



HOW OBJECTIVATE SLIMMING CLAIMS?

The cellulite is believed to result when subcutaneous adipose tissue protrudes into the lower reticular dermis, thereby significantly modifying the dermo-epidermis junction and **creating irregularities at the surface**. The biomechanical properties of epidermal and dermal tissue may also influence severity. This phenomenon located principally in the thighs, abdomen and buttocks is characterised giving a spongy aspect of the skin. It can be associated with water retention and fibrose. The changes of the skin by the adipose tissue induce the changes of the biomechanical properties of the dermis.

The clinical evaluation of the treatment efficacy of slimming products objectivates quantitatively and qualitatively, at the surface or deeply, the body morphology, the skin topography, the state of the dermis and hypodermis and the water flow of the skin. The inclusion of the subjects is a key point of this type of evaluation to minimise the inter-individual variations. Investigators will specifically pay attention to the hormonal criteria.

The consumer tests and the neurosensory evaluations can be a good way to evaluate the global effects of the personal care on the silhouette, the texture and aspect of the skin, the volume of the legs and the stomach.

What are the present methods and devices available to characterise the changes of centimetric loss and cellulite decrease?

Body morphology

1. **Scores by experts:** 2 scales for body images (Gardner and al.), Body shape Questionnaire (Rousseau and al.), Body-image assessment scale (Thompson and al.)
2. **Centimetric measurements:** circumference by a tape measure or a laser
3. **2D imaging** using cameras or video for multidimensional qualitative and quantitative evaluation and a special bench associated with data treatment.
4. **3D imaging**
 - **Stereo vision system,** camera or video for multidimensional qualitative and quantitative evaluation in 3D and a special bench, associated with data treatment and modelling: AEVA 4D (Eotech), BodyScan 3D (Canfield)
 - Fringe projection and data treatment.

Cellulite aspects

1. **Clinical visual and tactile scores by skin experts:** Scores by experts of the orange peel appearance, skin rugosity and elasticity: mechanically accented microrelief of thigh skin (Perin and t al.), photo scale of Skin roughness using oblique light (Bielfeldt and al.), photo numeric cellulite severity scale (Hexsel and al.)
2. **Global surface aspect of the skin:** C-Cube, DermaTOP, Antera 3D, Videometer.
3. **Surface topography analysis** by Silflo print, photo with oblique light, fringe projections.
4. **Hypodermis analysis** measure of the thickness and density and evaluation of the **invagination of the hypodermis in the equivalent of the dermis.**
 - **Ultrasound** (5-10 MHz): Dermis size and shape: DUB@SkinScanner, Dermascan, Dermcup
 - **MRI** : quantitatively evaluation of the fatty noddles
 - **Microscopy:** Confocal with Vivascope (Mavig), MPT Flew, Vivosight (Michelson); Raman Spectroscopy: (RiverD); LC-OCT (Damae Medical); Optical Multiphoton Tomography LAB MPT Flex (Jenlab).

Biomechanical properties of the skin

Elasticity and the firmness of the dermis. A real-time deformation using several principles:

1. Suction:

- Cutometer and Cutiscan (C+K)
- Elastimeter and Skinfibrometer (Delfin)
- Dermalab Elasticity (Cortex)

1. Ballistometry: Ballistometer (Dia-Stron),

2. Indentation: Indetometer (C+K)

3. Airflow:

- Dynaskin (Eotech, Orion),
- SkinFlex (Orion),
- WaveSkin and UnderSkin (LTDS)

Then, the biomechanical behaviour induced can be measured through **optical or fringe projection principle**.

Microcirculation

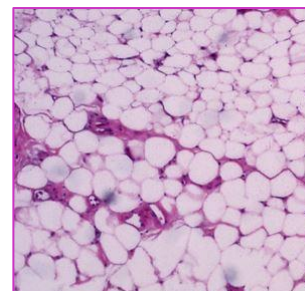
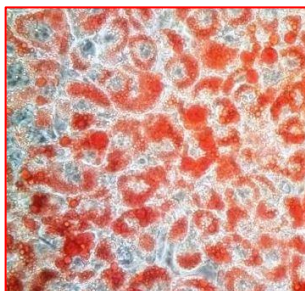
- AB TiVi 700 and Tivi 8000 (Wheelsbridge)
- Laser Doppler...

For the slimming efficacy, the **auto-evaluation with a use test questionnaire** or a quality of life one, gives a very interesting information of the treatment performance perceived by the consumers.

The multiparametric study is a great approach of this claim crossing results from **consumer insights, scores by experts and metrology**.

On the [clinical testing platform](#), you can find for the claims: slimming, anti-cellulite, anti-orange skin:

- **57 methods**
- **114 testing laboratories** located in 36 countries
- **57 measurement devices** offered by 30 instrumentation manufacturers.



Their partners have the floor

They are glad to introduce the several topics presented
by their partners

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Measuring Slimming effect in 3D by Eotech

Jean-Jacques SERVANT | CEO

EOTECH is Theyll known to provide 3D measuring solution on the Skin, Face, and body parts. They also have **11 years of experience in body measurement** with their previous AEVA-HE/Visio4D setup.

They had the opportunity during the Covid time to develop a **new positioning device** which provides much easier use of the system and much more performances measuring body parts. Combined with their **AEVA-HE² FOV XL (500 mm)** or their new standard **EvaBody sensor (600 mm)**, larger part of the body can be measured at once. The **VisioHOP bench** drives sensor positioning over 360° and over 1.20 m in height while the volunteer is standing steady on the foot strap and hanging a stabilization bar.

Their AEVA software controls the scanning operation over 360°, move the sensor up or down to scan another part. Each part will be assembled in one file and be

connected to the upper or lower part measured.

The different time point measurement will be aligned carefully to the baseline 3D data taking care of reliable region where the geometry is not changing.

Of course, measuring body on a very reproducible way is always a challenge taking care of breathing and volunteer global position while scanning, that is why their software provides **control steps** to produce the best results. The data analysis consists of to extract some body part to calculate **volume and circumference** changes. They also calculate the global deviation in pseudo color to illustrate the change in volume.

They also provide **geometric measurements** like direct distance (Belly size), section length in 3D, or angles. Their analysis task creates several calculated parameters in a file in csv format as well as illustrations in png format.

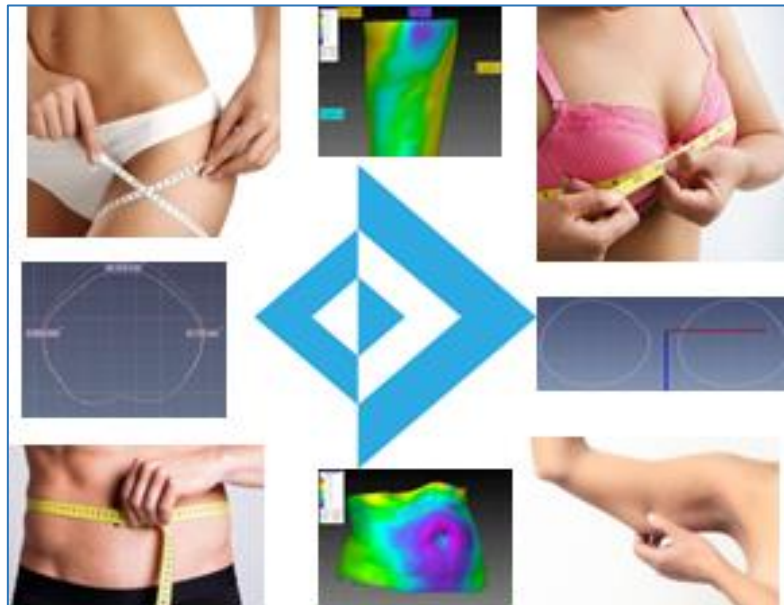
Because the study includes many volunteers, all calculated data are available in the same file for the same study.

The Aeva software provides body-oriented study design to create the project adapted to their need.

Moreover, the AEVA-HE sensor can have a **color camera** to acquire the color texture while measuring and map it on the 3D data. This can give information on the spot,

scars, and melanoma on some body areas.

On Top of these capabilities, the **VisioHOP system** can be transform easily on a Face measuring device by clicking a chair on the elevation platform, and by sliding down the head holding device. This takes less than a minute (see their video: <https://vimeo.com/688118657/b9231ab7ad>).



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Visualizing slimming effects: Eurofins Cosmetics & Personal Care approaches

Anne SIRVENT | Scientific Communication and R&D Manager

As the weather gets warmer and clothes become lighter, slimming, and firming products for the body will once again be in the spotlight in shops. These products, which are almost exclusively intended for women, do not aim to make you lose weight (which would be outside the scope of a cosmetic product) but to locally reshape the tissues to tone up and tighten in the lower body (stomach, hips, buttocks, legs) or upper arms, as well as to reduce the appearance of cellulite. Cellulite is particularly visible on the thighs and buttocks, where it gives the skin that characteristic appearance known as "orange peel". Although cellulite is completely natural, it is often viewed negatively and can affect the body image of those who have it to varying degrees.

Slimming products are no exception to the current trend of "Body-positivity", which claims that one should take care of one's own well-being and not feel pressured by the view of society or the gaze of others. The names of these products are now **evocative of the benefits they claim** to have (e.g., body-fit, global sculpture, melt with pleasure, second skin effect), the formulas put naturalness in the spotlight with active ingredients that make multiple promises (e.g. ultra-stimulating, energy booster, toning, firming, smoothing, moisturizing, softness) and with fragrances that claim to provide relaxation, soothing or, on the contrary, have an invigorating and energizing effect... The sensoriality of

these new products are particularly well documented: it creates surprise with warm (e.g., thermo-active cream) or cold (e.g., shivering gel) effects as well as innovative textures (e.g., crunchy foam, "cocoon" balm) that encourage their use.

If the wording around these products is evolving, their targets often remain the same (e.g., remodeling, surface smoothing, firmness). The techniques for evaluating the effectiveness of these products, which allow the effects to be visualized, are particularly popular. Thus, they can propose:

- **The "orange peel" appearance** of the skin can be objectively assessed by clinical score on the subjects or on photographs taken under standardized lighting conditions.

A decrease in the number and/or depth of the dimples attests to smoother skin.

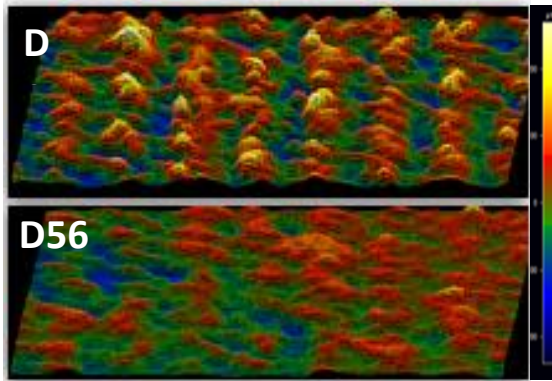


Photographs of the appearance of dimples on the back of a thigh before and after 56 days of twice-daily application of a slimming cream.

- **In vivo fringe projection** allows fine measurements of:
 - the skin surface roughness Sa (μm) in relation to the smoothing of the relief,

- the maximum amplitude of the surface St (μm) associated with dimpling,
- the volume (mm^3) also reflecting the presence of dimples.

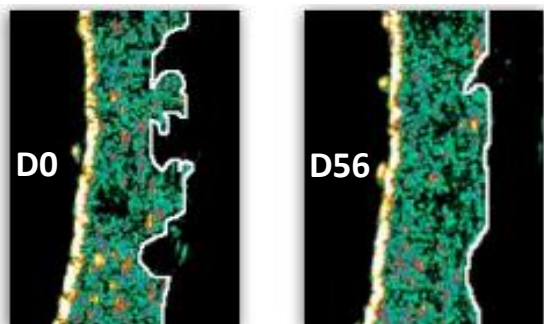
This technique also makes it possible to obtain interesting visuals in 2D/3D imaging of skin relief and dimples.



PRIMOS® fringe projection imaging of the appearance of dimpled skin on a thigh (μm) before and after 56 days of twice-daily application of a slimming cream.

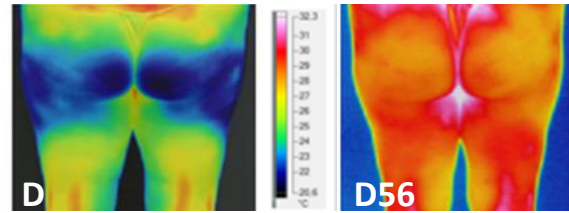
On a larger scale, fringe projection allows volume measurement on areas such as the stomach, buttocks, or thighs, coupled with 2D/3D visuals.

- **Low frequency ultrasound** (7.5 MHz) allows the *thickness of fat tissue* to be followed over time, while 20 MHz ultrasound provides information on *dermal disinfiltration* (related to water retention) and smoothing of the dermal-hypodermal junction (related to invagination of fatty tissue in the dermis).



20MHz ultrasound (DermaScan C2D) of the dermal-hypodermal junction on a thigh before and after 56 days of twice daily application of a slimming cream

- **Cellulite** is generally related to alterations in **microcirculation** leading to a decrease in thermal emissivity. The latter can be visualized with a **thermal camera**. The application of specific active ingredients coupled with the action of the massage allows a revival of the cutaneous microcirculation associated with an increase in the surface temperature.



Infrared thermal imaging (TI300) on the back of the thighs and buttocks ($^{\circ}\text{C}$) before and after 56 days of twice daily application of a slimming cream

In addition to these imaging methods, biometric measurements of **skin firmness, hydration, microcirculation** as well as **quality of life approaches** and **sensorial analysis** complete the assessments.

Do not hesitate to consult them for their future launches.

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Anticellulite Products: An Efficacy and Safety Testing Strategy by Princeton Consumer Research

Dr. Nalini KAUL | Ph.D. Vice President Technical

Cellulite is an aesthetic skin concern that affects 90% of post pubertal women and is not just specific to over-weight women. It manifests as a buildup of fat deposits beneath the skin that causes a lumpy, “cottage cheese” look on the thighs, rear end, hips, and belly. Cellulite is also known as orange-peel skin, due to its texture. It is characterized by large adipocytes that cause dimple contour alterations of the skin. There is reduced microcirculation, edema, localized adipocyte hypertrophy, extracellular matrix changes and abnormal elasticity and resilience of the skin.

Besides laser therapy, acoustic wave therapy, fillers and injectables, topical treatments are often used, with ingredients like caffeine, carnitine, retinol, escin from horse chestnut, ubiquinone and various herbal plant extracts and blends. It is important to understand that **cellulite is complex occurrence** and involves extended use of topical treatments, mechanical stimulation via massages besides adopting an active lifestyle.

Given the commercial interest in anticellulite topical products, efficacy, safety testing and patient satisfaction of these products is in demand for reducing the cottage cheese-like appearance of the

cellulite prone areas and for silhouette contouring.

Besides noting **circumference and body mass index**, the following assessments are carried out:

- expert clinical grading
- measurement of skin hydration
- roughness
- elasticity with non-invasive bio instruments,
- subjective questionnaires,
- clinical photography.

Profilometry and various imaging modalities like **ultrasound, laser doppler, thermography, MRI** can be included. A good clinical design involves understanding **cellulite etiology**, knowledge of product ingredients, their concentrations and absorption, action and timeline of their effectiveness, and the utilization of sound scientific design and methodology.

A double blind, randomized placebo-controlled study of at least 10-12 weeks in duration with more subjects, use of **standardized cellulite rating severity scales**, same expert clinical grader throughout the study, non-invasive bio instruments for **moisture, roughness, elasticity, validated clinical digital**

photography and ultrasonography or other imaging methods, along with self-perception questionnaires should be employed for capturing the severity of the condition and the treatment effects.

This combination approach with objective data can help in obtaining support or rejection of anticellulite efficacy claims for topical products.

Potential claims may include reduces appearance of cellulite; ameliorates the appearance of cellulite, reduces dimpling, reduces orange peel appearance, skin looks smoother, skin looks firmer, slimmer look, silhouette countering.

In conclusion efficacy and safety testing of anticellulite products with proven scientific designs, methodologies and proper statistical analysis will help provide their validation as well as help establish consumer confidence.

Cellulite grading

A **cellulite severity scale**, developed by Hexsel et al (2009) is a validated photo numeric scale with excellent reliability and internal consistency based on 5 morphologic aspects:

- 1) number of depressions,
 - 2) depth of depressions,
 - 3) clinical morphology
 - 4) extent of skin laxity, flaccidity, or sagging
 - 5) Nurnberger-Muller classification guide.
- Each variable is graded using three grades:

- *Grade 1, or mild:* There is an "orange-peel" appearance, with between 1 and 4 superficial depressions, and a slightly "draped" or sagging appearance to the skin.

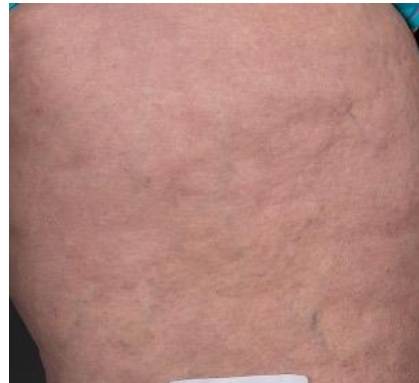
- *Grade 2, or moderate:* There are between 5 and 9 medium-depth depressions, a "cottage cheese" appearance, and the skin appears moderately draped.

- *Grade 3, or severe:* There is a "mattress" appearance, with 10 or more deep depressions, and the skin is severely draped.

Baseline



After Treatment



Reference: Hexel DM, Dal'Forno T, Hexcel CL. A validate photonumeric cellulite severity scale. J Eur Acad Dermatol Venereol. 2009; 23(5) 523-528

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Evaluation of the effectiveness of slimming products through consumer testing by Syres

Séverine FREYSSINET | Director of Analysis

The slimming and anti-dimpling effects of the products can be assessed in a relevant way through consumer tests.

They offer tailor-made protocols according to their clients' objectives. **A self-assessment** by the volunteers can be coupled with a **visual evaluation** of the dimples by their study managers (specific scale with photos).

Hemi body studies may allow a comparative study of two formulas or two methods of application.

Here is the protocol of a study They recently carried out on a slimming treatment.

60 women participated in this study over 56 days.

Panel features

- All volunteers with BMI between 22 and 25.
- Volunteers aged 20 to 60
- Habitual users of such products
Women prone to cellulite problems and dimpling and looking for an anti-cellulite/slimming result.

The volunteers used a slimming treatment according to an explained massage protocol, **for 56 days**, morning and evening, without and with hemi body accessory (right/left randomization).

The volunteers came to the center at T0, T28 and T56 days for

- An evaluation of **the intensity of the dimples** on each thigh was carried out by their researcher thanks to a visual scale at these three study times.
- Photos were taken of the same area at the three study times.
- An assessment of the **intensity of the pinching pain** on each thigh was carried out in self-assessment by the volunteers at the three study times.
- Self-assessment questionnaires were completed all three study stages by the volunteers.

The main results of the study showed that:

- The **application and the texture** of the product is an important aspect for women (sticky, greasy, penetration and felt during massage, the product must blend into the skin).
- The **notion of perfume** is not essential, but they expect a pleasant scent that they want to enjoy if possible.
- The recommended **10-minute massage** protocol, although restrictive, allows women to rediscover their skin and see it change more significantly as they go along.
- Women are delighted to use a product with an accessory because they feel that it makes the circulation work more and the **massage is more effective** than with the hands.
- The effectiveness of the slimming treatment on the anti-dimpling effect is significant over 56 days of study (more than 80% of favorable opinions), with or without accessory. The **use of the accessory** increased the effectiveness in self-assessment (+10%).

- The accessory group noticed a significant result on firmness (89%) and smoother skin appearance (92%).
- The accessory-free group rated immediate skin softness (88%) and over time (95%) as well as smoother skin (89%).



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What's behind the claim? Body care efficacy proven by an integrated and multi-tool approach by Mérieux NutriSciences.

Chiara Chiaratti | Cosmetics and Personal Care project manager

For as long time, the focus on skin care has been predominantly on the face and the searching for products and treatments by industry experts and consumers has been aimed at defining the best routine to always have a well-groomed, healthy-looking skin and a glowing complexion.

But now something has changed, and the rediscovery of self-care, body and mind has a great impact in the consumer demand. So not only body product that claim for anti-cellulite, slimming, firming, improving skin imperfections effects, but also that **combining wellbeing benefits**.

This should not be surprising because according to a study published in Cosmetic Europe, for **71% of European consumers**, cosmetics are important in improving quality of life, for **70% in boosting their self-esteem**.

Body care product is one of the fastest-growing segments in the cosmetics industry, as it has become an important part of women's fashion.

Anti-cellulite skin care products are in **high demand among an aging population in the developed countries**.

Cosmetic claims and claim supports should go hand in hand, and it is important to find the right solution for each project through **the combination of:**

- Efficacy evaluation,
- Sensory analysis,
- Consumers' self-assessment
- Support of technical and medical experts.

So, how Mérieux NutriSciences support the main body care products claims?

1. ANTI-CELLULITE AND SKIN IMPERFECTION

- **Lipolytic effect (*in-vitro*)**
Triglycerides extraction and amount determination, through morphological analysis and digital imaging acquisition OilRed coltheired Adipocytes.

- **Anti-cellulite effect (*in-vivo*)**
Waviness amplitude parameters through 3D Skin scanner, using non-contact measurement and visio-bench for positioning and repositioning.
- **Skin thermography (*in-vivo*).**
Analyse thermal distribution analyser due to non-contact infrared measurements to evaluate the efficacy of cosmetic, dermatologic, and aesthetical.

2. SLIMMING EFFECT

- **Lipolitic effect (*in-vitro*).**
Triglycerides extraction and amount determination, through morphological analysis and digital imaging acquisition OilRed coloured Adipocytes.
- **Circumference evaluation (*in-vivo*).** Thighs and inter-trochanteric circumference measurements through Millimeter tape.
- **Skin elasticity (*in-vivo*).** Skin viscoelastic properties evaluation: skin firmness and elastic properties through Cutometer or Elastimeter.
- **Skin laxity (*in-vivo*).** Evaluation of skin laxity with high-resolution image analysis through skin echography using high-frequency cutaneous ultrasounds.
- **Expert evaluation.** Visual assessment of body skin by score-defined through visual assessment.

3. ANTI-STRETCH MARKS

- **Hydration (*in-vivo*).** Water-content evaluation in the stratum corneum both in the area of application and in the non-treated closed area through Moisturemeter or Corneometer.
- **Skin marks (*in-vivo*).** Evaluation of skin marks with high-resolution image analysis through Skin

echography using high-frequency cutaneous ultrasounds.

4. SUGGESTIVE SCENTS - CONSUMER EMOTIONS AND PREFERENCES

The scent of a body care is one of the most impacting characteristics that need to be considered, so how can They capture a preference for a perfume? How can They understand what can be the best emotional fragrances to associate with a specific product effect? **Emotions and sensations always play a key role,** and they can measure them in order to communicate them at their best, and associate the right scent to the product.

5. The liking (Sensory analysis)

Identification of liking scores expressed for different fragrances.

6. Emotions (Sensory analysis).

Emotional profile.



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