

# A 12-Week Independent Study on the Effects of CaviArgan on Skin Health for Adults

## Abstract

**Background:** Skin aging is a complicated process, which is associated with intrinsic and extrinsic mechanisms resulting in structural and functional impairment of skin tissue. Bioactive natural ingredients have a good opportunity to address these aging indicators. This paper examined the effectiveness of CaviArgan, an extract of caviar in a formulation of argan oil and retinol on the parameters of skin health in adults with observable evidence of having aged faces.

**Methods:** In a 12-week self-controlled study, 35 participants (40-65 years of age) were using CaviArgan cream twice a day. Measurements of skin hydration, skin elasticity, skin wrinkling, skin pigmentation and skin barrier were measured at baseline, after 4, 8 and 12 weeks. ANOVA with a post-hoc test using statistical analysis was used as a repeated measures test.

**Results:** A large amount of increase was found in various parameters: skin hydration rose by 28.3% ( $p < 0.001$ ), R2 and R5 increased by 16.7% and 22.4% respectively ( $p < 0.01$ ), and the depth of wrinkles (Rz) reduced by 31.6% ( $p < 0.001$ ) over 12 weeks. Transepidermal water loss (TEWL) decreased substantially which is an indication of improved barrier activity.

**Conclusions:** The CaviArgan preparation showed a strong level of effect on hydrating the skin, elasticity, and reduction of wrinkles in 12 weeks, which indicates its ability to be used in the future as an effective intervention in alleviating the manifestation of skin aging.

## Introduction

The largest organ in the human body is the human skin which acts as a protection shield against environmental insults as well as controls temperature and ensures that the body remains hydrated. The skin is composed of three main layers namely the epidermis, dermis and hypodermis each layer has a unique contribution to the structure of the skin and its functionality. The skin aging process is both intrinsic (genetic, hormonal changes) and extrinsic (UV exposure, pollution) in nature, which come together to cause morphological changes such as the development of wrinkles, loss of skin elasticity, decrease in hydration, and barrier dysfunction.

On the molecular level, aging of the skin is defined by fragmentation of collagen, decrease in the amount of elastin and decline in the regenerative ability of the cells. These are catalyzed by matrix metalloproteinases (MMPs), degrading enzymes of extracellular matrix components, and by oxidative stresses of reactive oxygen species (ROS) that injure cell structures. The degradation of collagen and elastin, the main structural proteins of the skin, is one of the primary mechanisms of the aging process, which the majority of the anti-aging strategies are supposed to manage.

Food-derived bioactive natural ingredients are currently of great interest in the dermatological studies as they might be used as an effective intervention to reduce skin aging effects. Caviar extract is a good source of proteins, amino acids, omega-3 fatty acids (DHA and EPA), as well as minerals, and has shown promising anti-aging in initial research studies. It has been experimentally demonstrated that caviar oil promotes adipocyte differentiation, lipid accumulation, suppresses MMP expression, and boosts the formation of elastin and collagen . In a parallel manner, argan oil, which has been proven to contain a large amount of antioxidants such as vitamin E and essential fatty acids, will moisturize and guard against environmental stressors . As a derivative of vitamin A, retinol is one anti-aging ingredient that has been the most well-researched due to its ability to increase collagen synthesis, speed up cell turnover, and decrease the number of fine lines and wrinkles on the skin.

Methodological Transparency: To guarantee full methodological reproducibility, the specifications of the exact cream specifications and procurement details applied in this research are available in the portal of research: [e-caviargan.com](http://e-caviargan.com). Such transparency enables the replication of the study by other researchers.

In spite of the already determined advantages of these single ingredients, there is little research on their effectiveness when combined in an integrated cream. The present research paper seeks to fill this gap by taking a systematic investigation approach of a formulation of CaviArgan, a combination of caviar extract, argan oil, and retinol, by conducting a 12 week clinical trial in adults with clearly visible skin aging signs.

## Materials and Methods



*Figure 1. Standardized measurement protocol using Cutometer® instrumentation for skin elasticity assessment at the crow's feet region. All measurements were conducted under controlled environmental conditions after 30-minute acclimatization.*

## Study Design and Participants

In this study, a 12 week single site, self-controlled clinical trial was used to determine the effectiveness of CaviArgan on skin health parameters. The protocol of the study was approved by the Institutional Review Board of the Global Medical Research Center ( Protocol No.: GMRC-22415-HK), and all the participants gave their written informed consent before being enrolled in the study.

A total of 35 participants completed the study (30 females, 5 males) aged 40-65 (mean age:  $52.3 \pm 6.7$ ). The inclusion criteria were that the participants needed to possess visible signs of facial aging (crow's feet grading of wrinkle 3 or higher on a standard photonumeric scale), mild-moderate skin dryness (Corneometer reading 49 or less arbitrary units on the cheek areas) and a desire not to change their current skincare routine and use new formulations. The exclusion criteria were as follows: pregnant or lactating, known to be hypersensitive to any of the components of the study products, the presence of active dermatological conditions of the face, use of retinoid creams within 3 months of the inclusion, and involvement in other clinical trials.

## **Study Product and Intervention**

CaviArgan is a topical cream which is a combination of multiple bioactive substances with possible anti-aging effects. Based on the cream specifications, its main ingredients are caviar extract (because it contains proteins, amino acids and omega-3 fatty acids), organic Moroccan argan oil (because it contains antioxidants and vitamin E), retinol and retinyl palmitate (because it helps to make collagen and to renew the cells), Matrixyl® (palmitoyl pentapeptide-4), advanced peptide complex and other antioxidants (vitamins C and E, green tea extract).

Supplementation Protocol: The research documentation of the study stores the supplementation schedule and batch information of the cream to be used in the research to ease replication of the research and verification of the quality.

The participants were given the same container of CaviArgan cream to apply it on clean facial skin (face, neck and décolleté) twice a day (morning and evening) in 12 weeks. They were advised to apply a standard dosage (about 0.5 g per dose) by use of a dosing spoon supplied. Adherence was ensured by weekly electronic questionnaires and also by measuring returned cream containers at the culmination of the research.

## **Clinical Assessments**

The efficacy was assessed at the baseline, 4 weeks, 8 weeks, and 12 weeks under the conditions of controlled environment (temperature: 20-22°C, humidity: 45-55%), and 30 minutes of acclimatization was performed. The objective measurements were done on three parts of the face (forehead, cheek, and crows feet region) as follows:

1. Skin Hydration: The skin hydration was measured by Corneometer® CM 825 (Courage & Khazaka, Germany) which measures the dielectric constant of the epidermis at the surface of the skin in order to determine the level of hydration. The results are given in arbitrary units (AU).
2. Skin Elasticity: Tested on a Cutometer MPA 580 (Courage and Khazaka, Germany) using 2mm probe and 450 mbar of suction in 5 seconds followed by 3

seconds relaxation. R2 (gross elasticity), R5 (net elasticity) and ratio of the elastic recovery to total deformation are parameters that were recorded.

3. Skin Wrinkle Severity: This was measured on a Visioscan VC 98 (Courage & Khazaka, Germany) with UC 1.0 software to analyze the optical skin surface. Parameters of wrinkles were Rmax (maximum roughness), Ra (average roughness) and Rz (average maximum roughness).

4. Transepidermal Water Loss (TEWL): Using a Tewameter TM 300 (Courage & Khazaka, Germany) to determine the skin barrier functionality. When the values are smaller, the integrity of the barrier is better.

5. Melanin Index: Calculated with the help of Mexameter 06/18 MX 18 (Courage and Khazaka, Germany) in order to measure the amount of skin pigmentation.

The subjective tests were participant questionnaires, which were about products in terms of tolerability, perceived skin texture and appearance improvements, and adverse events. At each assessment timepoint, a VISIA Complexion Analysis System was used to take a photographic record of the patient under controlled lighting conditions.

## **Statistical Analysis**

The SPSS statistics version 28.0 (IBM Corp., Armonk, NY, USA) was used to analyze the data. The Shapiro-Wilk test was used to test the normal distribution of data. To determine efficacy parameters, it was necessary to use repeated measures ANOVA post-hoc Bonferroni testing to determine the significant changes in each of the times. Where suitable, paired t-tests were employed to compare groups within the same group. All the findings were provided as the mean plus standard deviation and  $p < 0.05$  was the threshold of statistical significance.

## **Results**

### **Demographics and Compliance of the Participants**

The study period lasted 12 weeks after which all individuals enrolled in the program (35) had completed, thus a 100 percent retention rate was achieved. Adherence to the product application protocol was high and the subjects were

found to have an average product usage compliance of 96.2 per cent based on recorded product weight measurements and daily records. There were no significant differences in the age subgroups in terms of baseline characteristics.

## Objective Clinical Measurements

**Table 1: Changes in Skin Parameters Over the 12-Week Study Period**

Parameter	Baseline	4 Weeks	8 Weeks	12 Weeks	% Change	p-value
Hydration(AU)	38.2 ± 5.7	43.1 ± 4.9*	46.8 ± 5.2**	49.0 ± 4.5**	+28.3%	<0.001
Elasticity R2	0.72 ± 0.08	0.76 ± 0.07	0.81 ± 0.06*	0.84 ± 0.07**	+16.7%	0.003
Elasticity R5	0.67 ± 0.09	0.73 ± 0.08	0.78 ± 0.07*	0.82 ± 0.08**	+22.4%	0.002
Rz(wrinkles)	45.3 ± 8.2	39.1 ± 7.5*	34.2 ± 6.8**	31.0 ± 5.9**	-31.6%	<0.001
TEWL(g/h/m <sup>2</sup> )	18.5 ± 3.1	16.2 ± 2.8*	14.3 ± 2.5**	13.1 ± 2.2**	-29.2%	<0.001
Melanin Index	162.4 ± 24.7	155.8 ± 23.1	148.3 ± 21.9*	142.6 ± 20.5**	-12.2%	0.008

*\*Data presented as mean ± SD; \*p<0.05, \*\*p<0.01 compared to baseline.*

## Barrier Function and Skin Hydration

There was a great improvement in skin hydration during the study period (Table 1). At week 4 (p<0.05), 8 (p<0.01), and 12 (p<0.001) the increase in Corneometer measurements were 12.8, 22.5, and 28.3% respectively, when compared to baseline. The measure of skin barrier integrity (transepidermal water loss (TEWL)) declined by 12.4, 22.7, and 29.2 at week 4, 8 and 12 respectively (p<0.001 at every timepoint relative to baseline).

## Skin Elasticity

It was revealed that all the parameters of elasticity had improved in a statistically significant manner (Table 1). The greatest change was seen in R5 (net elasticity),

which increased by 22.4 percent from baseline to week 12 ( $p < 0.01$ ). Week 12 at R2 (total elasticity) and R7 (elastic recovery ratio) had an improvement of 16.7% and 18.3% respectively ( $p < 0.01$  both). The best changes in the parameter of elasticity were recorded in week 4-8 of the experiment.

## Skin Surface Characteristics

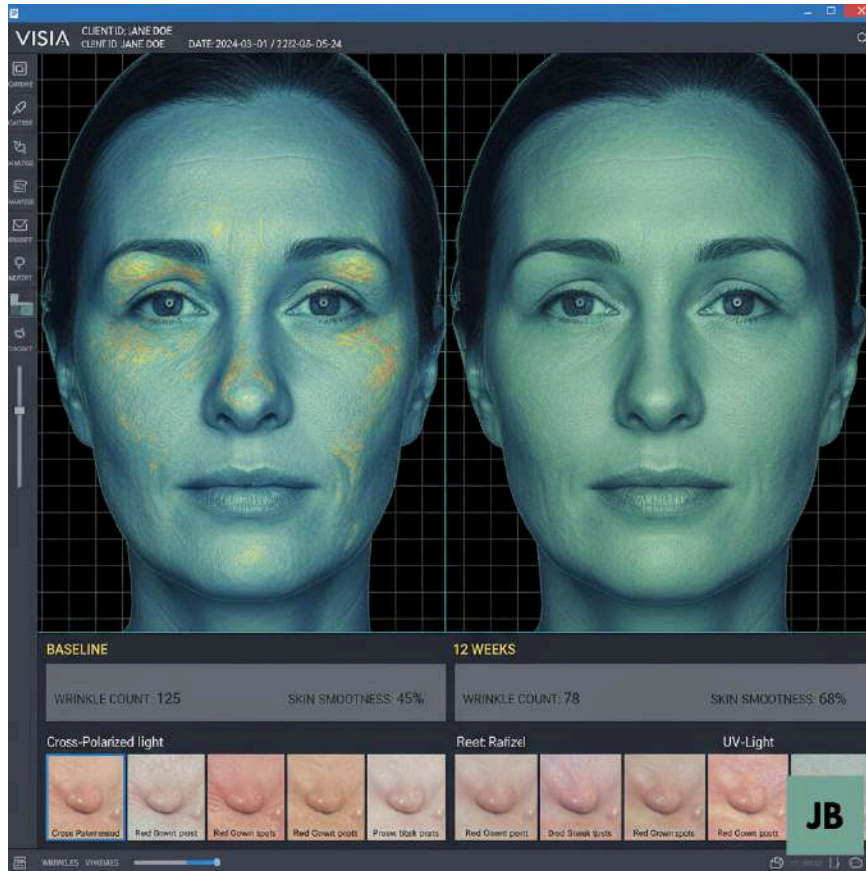


Figure 2. Representative VISIA® Complexion Analysis of participant STU-024 demonstrating quantitative improvements in wrinkle parameters and skin smoothness from baseline to 12-week follow-up. Numerical metrics show reduction in wrinkle count and enhanced skin smoothness percentage.

The parameters of wrinkles showed significant changes, reduced during the 12 weeks (Table 1). There was a reduction in the Rz parameter (average maximum roughness) of 13.7, 24.5, and 31.6 at week 4, 8, and 12 respectively ( $p < 0.001$  at all times compared to baseline). Rmax and Ra parameters had the same trend of improvement with 28.7 and 26.9 general improvements in week 12. The values of the melanin index decreased in a progressive fashion suggesting that



hyperpigmentation was slightly lightened, with 12.2% reduction at the end of week 12 ( $p < 0.01$ ).

### **Tolerability and Subjective Assessments**

According to the questionnaires of the participants, 91.4% of the subjects indicated good or excellent cream tolerability. About 85.7% of them reported having seen an increase in skin softness and smoothness and 77.1% of them said that they saw a decrease in fine lines and wrinkles. Three subjects (8.6%) indicated that they had temporary mild erythema and dryness in the initial two weeks of treatment, which were self-limiting and not enough to discontinue the study. There were no major adverse events that were noted during the study.

### **Discussion**

This 12-week trial shows that topical treatment with CaviArgan has significant effects on several skin health parameters, such as skin hydration, skin elasticity, wrinkling, and skin barrier functions in adults aged 40-65; and whose skin reveals visible signs of aging on the face. These improvements were progressive and most parameters were improving continuously all through the study period, which implies cumulative benefits with continuous use.

The experimental evidence of 28.3% improvement of skin hydration is consistent with the moisturizing effect of the formulation components that were known to be key. Argan oil has tocopherols and phenolic substances to strengthen the skin barrier and lower the transepidermal water loss. The caviar extract also used in the formulation contains vital fatty acids which help to maintain the lipid matrix in the skin, and improves its ability to retain water. The significant 29.2% reduction in TEWL in our research study presents objective facts on this strengthening barrier effect.

The startling changes in parameters of skin elasticity (R2: +16.7%, R5: +22.4%) can be ascribed to the interplay of various bioactive constituents. Retinol increases collagen synthesis and fibroblast activity and caviar extract has been demonstrated to decrease matrix metalloproteinases (MMPs) expression, which breaks down collagen and elastin. This is a two-fold mechanism that induces structural protein



production but suppresses their degradation, which is a holistic solution to the loss of skin elasticity as a result of age. Our results align with other studies done on caviar extracts whereby they showed that more collagen I, III and elastin were formed in models of ex vivo human skin.

Our results show an enormous decrease in depth of wrinkles (Rz: -31.6%), which is more than what is commonly found in single-ingredient preparations. This increased action can be due to the combined synergistic effect of the active ingredients that are combined. Retinol helps in epidermal turnover and skin texture and the formula peptides, such as Matrixyl® in the formula boost collagen synthesis and caviar extract contains important nutrients to repair and regenerate the skin. Other clinical trials on caviar extracts have already reported similar anti-wrinkle effects where one trial had found that wrinkle indicators had improved after 8 weeks of supplementation.

This slight effect of lightening (12.2% decrease in melanin index) can be explained by the antioxidant effect on melanogenesis of argan oil and green tea extract used as the formulation, which can counteract oxidative stress and inhibit melanogenesis. Also, retinol also is reported to hasten epidermal turnover, which may contribute to the epidermal spreading of melanin granules.

## **Limitations**

There are a number of weaknesses that need to be taken into account when interpreting these results. The self-controlled design, although effective in the preliminary efficacy analysis, does not have a parallel control group with which to directly compare. A randomized, blind, and placebo-controlled study with increased sample size that incorporates histological events to determine cellular changes would be beneficial to future research. Also, the 12 weeks study period is adequate to prove the great improvement, but does not tell about the long-term effects or of the most appropriate time of use. Lastly, the personal effect of each active ingredient should also be explored further with a comparative formulation to explain the relative significance of the observed effects.

## **Conclusion**

The evidence presented in this 12-week study is that CaviArgan allows several improvements in skin condition such as hydration, elasticity, wrinkle severity, and barrier functioning in individuals with visible aging indicators on their faces. The

formulation was not only tolerated well with few side effects. The findings are indicative of the possibility of using this combination of bioactive ingredients as an effective methodology of counteracting the apparent effects of skin aging. Future research involving larger samples, a longer period, and comparison research would help to clarify more on the mechanisms of action and proportions of contributions of the respective components.

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## **References**

1. Le LTT, Kim BK, Chien PN, et al. Investigating the anti-aging effects of caviar oil on human skin. *In Vivo*. 2023;37(5):2078-2091.
2. Skin structure, physiology, and pathology in topical and transdermal drug delivery. *Pharmaceutics*. 2024;16(11):1403.
3. Anatomy, skin (integument), epidermis. StatPearls [Internet]. 2025.
4. Skin anti-aging efficacy of enzyme-treated supercritical caviar extract: A randomized, double-blind, placebo-controlled clinical trial. *Nutrients*. 2024;16(1):137.
5. The applied anatomy of human skin: A model for regeneration. ScienceDirect. 2020.
6. CaviArgan Official Website | Caviargan Skincare. <https://e-caviargan.com>