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Next-Gen Firming: Innovative Approaches for Structure, Dynamics & Emotion

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abstract

Firmness and elasticity are key biomarkers for youthful skin. Alongside biological "long-term" approaches (e.g., epigenetic modulation), neuro- and sensocosmetic strategies as well as instant lifting are gaining importance, driven by consumer expectations for immediately visible and scientifically proven results. "Skinimalism" (fewer products, more performance), personalization (including AI-supported diagnostics), and "well-aging"/longevity are also important topics in today's trend landscape.

This article compares four active ingredients with complementary mechanisms of action: CALNEURIN®-SENSE (neuro-/sensocosmetic approach), LIFTONIN®-QI (epigenetic stress reduction), MYRAMAZE®-ESSENCE (sensocosmetic stress reduction), and LIFTONIN®-XPRESS (instant mechanical tightening). The activities of these ingredients are analyzed with regard to visual skin firming, structural skin firming, dynamic skin firming and sensory skin improvements.

Introduction

Skin aging results from intrinsic factors such as genetics, hormonal and metabolic changes and lifestyle, as well as extrinsic influences like UV exposure, microparticles and other exposomal factors [1]. On a structural level, collagen and elastin degradation, altered matrix organization, barrier weakening and inflammatory signalling lead to uneven skin, visible wrinkles, loss of elasticity and reduced firmness [2]. Causes often include oxidative stress from reactive oxygen species (ROS) and altered cell physiology due to biological aging. Epigenetic programming, such as DNA methylation or histone modification, modulates gene expression, including collagen- and barrier-related genes [3,4] and is becoming an increasingly important target in cosmetics.

This is also a major topic in the body-prepper scene, which aims to significantly extend healthy lifespan through lifestyle and supplements, considering at least the 12 hallmarks of aging that apply to both the body and the skin [5]. Cosmetic products can influence these parameters by helping the skin become more resilient to weakening factors or repair existing damage.

For the following discussion, we focus on key current market and societal trends:

Well-Aging/Longevity: The focus is on maintaining skin function rather than classic "anti-aging". The goal is not necessarily to make skin look younger but to keep it in an optimal state over time. Targeted, preventive solutions activate the skin via biological hallmarks such as cell energy, senescence, epigenetics, inflammation, microbiome and more [6].

Skinimalism: Fewer but more effective products with multifunctional benefits. Scientifically proven actives that optimize dermal and epidermal functions to keep skin in its healthiest, most attractive state.

Neuro-/Sensocosmetics: Beyond direct soothing effects on skin receptors located on peripheral nerve endings (e.g., TRP family receptors), holistic concepts that positively influence the skin-brain axis are emerging. These include stimulating peripheral nerve endings in the skin or activating olfactory receptors in the nose [7,8]. Advanced emotion-measurement technologies are used to assess these effects. Desired outcomes include stress reduction and enhanced well-being.

Personalization & AI: Instrument-based and image-based diagnostics combined with data-driven AI recommendation systems for precise care represent the cutting edge of consumer-facing cosmetic technology [9]. While its overall market impact remains to be seen, its benefits for informed, experimental consumers seeking tailored results are undeniable.

Microbiome Orientation: A growing pipeline of pre-, pro-, and postbiotics aims to strengthen the barrier and improve skin ecology (Grand View Research).

The focus in cosmetic treatment of wrinkles and other signs of aging is shifting from purely **visual tightening effects** to firming as a multidimensional concept: **structural firmness** of tissue, **dynamic firmness** describing elasticity under stress (e.g., facial expressions), and **sensory firmness**, namely the skin feel and well-being.

Standardized industry methods are used to objectively assess these four firmness parameters: Visual assessment of wrinkles and unevenness uses techniques like fringe projection (e.g., PRIMOS® or AEVA®) or high-resolution photography (e.g., VISIA®-CR, Antera 3D®), enabling micrometer-level precision.

Cutometry evaluates firmness via suction deformation measurements, deriving R-parameters: firmness (R0), "gross elasticity" (R2), "net elasticity" (R5), and "biological elasticity" Ur/Uf (R7).

Dynamic firmness is assessed using high-speed camera systems that record tissue movement during facial expressions (e.g., opening and closing the mouth).

Sensory firmness is measured using neurophysiological methods: alpha brainwave activity and frontal cortical asymmetry as correlates for positive valence/relaxation during product application or subjective skin evaluation. Advanced face and eye tracking combined with galvanic skin response enables precise analysis of emotional valence and intensity.

Materials and methods

Placebo-controlled double-blind studies lasting up to 3 months were conducted to evaluate the efficacy of the active ingredients. MYRAMAZE®-ESSENCE (1%, hereafter Myrothamnus extract) and CALNEURIN®-SENSE (1–3%, hereafter Cichorium extract) were applied twice daily to the face; LIFTONIN®-QI (3%, hereafter Ganoderma extract) once daily; LIFTONIN®-XPRESS (2%, hereafter Express Lifting active) was applied once and its immediate effect was assessed. Analyses included skin evenness, wrinkle analysis, and firmness using frictiometry, cutometry, AEVA®, and VECTRA®-XT. Emotional parameters were assessed using advanced face and eye tracking, galvanic skin response, and EEG. Instrumental data were corroborated by dermatological and subjective evaluations. Tests were conducted on European and Asian panels.

Results

The Express Lifting active is a physical skin tightener with an instant effect. Its activity is based on a combination of various polysaccharides, namely pullulan, hydroxypropyl methylcellulose (HPMC) and phycocolloids from the red algae *Porphyridium cruentum*. When these molecules release their bound moisture from the cosmetic base to the skin, tensile forces are created in the secondary structure, effectively smoothing skin wrinkles. The effect is visible after just one minute and works in all common cosmetic bases such as gels, emulsions, and serums. The effect can be applied to a wide range of individuals across different age groups. In addition to the

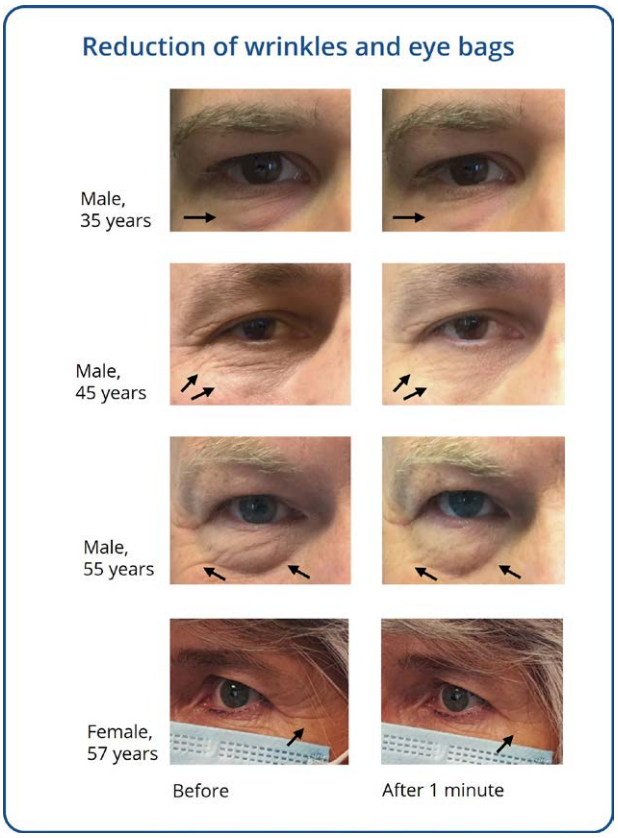

Fig. 1 Firming effect of 2% Express Lifting active after 1 minute on periocular wrinkles and under-eye bags in individuals of different ages.

visually firming effect on wrinkles, the active ingredient is also visibly effective on eye bags **(Figure 1)**. The effect lasted up to 6 hours.

Ganoderma extract was developed as an active ingredient for **structural firming**, as such an ingredient that builds dermal structures. It is an aqueous extract of the number one healing substance in traditional Chinese medicine: *Ganoderma lucidum*. Its content of β-glucan and adaptogenic molecules has a positive effect on the skin. Skin aging and solar elastosis leave an area of thinned collagen and elastin structures in the

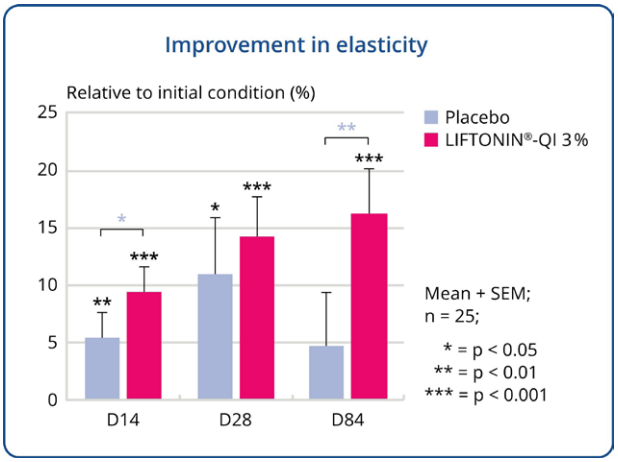

Fig. 2 Ganoderma extract significantly improves skin elasticity after just 14 days.

papillary dermis. This area appears in ultrasound images as a subepidermal low echogenic band (SLEB). Ganoderma extract positively influences methylation patterns in epigenetic gene regulation and significantly improved dermal density by 32% compared to baseline after 3 months. It was more than twice as effective as placebo, which showed no significant effects (data not shown). The impact on **structural skin firmness** was confirmed by cutometry. Skin elasticity increased significantly by 9% after 14 days, improved to 14% after 28 days and reached 16% after 3 months **(Figure 2)**.

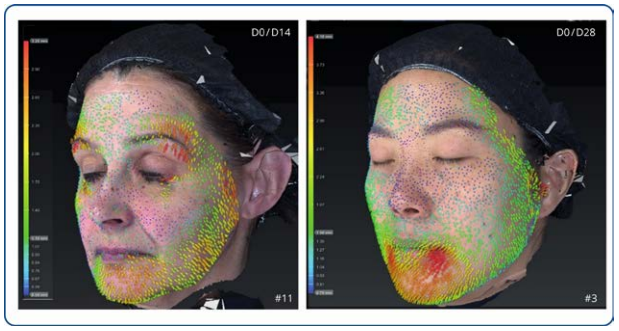

Fig. 3 Contour lifting by Ganoderma extract. **Right**: In the European panel, lifting was most pronounced in the eye area, while in Asians it was strongest at the mouth corners **(left)**. Arrows indicate the strength and direction of the lifting effect (red = strong, blue = weak).

Placebo showed much lower values. This improvement in structural firmness was reflected in a significant lifting effect measured on both European and Asian skin **(Figure 3)**. VECTRA®-XT images show a significant overall lifting effect, particularly in the upper eyelid area for Europeans and at the corners of the mouth for Asians. These quantified effects were highly significant compared to baseline, while placebo tended to have a negative effect (data not shown). Additionally, the active ingredient has prebiotic properties and promotes the growth of *Staphylococcus epidermidis*.

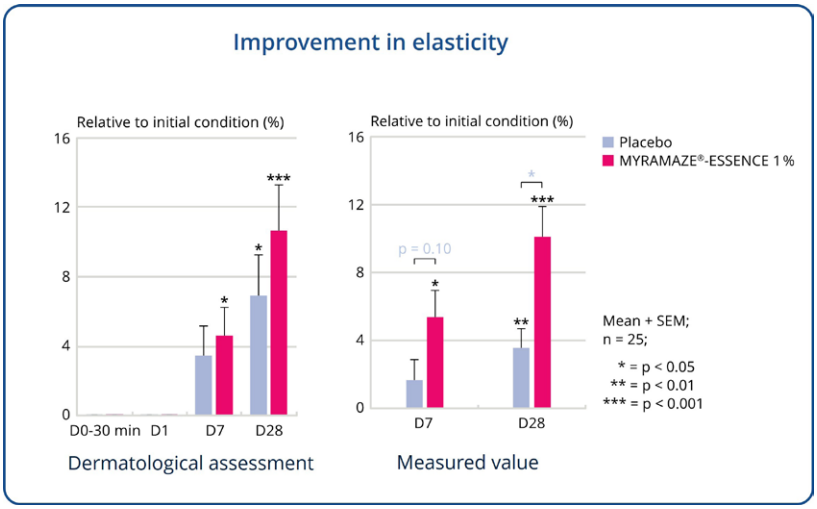

Fig. 4 Improvement of skin elasticity by Myrothamnus extract. Both dermatological assessment **(left)** and cutometry measurements showed significant results after just 7 days.

Myrothamnus extract is made from the CO_2 extract of the leaves of the resurrection plant *Myrothamnus flabellifolia*. The extract has a pleasant scent reminiscent of pine, meadow herbs and citrus fruits. In a study where subjects applied the active ingredient to facial skin, a stress-reducing effect was observed even though the scent was not consciously perceived. During olfactory exposure to the active ingredient, a significant improvement in stress reduction was observed [10]. This effect is due to the interaction of odour-active components from the plant's essential oil with olfactory receptors in the nose and signal transmission to the brain. On the skin, bitter taste receptors are activated, promoting skin health. In terms of **structural skin firmness**, a significant improvement in skin elasticity was observed after only 7 days, increasing to 10% after 28 days compared to baseline **(Figure 4)**. A dermatological assessment confirmed this result. In addition to improving the periocular wrinkle pattern, the active ingredient showed lip-plumping effects when used in a lip balm, with highly significant results after just 7 days **(Figure 5)**. This effect is attributed to improved elasticity of lip tissue and the ingredient's excellent hydration properties. As **Figure 5** shows, lip wrinkles were visibly reduced.

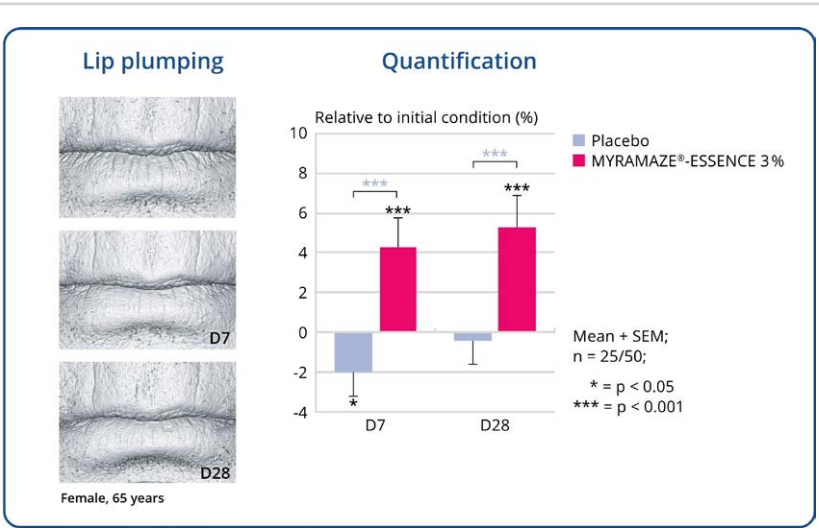

Fig. 5 Myrothamnus extract plumps lips. After only 7 days, the effect was highly significant. Lip wrinkles are visibly reduced.

For the assessment of **dynamic skin firmness**, 3% Cichorium extract in a base emulsion was applied twice daily to facial skin for 28 days. Skin movements during mouth open-

ing and closing were recorded on days 0 and 28 using a high-speed camera, and tissue movements between two previously marked points were quantified over time **(Figure 6)**. The active ingredient improved dynamic skin firmness by 17.6% compared to baseline **(Figure 7)**. Placebo had no effect or a slightly opposite trend.

This active ingredient was also analysed for **sensory firmness**, expressed as smoothness and skin feel. Subjective perception of skin feel improved by 50% after 7 days and by almost 100% after 28 days [11]. The result was confirmed by dermatological assessment and instrumentally using frictiometry and fringe projection (data not shown). Emotional parameters were also evaluated using advanced face and eye tracking and galvanic skin response, revealing positive emotions in subjects who applied the active ingredient. Placebo use led to rather negative emotions [11]. Interestingly, the skin condition after application of the active ingredient changed so much that it also felt better to a second person. This was confirmed not only by dermatological findings but also by EEG measurements of a person caressing the treated skin. For the measurement, the person wore an EEG cap and caressed all subjects; alpha waves were analysed by hemisphere, allowing calculation of alpha-wave asymmetry, an indicator of emotional orientation. Positive, socially interactive emotional brain activity was observed when caressing skin treated with the active ingredient, whereas placebo-treated skin showed tendencies toward socially isolating emotions **(Figure 8)** [11].

The active ingredient is obtained from chicory root water *(Cichorium intybus)* and contains short-chain inulin fructo-oligosaccharides, which, in interaction with the skin microbiota, trigger a positive neurosensory effect in the skin that benefits overall well-being [11].

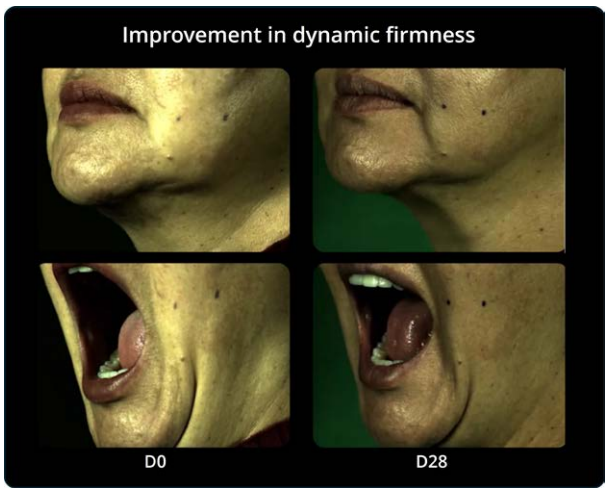

Fig. 6 Dynamic skin firmness during facial movements. A high-speed camera records movements during mouth opening and closing. Tissue movements between two predefined points (black) are quantified.

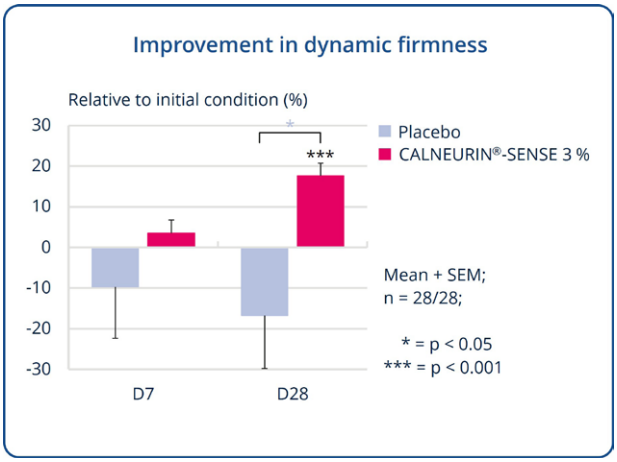

Fig. 7 Cichorium extract significantly improves skin firmness during movement after 28 days.

Conclusion

Firming today is multidimensional: structure, dynamics, and sensory/emotional aspects are interconnected. The active ingredients discussed here optimally cover this spectrum. The trend topics "well-aging"/longevity, "skinimalism," neuro-/sensocosmetics, personalization, and microbiome orientation can all be addressed. The high versatility of these actives particularly supports the "skinimalism" trend, meaning multiple claims can be achieved without using numerous active ingredients in a single cosmetic product.

The Express Lifting active creates mechanical tightening through a flexible film matrix of various polysaccharides. It is ideal for instant claims and event-ready applications for immediate perception and visual skin firming.

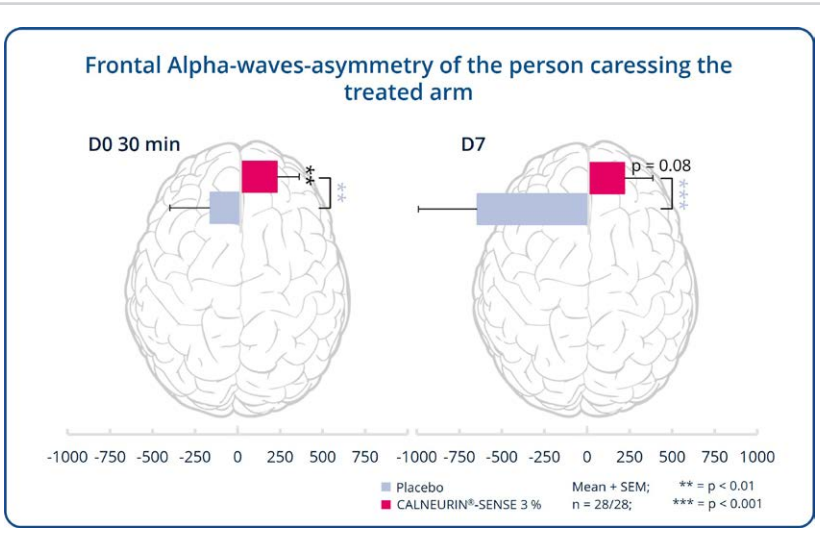

Fig. 8 Cichorium extract induces positive alpha-wave asymmetry in a person caressing treated skin, indicating socially interactive emotions.

Ganoderma extract addresses epigenetic stress and shows robust improvements in dermis and epidermis quality and elasticity: aligned with the 2025 shift toward "well-aging"/longevity and hallmark of ageing-based concepts. It specializes in long-term dermal structure building and maintenance.

Myrothamnus extract combines sensocosmetic activation via skin receptors and nasal olfactory stimulation with improved structural firmness and stress reduction. This concept aligns with the growing demand for neurocosmetics. Its lip-plumping effect through enhanced elasticity and hydration is particularly noteworthy.

Cichorium extract strengthens dynamic tissue firmness and demonstrates positive emotional patterns during use, confirmed by advanced technologies such as EEG, face and eye tracking, and galvanic skin response. This appeals to consumers seeking visible and tangible results combined with well-being.

The range of effects, from instant results to long-term remodeling and sensorial/neuro support, meets the demand for effective, evidence-based products that support "less is more" routines, enhance well-being, and enable personalization. Some actives also allow prebiotic claims.

The presented actives can be targeted to different consumer groups: Generation X prefers holistic "well-aging" concepts with long-term structural improvements, which makes Ganoderma extract suitable here. Millennials seek efficient, minimalist solutions for an active lifestyle, making skinimalism and instant effects like the Express Lifting active particularly attractive. Gen Z values sensory experiences, personalization, and emotional benefits – actives like Cichorium and Myrothamnus extracts meet these expectations.

For all age groups, the combination of visible firming, emotional well-being, and scientifically proven efficacy builds trust and market differentiation.

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