,000

Procedure

1. The sample was inoculated with the reference inocula according to the test method above.
2. Total viable counts were performed at 7,14 and 28 days after inoculation.

Results after inoculation

Test Strains:	Colony forming units (CFU) per g			
	Inoculum	7 Days	14 Days	28 Days
Staphylococcus aureus	6,410,000	0	0	0
Pseudomonas aeruginosa	5,490,000	0	0	0
Candida albicans	198,000	0	0	0
Aspergillus brasiliensis	485,000	0	0	0

Test Strains:	Logarithmic decrease of plate counts			Result
	7 Days	14 Days	28 Days	ISO 11930*
Staphylococcus aureus	6.807	6.807	6.807	A, NIL
Pseudomonas aeruginosa	6.740	6.740	6.740	A, NIL
Candida albicans	5.297	5.297	5.297	A, NIL
Aspergillus brasiliensis	5.686	5.686	5.686	A, NIL

*Criteria A

The microbiological risk is considered to be tolerable (the cosmetic product is protected against microbial proliferation that may present a potential risk for the user) and the cosmetic product is deemed to meet the requirements ISO 11930.

Criteria B

The microbiological risk analysis demonstrates the existence of control factors not related to the formulation; for example, a protective package such as a pump provides a higher level of protection than a jar (see Annex D, ISO 11930). This would be considered a protective device for risk reduction.

The resulting criteria were obtained by the calculation method laid down in ISO 11930 2013-5-1.

Conclusion

The results apply only to the sample tested. When assessed against the ISO 11930 criteria for topical products, this sample meets the current ISO 11930 criteria for the Efficacy of Antimicrobial Preservation Test.

PRESERVATIVE EFFICACY TEST RESULTS FOR OUR BODY SERUM FORMULAS

Intensive Moisturizing Body Serum

Preservative Efficacy Testing

Test in analogy to ISO 11930 2.013-05-01

Test performed for:

Customer:

Material Tested: SERB417

ID: OB PET 2964 Date: 11/08/2021

Test Strains:			**Total viable counts per g of product**
Staphylococcus aureus	ATCC	6538	6,410,000
Pseudomonas aeruginosa	ATCC	9027	5,490,000
Candida albicans	ATCC	10321	198,000
Aspergillus brasiliensis	ATCC	16404	485,000

Procedure

1. The sample was inoculated with the reference inocula according to the test method above.
2. Total viable counts were performed at 7,14 and 28 days after inoculation.

Results after inoculation

Test Strains:	Colony forming units (CFU) per g			
	Inoculum	7 Days	14 Days	28 Days
Staphylococcus aureus	6,410,000	0	0	0
Pseudomonas aeruginosa	5,490,000	0	0	0
Candida albicans	198,000	0	0	0
Aspergillus brasiliensis	485,000	10	0	0

Test Strains:	Logarithmic decrease of plate counts			Result
	7 Days	14 Days	28 Days	ISO 11930*
Staphylococcus aureus	6.807	6.807	6.807	A, NIL
Pseudomonas aeruginosa	6.740	6.740	6.740	A, NIL
Candida albicans	5.297	5.297	5.297	A, NIL
Aspergillus brasiliensis	4.686	5.686	5.686	A, NIL

*Criteria A

The microbiological risk is considered to be tolerable (the cosmetic product is protected against microbial proliferation that may present a potential risk for the user) and the cosmetic product is deemed to meet the requirements ISO 11930.

Criteria B

The microbiological risk analysis demonstrates the existence of control factors not related to the formulation; for example, a protective package such as a pump provides a higher level of protection than a jar (see Annex D, ISO 11930). This would be considered a protective device for risk reduction.

The resulting criteria were obtained by the calculation method laid down in ISO 11930 2013-5-1.

Conclusion

The results apply only to the sample tested. When assessed against the ISO 11930 criteria for topical products, this sample meets the current ISO 11930 criteria for the Efficacy of Antimicrobial Preservation Test.

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