COREDERM SKIN RESEARCH CENTER

STUDY CODE: CDE-2300-066

A clinical study for skin improvement of ‘CELLTERMI REVIVE NX’ on human skin

STUDY SPONSOR : CHA Meditech Co., Ltd.

October 2023

A True Expert in Skin Research

COREDERM INC. Skin Research Center

APPROVAL SIGNATURES

□ Report Status : Final report
□ Study Code : CDE-2300-066
□ Protocol Code : TPCE-GDVA-040
□ IRB Number : CDIRB-QR-23-073
□ Report Date : October 16, 2023

□ Study Title : A clinical study for skin improvement of 'CELLTERMI REVIVE NX' on human skin

□ Test Product : CELLTERMI REVIVE NX

□ Sponsor / CHA Meditech Co., Ltd.
□ Coordinator : Hyuna Jung

Jeonmin-dong, 1646, Yuseongdae-ro, Yuseong-gu, Daejeon, Republic of Korea

Tel : +82-31-881-7813 / +82-10-6480-4913
Fax : +82-31-881-7562
Email : hyuna.jung@chamc.co.kr

□ Study Center: COREDERM Inc. Skin Research Center
Boncheol Leo Goo / Medical Director, Dermatologist

4F, Kukje Bld, 56, Jungdae-ro, Songpa-gu, Seoul, Republic of Korea
Tel : +82-2-6925-3707
Fax: +82-70-8275-3707
Email : src@corederm.co.kr

10/16/2023

Date

Joonhwan Cho
Scientific Director

Boncheol Leo Goo
Medical Director

Yeonwoo Shin
Subinvestigator

QUALITY ASSURANCE CERTIFICATION

The COREDERM Inc. Skin Research Center has unequivocally performed the study, "A clinical study for skin improvement of 'CELLTERMI REVIVE NX' on human skin" as requested by the **CHA Meditech Co., Ltd.**

The study was conducted in compliance with ISO 9001:2015 / KS Q ISO 9001:2015, the regulation of the Good Clinical Practice (GCP), Ministry of Food and Drug Safety (MFDS), and the experimental protocol of the **COREDERM Inc. Skin Research Center.**

It is confirmed that this report was reviewed and found that it accurately reflected the study result obtained during the study by following the protocols of the **COREDERM Inc. Skin Research Center.**

Item	Date	Confirmation of Scientific and Medical director
Study protocol	July 6, 2023	July 6, 2023
IRB review on study plan	July 6, 2023	July 6, 2023
Recruitment	July 7 to 21, 2023	July 7 and 21, 2023
Study period	July 24 to August 22, 2023	July 24 and August 22, 2023
IRB report on study completion	August 22, 2023	August 22, 2023
Draft report	September 22, 2023	September 22, 2023
Final report	October 16, 2023	October 16, 2023

Eunjoung Kim

Eunjoung Kim

Quality Assurance

10/16/2023

Date

Joonhwan Cho

Scientific Director

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SUMMARY

Title	A clinical study for skin improvement of 'CELLTERMI REVIVE NX' on human skin		
Study Code	CDE-2300-066	Protocol Code	TPCE-GDVA-040
Report Date	October 16, 2023	Study Period	July 24 to August 22, 2023
Test product	CELLTERMI REVIVE NX		
Objective	This study was conducted to evaluate the improvement of skin tone, skin tone evenness, skin texture (roughness), crow's feet, skin redness (hemoglobin concentration and evenness), melanin (concentration, evenness and area) of pigmentation such as melasma, skin hydration (outer moisture), skin elasticity, skin gloss and skin transparency by using test product and treating MTS once a week for 4 weeks on human skin.		
Methods	1. Study design: Comparison before and after using the test product. 2. Subject: 22 adult female subjects aged from 39 to 59 (average age: 51.8±4.9) participated in this study. 3. Assessments: Subjects suitable for this study had used the test product and treated MTS once a week for 4 weeks. Skin tone, skin tone evenness, skin texture (roughness), crow's feet, skin redness (hemoglobin concentration and evenness), melanin (concentration, evenness and area) of pigmentation such as melasma, skin hydration (outer moisture), skin elasticity, skin gloss, skin transparency were measured before, after 1 week and 4 weeks use of the product. Also, questionnaire surveys on the efficacy and usability, and skin safety evaluation were conducted.		
Results	1. Analysis of skin tone As a result of skin tone, the value significantly increased by 0.43% after 1 week and 1.03 % after 4 weeks use, compared to before (p<0.05). 2. Analysis of skin tone evenness As a result of skin tone unevenness (standard deviation), the value significantly decreased by 4.03% after 1 week and 8.28 % after 4 weeks use, compared to before (p<0.05). 3. Analysis of skin texture (roughness) As a result of skin texture (roughness), the value significantly decreased by 6.96% after 1 week and 12.92 % after 4 weeks use, compared to before (p<0.05). 4. Analysis of crow's feet As a result of crow's feet, the value significantly decreased by 7.63% after 1 week and 13.13% after 4 weeks use, compared to before (p<0.05). 5. Analysis of skin redness (hemoglobin concentration and evenness) As a result of skin redness (hemoglobin concentration and evenness), the hemoglobin concentration value significantly decreased by 4.08% after 1 week and 7.31% after 4 weeks use, and the hemoglobin unevennness value significantly decreased by 5.81% after 1 week and 10.40% after 4 weeks use compared to before (p<0.05).		

6. Analysis of melanin (concentration, evenness and area) of pigmentation such as melasma

As a result of melanin (concentration, evenness and area) of pigmentation such as melasma, the melanin concentration value significantly decreased by 0.63% after 1 week and 1.97% after 4 weeks use, the melanin unevennness value significantly decreased by 6.63% after 1 week and 10.30% after 4 weeks use, and the melanin area value significantly decreased by 11.62% after 4 weeks use, compared to before (p<0.05).

7. Analysis of skin hydration (outer moisture)

As a result of skin hydration (outer moisture), the value significantly increased by 7.46% after 1 week and 14.14% after 4 weeks use, compared to before (p<0.05).

8. Analysis of skin elasticity

As a result of skin elasticity, the value significantly increased by 1.88% after 1 week and 4.29% after 4 weeks use, compared to before (p<0.05).

9. Analysis of skin gloss

As a result of skin gloss, the value significantly increased by 9.90% after 1 week and 21.48% after 4 weeks use, compared to before (p<0.05).

10. Analysis of skin transparency

As a result of skin transparency, the value significantly increased by 3.42% after 1 week and 8.17% after 4 weeks use, compared to before (p<0.05).

11. Analysis of self-questionnaires by subjects

Item	After 1 week use (%)*	After 4 weeks use (%)*
Skin tone improved	86	95
Skin tone becomes more even	91	91
Skin texture improved	95	95
Crow's feet improved	86	91
Skin redness improved	86	95
Melanin of skin pigmentation area becomes faded	86	91
Skin hydration improved	100	95
Skin elasticity improved	100	95
Skin gloss (radiance) improved	91	100
Skin becomes clear and transparent	86	91
Overall satisfaction	-	95

* Positive answers (%) = Number of positive answers (4, 5, 6) / Total number of subjects (22) x 100

12. Skin adverse reaction

As a result of skin safety through interviews and observations, all subjects did not show any skin adverse reaction during this study.

Conclusion	Based on the above results, the 'CELLTERMI REVIVE NX' is applied during MTS treatment once a week for 4 weeks, and is considered to help improve skin tone, skin tone evenness, skin texture (roughness), crow's feet, skin redness (hemoglobin concentration and evenness), melanin (concentration and evenness) of pigmentation such as melasma, skin hydration (outer moisture), skin elasticity, skin gloss and skin transparency after 1 week use, and is considered to help improve skin tone, skin tone evenness, skin texture (roughness), crow's feet, skin redness (hemoglobin concentration and evenness), melanin (concentration, evenness and area) of pigmentation such as melasma, skin hydration (outer moisture), skin elasticity, skin gloss, skin transparency after 4 weeks use of the test product.

1. STUDY OBJECTIVE

This study was conducted to evaluate the improvement of skin tone, skin tone evenness, skin texture (roughness), crow's feet, skin redness (hemoglobin concentration and evenness), melanin (concentration, evenness and area) of pigmentation such as melasma, skin hydration (outer moisture), skin elasticity, skin gloss and skin transparency by using test product and treating MTS once a week for 4 weeks on human skin.

2. STUDY PERIODS

From July 24 to August 22, 2023

3. CLINICAL STUDY STANDARDS

The study was conducted in compliance with ISO 9001:2015 / KS Q ISO 9001:2015, the regulation of the Good Clinical Practice (GCP), Ministry of Food and Drug Safety (MFDS), and the experimental protocol of the COREDERM Inc. Skin Research Center.

4. TEST MATERIAL

4-1. Name of product: CELLTERMI REVIVE NX

4-2. Methods of application:

1) Open the caps of Vial 1 (Lyophilized Nidosome) and Vial 2 (Activating Solution).

2) After pouring the Vial 2 (Activating Solution) into the Vial 1 (Lyophilized Nidosome), close the cap of Vial 1.

3) Shake the Vial 1 (Lyophilized Nidosome) until all the powder dissolved in the liquid phase.

4) Before using the MTS device, gently massage the face with clean hands.

5) Take an appropriate amount of the mixed sample in which the powder is completely dissolved and spread it evenly on the face.

6) After applying the contents, gently roll for about 5 minutes along the curved surface of the face with the MTS device.

7) In the middle of MTS rolling, use the contents remaining in the vial to absorb into the facial skin.

5. STUDY DESIGN

Comparison before and after using the test product

6. VISITING SCHEDULE

6-1. Visit 1 (Before, Subjects selection, Assessments, Skin treatment and Skin adverse reaction)

- After explaining the contents of the test, subjects who signed the consent form were selected according to the criteria for inclusion and exclusion, and the skin characteristics were investigated.
- Before use of the product, skin tone, skin tone evenness, skin texture (roughness), crow's feet, skin redness (hemoglobin concentration and evenness), melanin (concentration, evenness and area) of pigmentation such as melasma, skin hydration (outer moisture), skin elasticity, skin gloss and skin transparency were measured.
- After skin measurement, MTS treatment and REVIVE NX application were conducted for first time.
- Skin adverse reactions including subjective and objective were observed.

6-2. Visit 2 (After 1 week, Assessment, Skin treatment, Questionnaire survey and Skin adverse reaction)

- After 1 week use of the product, skin tone, skin tone evenness, skin texture (roughness), crow's feet, skin redness (hemoglobin concentration and evenness), melanin (concentration, evenness and area) of pigmentation such as melasma, skin hydration (outer moisture), skin elasticity, skin gloss and skin transparency were measured.
- After skin measurement, MTS treatment and REVIVE NX application were conducted for second time.
- Questionnaire survey of the test product was conducted.
- Skin adverse reactions including subjective and objective were observed.

6-3. Visit 3, 4 (After 2 and 3 weeks, Skin treatment and Skin adverse reaction)

- MTS treatment and REVIVE NX application were conducted for third and forth time.
- Skin adverse reactions including subjective and objective were observed.

6-4. Visit 5 (After 4 weeks, Assessment, Questionnaire survey and Skin adverse reaction)

- After 4 weeks use of the product, skin tone, skin tone evenness, skin texture (roughness), crow's feet, skin redness (hemoglobin concentration and evenness), melanin (concentration, evenness and area) of pigmentation such as melasma, skin hydration (outer moisture), skin elasticity, skin gloss and skin transparency were measured.
- Questionnaire survey of the test product was conducted.
- Skin adverse reactions including subjective and objective were observed.

7. SUBJECTS

7-1. Principle of recruitment

The investigator primarily selected the potential study subjects satisfying the inclusion and exclusion criteria. The subjects in a testing participation agreement were in full degree notified of the following information and drew up a testing agreement.

- Purpose and method of the study
- The effect and adverse effects predicted by the study
- Free withdrawal of the agreement by the subject
- Compensation and treatment in case of harm occurrence
- Contents on confidentiality of the identity
- Benefit from the participation in the studying
- Other contents necessary to the protection of human rights of the subject

7-2. Selection of the subjects

This study was conducted on 22 female subjects who satisfied inclusion and exclusion criteria. All evaluations were conducted after 30 minutes of adaptation under constant conditions (22.0 ± 2℃, 50 ± 5%) after washing the face.

7-2-1. Inclusion criteria

- Female aged 35 to 59, who have wrinkles, pigmentation such as melasma, and flushed skin on the face.
- Subjects who have signed consent form voluntarily after being informed well object of study and all related contents.
- Subjects who can be observed and traced for all the experiment period.

7-2-2. Exclusion criteria

- Subjects who are pregnant and nursing or have a pregnant plan within six months.
- Subjects who have psychiatric or infectious skin diseases.
- Subjects who have a chronic and wasting disease (asthma, diabetes, high blood pressure, etc.).
- Subjects who have an allergic disorder (food, pollen, etc.) or hypersensitivity or atopic dermatitis.
- Subjects who are inappropriate for measurement in the test area with dots, acne, scars, erythema, capillary dilatation, burn marks, etc.
- Subjects who have used a topical product including steroid to cure skin disease on testing site for more than one month.
- Subjects who are allergic to cosmetics, medicines, or exposure to sunlight.
- Subjects who have used similar treatment during the previous three months.
- Subjects who have used aesthetic treatments during the previous six months such as laser, surgery, etc.
- Subjects who have used anticonceptive, antihistaminic and anti-inflammatory prescriptions.
- Subjects who have not passed three months since taking part in the same study.
- Subjects who are employed in this clinical research laboratory.
- Any individuals who are considered to be inappropriate to participate in the study by the researcher.

7-3. Drop-out criteria

Subjects who participated in this study may stop and withdraw their participation at any time. Researcher excluded the study subjects from this study if the following reasons occurred, excluded the test results of the study subjects from the final result calculation and recorded them in the final report and case report form.

- Subjects who are willing to discontinue the study
- Subjects who are with serious adverse event or who want to discontinue the study because of adverse event such as pruritus, erythema, etc
- Subjects who do not follow the instructions according to the test product usage method and protocol
- Subjects who cannot be observed and traced for all the experiment period
- Other unavoidable circumstances

8. ASSESSMENTS

8-1. Measurement of skin tone and tone evenness

Skin tone and tone evenness were taken by using VISIA® CR 2.3 (Canfield, USA). The images were analyzed using Image-pro® (Media Cybernetics, USA). Intensity value (brightness) and Intensity SD value (standard deviation) were analyzed using the analysis program. When the intensity value increases, it means that the skin tone becomes brighter, and when the intensity SD value decreases, the evenness of skin tone becomes more even (Fig. 1).

In this study, skin tone and tone evenness on the left or right cheek was analyzed before, after 1 week and 4 weeks use of the product.

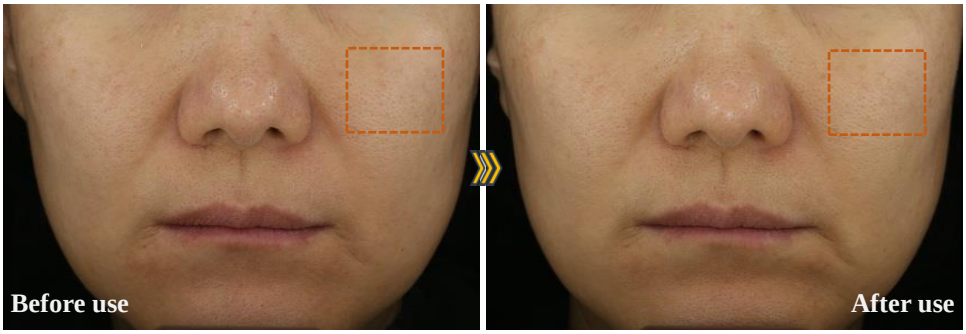


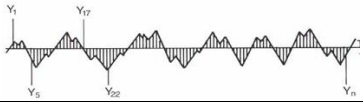
Figure 1. Skin tone and tone evenness analysis images

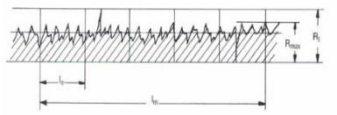
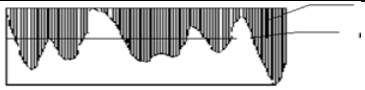
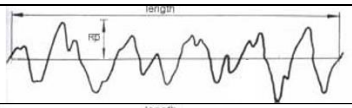
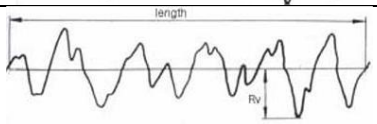
8-2. Measurement of skin texture (roughness)

Skin texture (roughness) was measured using PRIMOS® lite (Canfield, USA). The measuring principle is described as the optical method used for measuring the digital stripe projection technique, based on Digital Micro mirror Devices (DMD). The captured 3D image can measure the same area using the matching and overlay functions, and changes such as skin wrinkles, pores, surface roughness, area and volume can be measured using various parameters (Table 1, Fig. 2).

In this study, the skin texture (roughness) on the left or right cheek was measured before, after 1 week and 4 weeks use of the product and analyzed using the Ra parameter.

Table 1. Definition of skin texture (roughness) parameters

Parameters	Definition	Profile
Ra (㎛)	Arithmetic average value of profile peaks within the total measuring length	

Parameters	Definition	Profile
Rmax (㎛)	Difference of the highest and deepest value of a single section of measurements	
Rz (㎛)	Average maximum height of the profile	
Rp (㎛)	Largest positive deviation of the total measuring length from the reference plane	
Rv (㎛)	Largest negative deviation of the total measuring length from the reference plane	

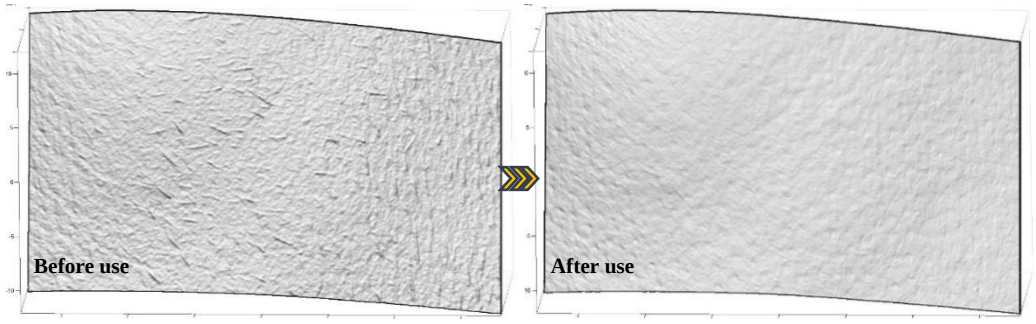


Figure 2. 3D images of skin texture (roughness) using PRIMOS® lite

8-3. Measurement of crow's feet

Crow's feet was measured using the 3D imaging system, Antera 3D® CS (Miravex Limited, Ireland). This device is analyzing skin parameters (texture, wrinkles, lines) and pigmentation parameters, captures high-resolution images of the skin surface and converts them into 3D images (Table 2, Fig. 3).

In this study, the left or right corners of the eye was photographed before, after 1 week and 4 weeks use of the product. Depth (Average wrinkle depth, mm), a skin wrinkle parameter, was analyzed using a 'wrinkle mode, small (1mm)' filter. The lower parameter value means improvement of crow's feet.

Table 2. Definition and explanation of skin wrinkle and fill analysis filter

Filter	Option	Definition
Small	1mm	Suitable for the analysis of fine lines.
Medium	2mm	Suitable for most wrinkles
Large	3mm	Suitable for large deep wrinkles
Custom	0.5~40mm	To define your own filter

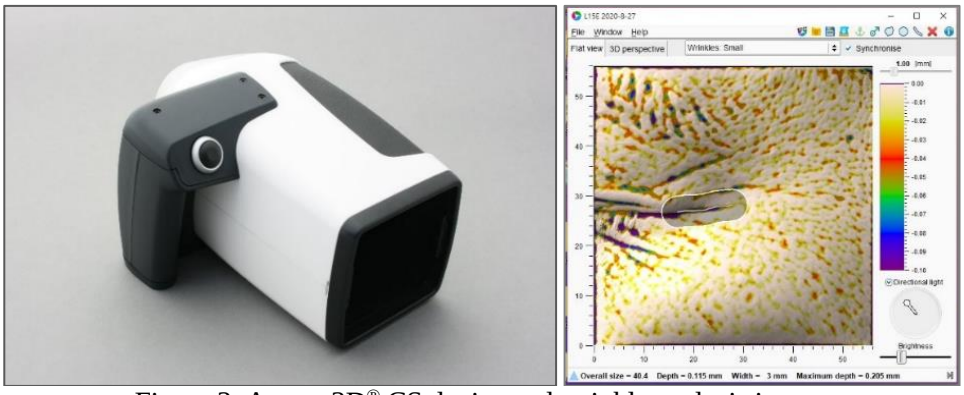


Figure 3. Antera 3D® CS device and wrinkle analysis image

8-4. Measurement of skin redness (hemoglobin concentration and evenness)

Skin redness (hemoglobin concentration and evenness) was measured using Antera 3D® CS (Miravex Limited, Ireland). The hemoglobin of skin redness site is analyzed using the absorption spectrum of hemoglobin in the converted image (Fig. 4).

In this study, the left or right cheek was measured and analyzed before, after 1 week and 4 weeks use of the product. The analyzed parameters are Average level(average hemoglobin concentration of selected site per unit area), Variation(Hemoglobin distribution unevenness within the selected area). The lower parameter value means improvement of skin redness.

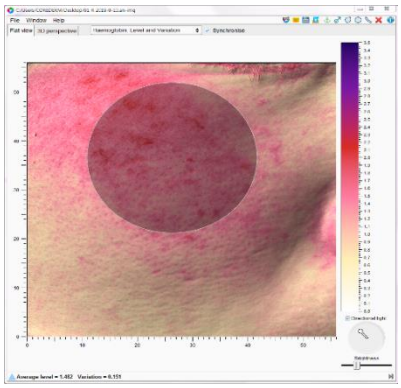


Figure 4. Skin redness (hemoglobin concentration and evenness) analysis image

8-5. Measurement of melanin (concentration, evenness and area) of pigmentation such as melasma

Melanin (concentration, evenness and area) of pigmentation such as melasma was measured using Antera 3D® CS (Miravex Limited, Ireland). The melanin (concentration, evenness and area) of the pigmentation site was analyzed using the absorption spectrum of melanin as a converted three-dimensional image (Fig. 5).

In this study, the left or right cheek and under the eye were measured and the melanin parameter (average level, variation, afftected area) was analyzed before, after 1 week and 4

weeks use of the product. The lower parameter value means improvement of melanin of pigmentation such as melasma.

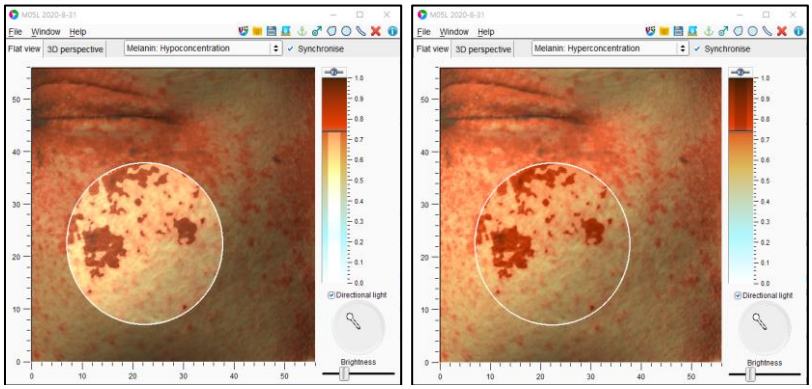


Figure 5. Melanin (concentration, evenness and area) of pigmentation such as melasma analysis image

8-6. Measurement of skin hydration (outer moisture)

Skin hydration (outer moisture) was measured by Corneometer® CM 825 (C+K, Germany). The measuring principle is based on the completely different dielectric constant of water and other substances. The measuring capacitor shows change of capacitance according to the hydration content of the measuring site. An electric scatter field penetrates the skin during the measurement and the dielectricity is determined. The drier the stratum corneum is the weaker electrical conductivity, the more hydrated the stratum corneum is the stronger electrical conductivity (Fig. 6).

In this study, skin hydration (outer moisture) on the left or right cheek was measured 3 times and the average value was analyzed before, after 1 week and 4 weeks use of the product. Skin hydration image was taken by using Epsilon E100 (Biox Ltd., England).

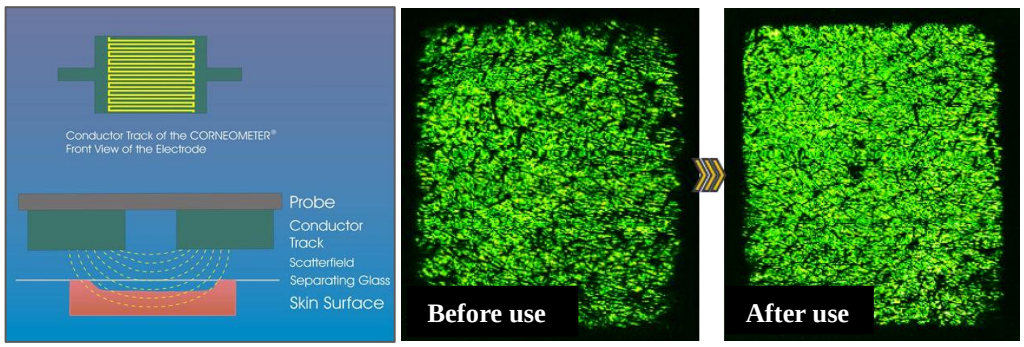


Figure 6. Principle of Corneometer® CM825 and Skin hydration images of Epsilon E100

8-7. Measurement of skin elasticity

Skin elasticity was measured using Cutometer® dual MPA 580 (C+K, Germany). This device is based on the suction method, in which negative pressure deforms the skin mechanically. The pressure is created in the device and the skin is drawn into the aperture of the probe and after a defined time released again. Inside the probe, the penetration depth is determined by a noncontact optical measuring system. The resistance of the skin to the negative pressure (firmness) and its ability to return to its original position (elasticity) are displayed as curves (penetration depth in mm/time) in real time during the measurement. From these curves a variety of interesting measurement parameters can be calculated related to elastic and viscoelasticity of skin surface and skin aging (Table 3, Fig. 7).

In this study, skin elasticity on the left or right cheek was measured before, after 1 week and 4 weeks use of the product. As the representative parameter R2 value nears 1, it means that elasticity is improved.

Table 3. Definition of parameters for skin elasticity using Cutometer® dual MPA 580

Parameters	Definition
R0	R0=Uf. First max. amplitude, highest point of the first curve, this has an implication for the firmness of the skin.
R1	Uf-Ua. First min. amplitude, lowest point of the first curve (ability of the skin to return to its original state)
R2	Ua/Uf. portion between the max. amplitude and the ability of returning to the original position. The closer the value is to 1 (100 %) the more elastic the curve
R3	last max. amplitude, highest point of the last curve, compared to the max. amplitude of the first curve. “Tiring effects“ of the skin are visible, as the amplitude increases with each new suction
R4	last min. amplitude, last measuring point, compared to the min. amplitude of the first curve. “tiring effects“ of the skin are visible, as the ability of returning to the original position decreases with each new suction
R5	Ur/Ue. elastic part of the suction phase vs. elastic part of the relaxation phase (net elasticity). The closer the value is to 1 (100 %) the more elastic the curve.
R6	Uv/Ue. portion of the viscoelasticity vs the elastic part of the curve in the suction phase. The smaller the value the higher the elasticity.
R7	Ur/Uf. portion of the elastic recovery compared to the complete curve, the closer the value is to 1 (100 %) the more elastic the curve.
R8	Ua of the first curve (total recovery). The closer Ua to R0 the greater the ability of the skin to return into its original state.
R9	R9=R3-R0. Represents tiring effects of the skin after repeated suction in of the skin. The smaller R9 the smaller the tiring effects.

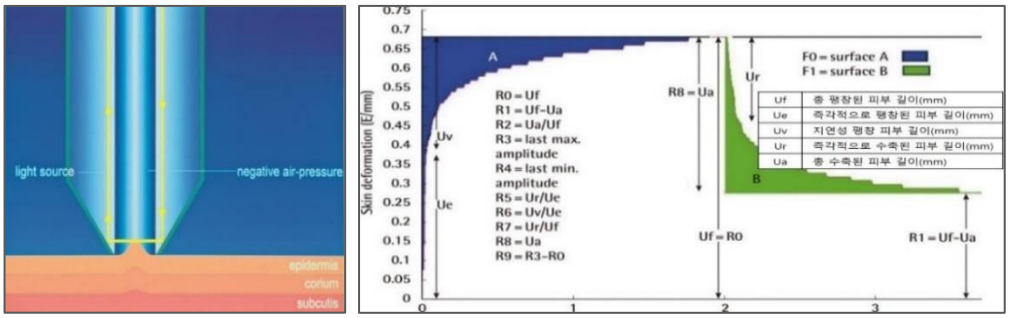


Figure 7. Principle, resulting graph, parameters of Cutometer®

8-8. Measurement of skin gloss

Skin gloss was measured using Micro-glossmeter 60° (BYK, Germany). When the closed chamber type probe contact with the skin surface, the semiconductor diode laser light source inside the chamber measures the specular reflection of the skin surface to indicate the degree of gloss on the skin surface. This laser light source has high light reflectivity on the skin surface or non-planar surface, and reflects specular reflection measured at a 60° angle when measuring, but does not measure scattered reflection (Fig. 8)

In this study, skin gloss on the left or right cheek was measured 3 times and the average value was analyzed before, after 1 week and 4 weeks use of the product. Skin gloss image was taken by using VISIA® CR 2.3 (Canfield, USA).



Figure 8. Micro-glossmeter 60° (BYK, Germany) Principle of measurement and device images

8-9. Measurement of skin transparency

Skin transparency was measured by using Translucency Measurement System (TMS). Using the reflection characteristics of the irradiated light, the amount of reflection on the surface of the skin and the amount of diffuse reflection in the skin are measured to measure the degree of transparency of the skin. It is a skin transparency device using the principle of Polarization Goniometry by contacting the skin. The incidence angle of the light source is 45°, and the surface reflection and diffuse reflection values are measured at the reflection angle of 30° to

60°. The high reflection of light (diffuse reflection) inside the skin means high transparency of the skin (Fig. 9).

In this study, the diffuse reflection value (30°) of the left or right cheek was measured and analyzed before, after 1 week and 4 weeks use of the product. Skin transparency image was taken by using VISIA® CR 2.3 (Canfield, USA).

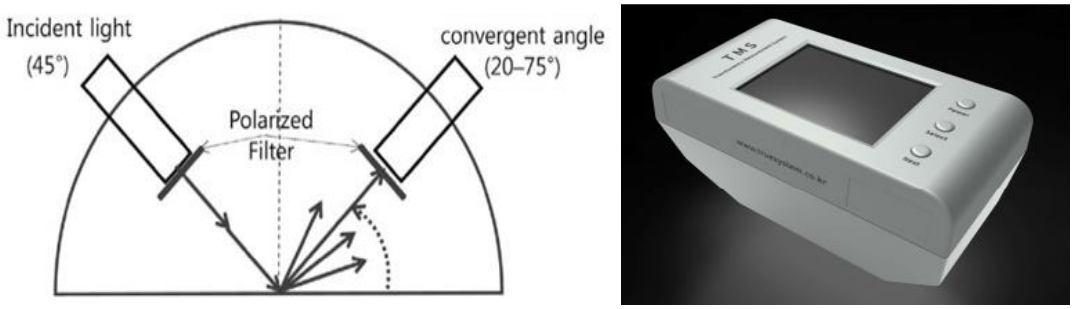


Figure 9. Principle of TMS and device images

8-10. Assessment of self-questionnaires by subjects

Questionnaire survey was conducted on the efficacy and usability of the test product. Each item was rated on 6 point scale (1, Strongly disagree 2, Disagree 3, Slightly disagree 4, Slightly agree 5, Agree 6, Strongly agree), and positive feedback (rating scale 4 to 6 according to question) was analyzed.

8-11. Skin adverse reaction

Subjective and objective skin reactions were assessed by interview and observations of an investigator. The assessment was considered by the subjects (subjective and objective signs) as well as by the investigator (clinical signs). The frequency, duration, and intensity of the sign, and a possible or probable relationship with the test products were investigated. Subjective signs included itching, prickling, tickling, burning, tingling, stiffness, tightening, etc. Objective signs included erythema, edema, desquamation, and papule, etc (Table 4).

Table 4. Criteria to determine the causal relation between skin adverse reactions and product

Classification	Definition
Certain	The pre-and post-use relationship of a product, etc., is described as valid and is not described as another medication or chemical or accompanying disease, and is clinically appropriate in the case of discontinuing the administration of a human application test product and, if necessary, determined by reinjection, pharmacology or phenomenology.

Classification	Definition
Probably	The time relationship with the use of the product is reasonable but does not appear to be due to other medications or chemicals or accompanying disease, and if it shows clinically reasonable responses when to stop using (no reinjection information).
Possible	The time relationship with the use of the product is reasonable but is also explained as due to other medications, chemicals, or accompanying diseases, and information on the discontinuation of administration is insufficient or unclear.
Unlikely	In case a temporary case that is unlikely to be causative to the use of the product, etc., and a reasonable explanation can be made by different medications, chemicals, or potential diseases.
Conditional	More data is needed for a proper assessment or additional data is being reviewed.
Unassessable	In case information is insufficient or conflicting and cannot be determined and supplemented or verified.

※ *Ref. COREDERM Inc. Skin Research Center SOP*

8-12. Statistical analysis

Statistical analysis was conducted using the SPSS® ver. 27 software program (IBM, USA) and to determine whether variables followed a normal distribution or not, the Shapiro-Wilk test and Kurtosis & Skewness were used.

Statistical analysis of assessment item was conducted using RM-ANOVA (Repeated Measured Analysis of Variance). A statistically significant difference was set at $p<0.05$.

The change rate by test product (%) is defined that:

$$\text{Change rate (\%)} = \frac{\text{Analysis value after use - Analysis value before use}}{\text{Analysis value before use}} \times 100$$

9. RESULTS

9-1. Characteristics of subjects

This study was started for 22 subjects aged from 39 to 59 (average age: 51.8±4.9) who were suitable to the subject inclusion and exclusion criteria, and all subjects completed the study in good faith during the entire process.

The skin characteristics of the subjects were investigated by the survey, and the results of the analysis are as follows: Table 5, Appendix I.

Table 5. Skin characteristics of subjects (n=22)

Item	Classification	Frequency (N)	Percentage (%)
Age	30’s	1	4.55
	40’s	6	27.27
	50’s	15	68.18
Skin type	Dry	13	59.09
	Normal	6	27.27
	Oily	0	0.00
	Combination	3	13.64
	Troubled skin	0	0.00
Skin moisture	Moist	0	0.00
	Normal	11	50.00
	Dry	10	45.45
	Very dry	1	4.55
Skin sebum	Glossy	0	0.00
	Normal	15	68.18
	Deficient	7	31.82
Body dryness	Moist	0	0.00
	Normal	10	45.45
	Dry	12	54.55
	Very dry	0	0.00
Number of showers (weekly)	Less than 1 time	1	4.55
	2-3 times	1	4.55
	4-6 times	10	45.45
	Once a day	10	45.45
	More than twice a day	0	0.00

Item	Classification	Frequency (N)	Percentage (%)
Using body products	Not use	4	18.18
	Occasionally used	15	68.18
	Always used	3	13.64
UV exposure (daily)	Less than 1 hrs	3	13.64
	1-3 hrs	18	81.81
	More than 3 hrs	1	4.55
Sleep (daily)	Less than 5 hrs	0	0.00
	5-8 hrs	22	100.00
	More than 8 hrs	0	0.00
Smoking (daily)	No	22	100.00
	Less than 10 cigarettes	0	0.00
	More than 10 cigarettes	0	0.00
	More than a pack of cigarettes	0	0.00
Sensitive skin	Yes	0	0.00
	No	22	100.00
Sting / Itching sensitivity	Yes	0	0.00
	No	22	100.00
Experience of adverse reaction to cosmetic	Yes	0	0.00
	No	22	100.00
Change of skin during the menstruation	Yes	0	0.00
	No	7	31.82
	N/A	15	68.18
The current state	A week before menstruation	0	0.00
	Having a menstruation	1	4.55
	In a week after menstruation	4	18.18
	Etc.	2	9.09
	N/A	15	68.18

9-2. Analysis of skin tone

As a result of skin tone on the cheek, the value significantly increased by 0.43% after 1 week and 1.03% after 4 weeks use, compared to before (p<0.05), and it is confirmed that skin tone improved after using the test product for 1 week and 4 weeks (Table 6, Fig. 10, 12).

Table 6. Statistical analysis of skin tone (n=22)

Time point	Mean, Intensity	SD	p-value[1]	Average change rate (%)[2]
Before	144.22	5.31	-	-
After 1 week use	144.84	5.30	0.000*	0.43▲
After 4 weeks use	145.68	5.16	0.001*	1.03▲

Increment of the mean value (▲) represents of improving skin tone

[1] RM-ANOVA (p<0.05 Significant difference compared to before)

[2] Average change rate (%) = $\frac{\left[\sum_{k=1}^{n}\frac{(Analysis\ value\ after\ use\ k - Analysis\ value\ before\ use\ k)}{Analysis\ value\ before\ use\ k}\times 100\right]}{n}$, n= Subject number

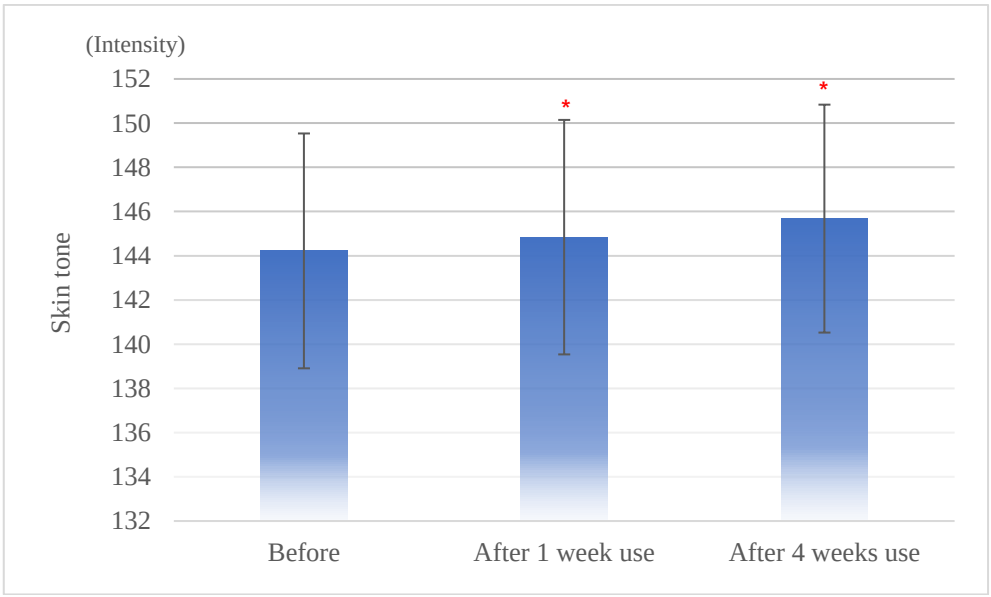


Figure 10. Analysis graph of skin tone after using the product
(Mean ± SD, p<0.05*)

9-3. Analysis of skin tone evenness

As a result of skin tone unevenness (standard deviation) on the cheek, the value significantly decreased by 4.03% after 1 week and 8.28% after 4 weeks use, compared to before (p<0.05), and it is confirmed that skin tone eveness improved after using the test product for 1 week and 4 weeks (Table 7, Fig. 11, 12).

Table 7. Statistical analysis of skin tone evenness (n=22)

Time point	Mean, Intensity SD	SD	p-value[1]	Average change rate (%)[2]
Before	12.03	1.24	-	-
After 1 week use	11.55	1.29	0.000*	4.03▼
After 4 weeks use	11.04	1.25	0.000*	8.28▼

Decrement of the mean value (▼) represents of improving skin tone evenness

[1] RM-ANOVA (p<0.05 Significant difference compared to before)

[2] Average change rate (%) = $\frac{\left[\sum_{k=1}^{n}\frac{(Analysis\ value\ after\ use\ k - Analysis\ value\ before\ use\ k)}{Analysis\ value\ before\ use\ k}\times 100\right]}{n}$, n= Subject number

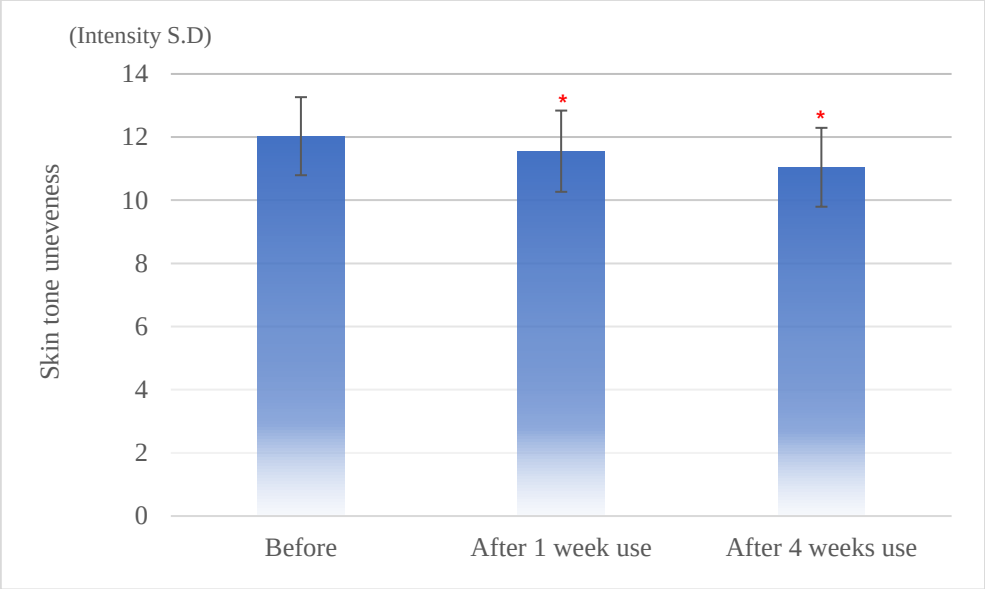


Figure 11. Analysis graph of skin tone evenness after using the product (Mean ± SD, p<0.05*)



Figure 12. Images of skin tone and tone evenness after using the product (Subject No. 01)

9-4. Analysis of skin texture (roughness)

As a result of skin texture (roughness) on the cheek, the value significantly decreased by 6.96% after 1 week and 12.92% after 4 weeks use, compared to before (p<0.05), and it is confirmed that skin texture (roughness) improved after using the test product for 1 week and 4 weeks (Table 8, Fig. 13, 14).

Table 8. Statistical analysis of skin texture (roughness) (n=22)

Time point	Mean, μm	SD	p-value[1]	Average change rate (%)[2]
Before	20.732	3.966	-	-
After 1 week use	19.282	3.756	0.000*	6.96▼
After 4 weeks use	18.001	3.326	0.000*	12.92▼

Decrement of the mean value (▼) represents of improving skin texture (roughness)

[1] RM-ANOVA (p<0.05 Significant difference compared to before)

[2] Average change rate (%) = $\frac{\left[\sum_{k=1}^{n}\frac{(Analysis\ value\ after\ use\ k - Analysis\ value\ before\ use\ k)}{Analysis\ value\ before\ use\ k}\times 100\right]}{n}$, n= Subject number

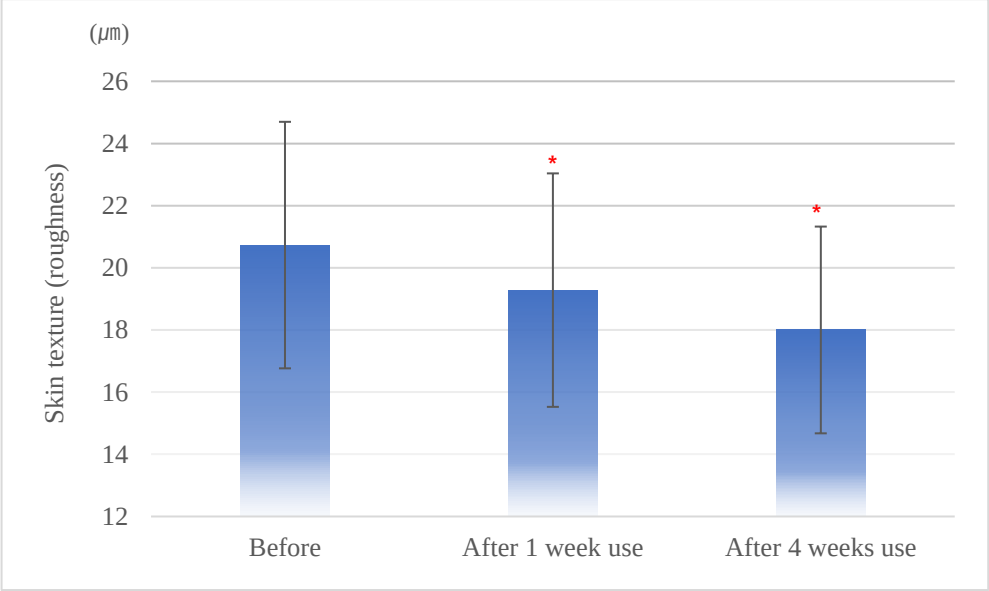


Figure 13. Analysis graph of skin texture (roughness) after using the product (Mean ± SD, p<0.05*)



Figure 14. Images of skin texture (roughness) after using the product (Subject No. 12)

9-5. Analysis of crow's feet

As a result of crow's feet, the value significantly decreased by 7.63% after 1 week and 13.13% after 4 weeks use, compared to before (p<0.05), and it is confirmed that crow's feet improved after using the test product for 1 week and 4 weeks (Table 9, Fig. 15, 16).

Table 9. Statistical analysis of crow's feet (n=22)

Time point	Mean, mm	SD	p-value[1]	Average change rate (%)[2]
Before	0.085	0.021	-	-
After 1 week use	0.078	0.017	0.005*	7.63▼
After 4 weeks use	0.073	0.016	0.000*	13.13▼

Decrement of the mean value (▼) represents of improving crow's feet

[1] RM-ANOVA (p<0.05 Significant difference compared to before)

[2] Average change rate (%) = $\frac{\left[\sum_{k=1}^{n} \frac{(Analysis\ value\ after\ use\ k - Analysis\ value\ before\ use\ k)}{Analysis\ value\ before\ use\ k} \times 100\right]}{n}$, n= Subject number

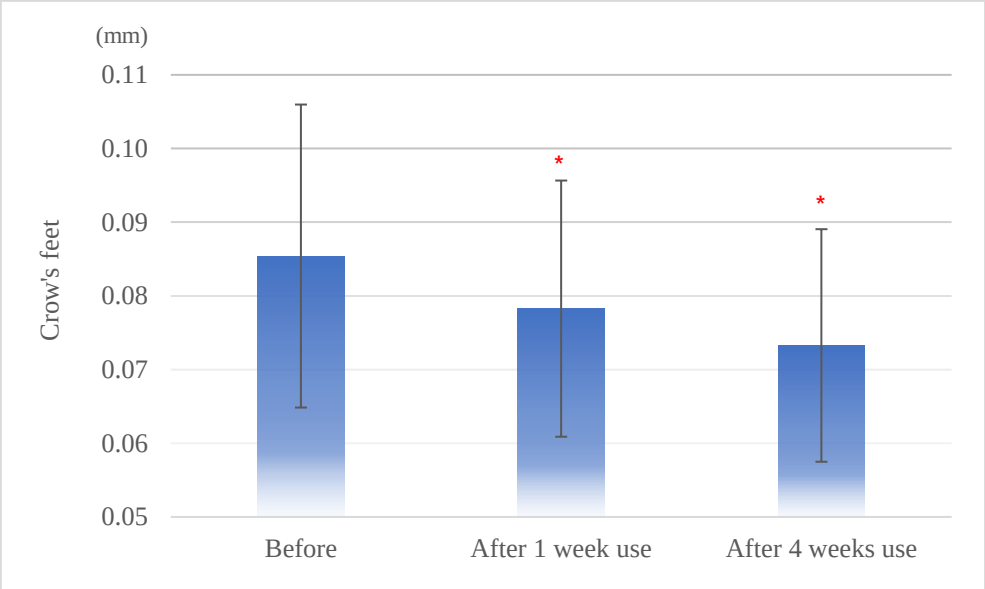


Figure 15. Analysis graph of crow's feet after using the product
(Mean ± SD, p<0.05*)

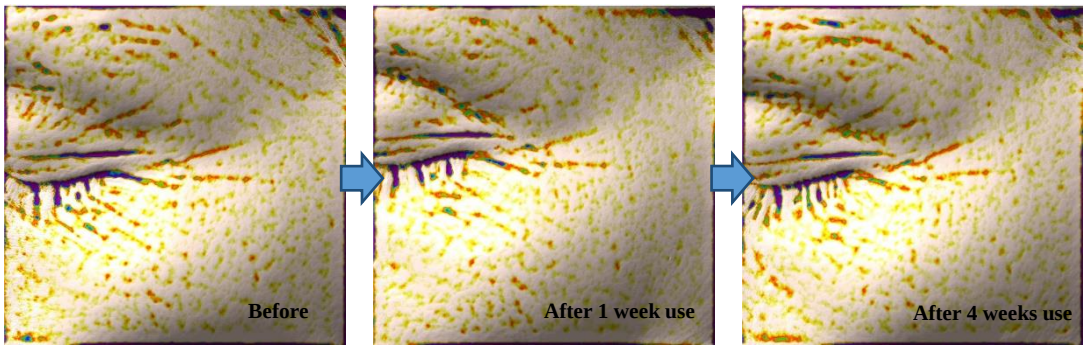


Figure 16. Images of crow's feet after using the product (Subject No. 05)

9-6. Analysis of skin redness (hemoglobin concentration and evenness)

As a result of skin redness (hemoglobin concentration and evenness) on the cheek, the hemoglobin concentration value significantly decreased by 4.08% after 1 week and 7.31% after 4 weeks use, and the hemoglobin unevennness value significantly decreased by 5.81% after 1 week and 10.40% after 4 weeks use compared to before (p<0.05), and it is confirmed that skin redness (hemoglobin concentration and evenness) improved after using the test product for 1 week and 4 weeks (Table 10, Fig. 17, 18).

Table 10. Statistical analysis of skin redness (hemoglobin concentration and evenness) (n=22)

Parameter	Time point	Mean, A.U.	SD	p-value[1]	Average change rate (%)[2]
Concentration	Before	1.214	0.131	-	-
	After 1 week use	1.164	0.148	0.010*	4.08▼
	After 4 weeks use	1.124	0.131	0.000*	7.31▼
Unevenness	Before	0.154	0.039	-	-
	After 1 week use	0.145	0.036	0.000*	5.81▼
	After 4 weeks use	0.137	0.032	0.000*	10.40▼

Decrement of the mean value (▼) represents of improving skin redness (hemoglobin concentration and evenness)

[1] RM-ANOVA (p<0.05 Significant difference compared to before)

[2] Average change rate (%) = $\frac{\left[\sum_{k=1}^{n} \frac{(Analysis\ value\ after\ use\ k - Analysis\ value\ before\ use\ k)}{Analysis\ value\ before\ use\ k} \times 100\right]}{n}$, n= Subject number

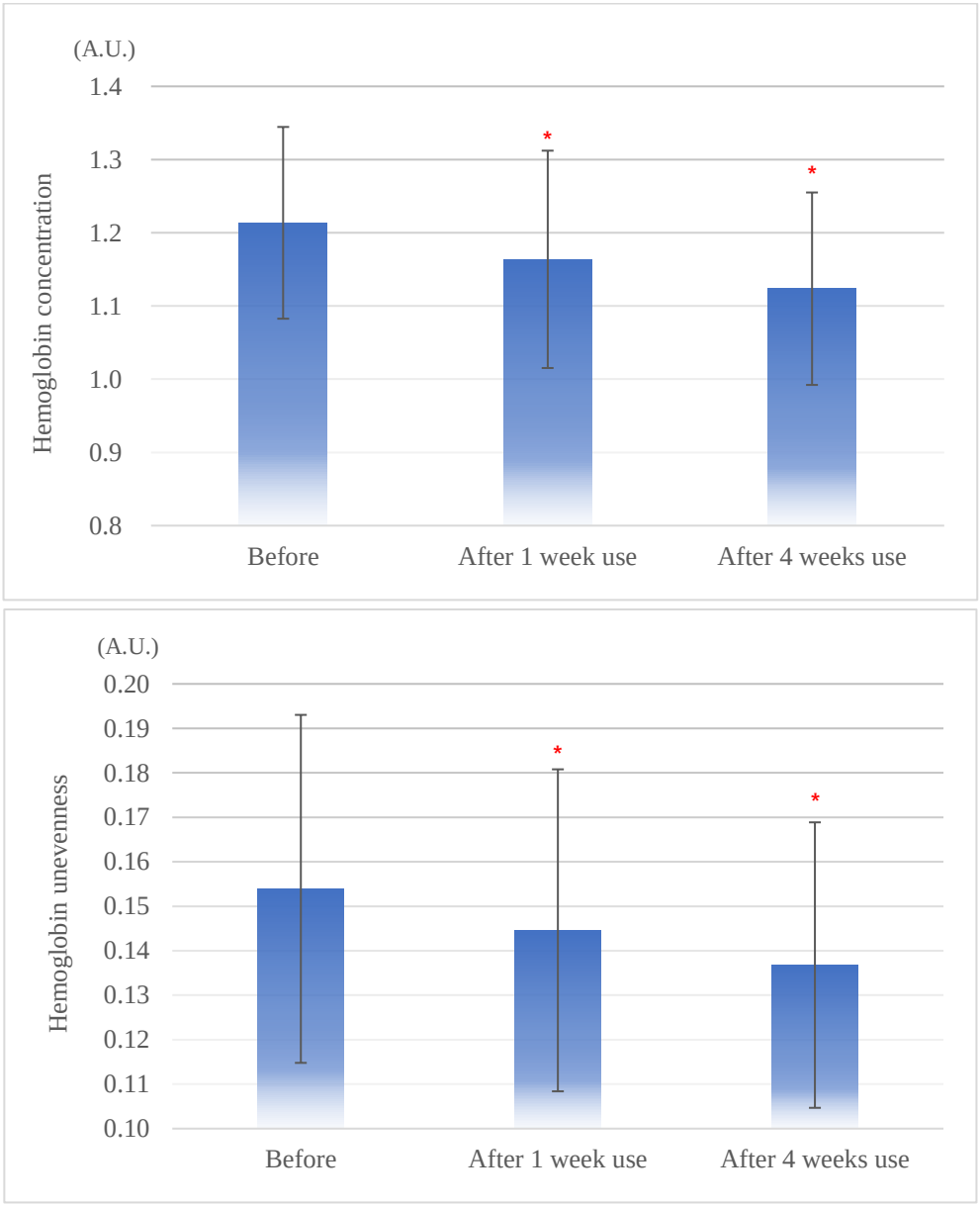


Figure 17. Analysis graph of skin redness (hemoglobin concentration and evenness) after using the product
(Mean ± SD, $p<0.05$*)



Figure 18. Images of skin redness (hemoglobin concentration and evenness) after using the product (Subject No. 15)

9-7. Analysis of melanin (concentration, evenness and area) of pigmentation such as melasma

As a result of melanin (concentration, evenness and area) of pigmentation such as melasma on the cheek and under the eye, the melanin concentration value significantly decreased by 0.63% after 1 week and 1.97% after 4 weeks use, and the melanin unevennness value significantly decreased by 6.63% after 1 week and 10.30% after 4 weeks use, and the melanin area value significantly decreased by 11.62% after 4 weeks use compared to before (p<0.05), and it is confirmed that melanin (concentration, evenness and area) of pigmentation such as melasma improved after using the test product for 4 weeks (Table 11, Fig. 19, 20, 21).

Table 11. Statistical analysis of melanin (concentration, evenness and area) of pigmentation such as melasma (n=22)

Parameter	Time point	Mean	SD	p-value[1]	Average change rate (%)[2]
Concentration (A.U.)	Before	0.595	0.045	-	-
	After 1 week use	0.591	0.045	0.040*	0.63▼
	After 4 weeks use	0.583	0.042	0.000*	1.97▼
Unevenness (A.U.)	Before	0.037	0.008	-	-
	After 1 week use	0.034	0.007	0.020*	6.63▼
	After 4 weeks use	0.033	0.006	0.000*	10.30▼
Area (mm^2)	Before	274.844	168.895	-	-
	After 1 week use	262.987	160.926	0.402	1.71▲
	After 4 weeks use	218.332	135.985	0.004*	11.62▼

Decrement of the mean value (▼) represents of improving melanin (concentration, evenness and area) of pigmentation such as melasma

[1] RM-ANOVA (p<0.05 Significant difference compared to before)

[2] Average change rate (%) = $\frac{\left[\sum_{k=1}^{n} \frac{(Analysis\ value\ after\ use\ k - Analysis\ value\ before\ use\ k)}{Analysis\ value\ before\ use\ k} \times 100\right]}{n}$, n= Subject number

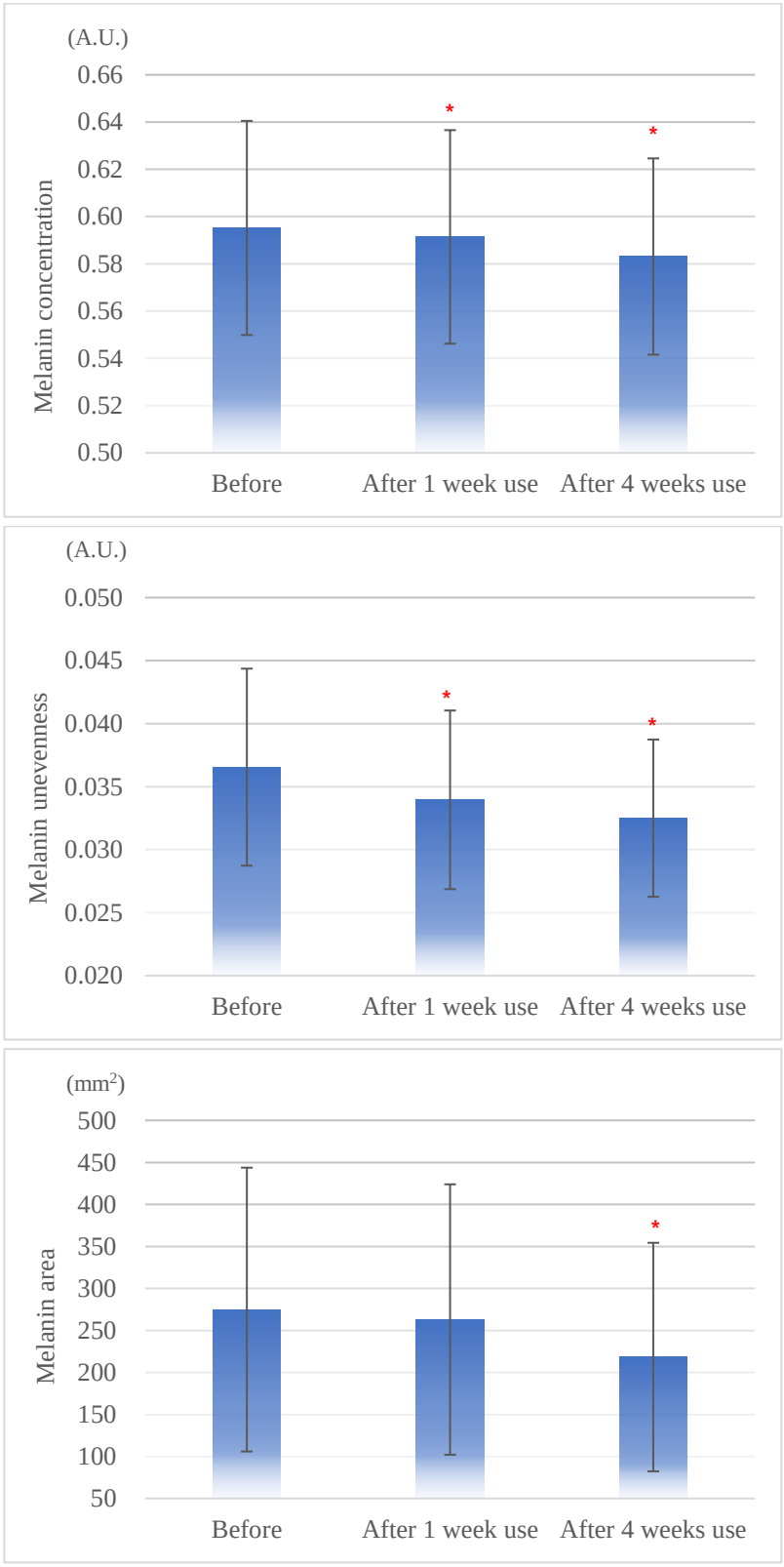


Figure 19. Analysis graph of melanin (concentration, evenness and area) of pigmentation such as melasma after using the product
(Mean ± SD, $p<0.05$*)

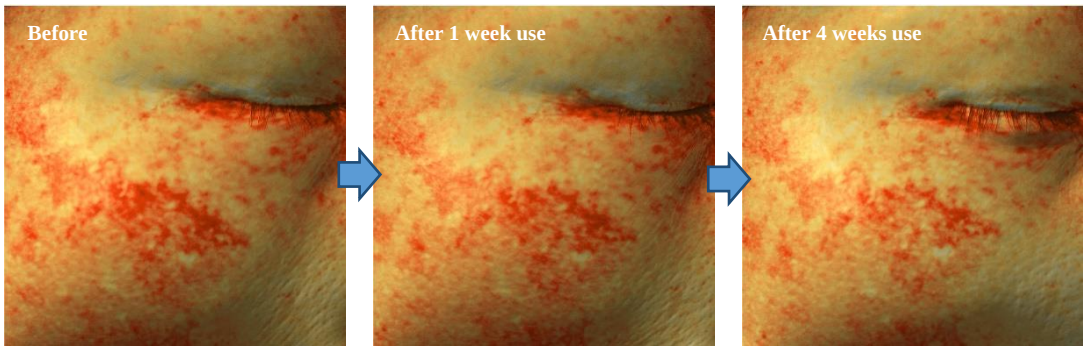


Figure 20. Images of melanin (concentration and evenness) of pigmentation such as melasma after using the product (Subject No. 21)

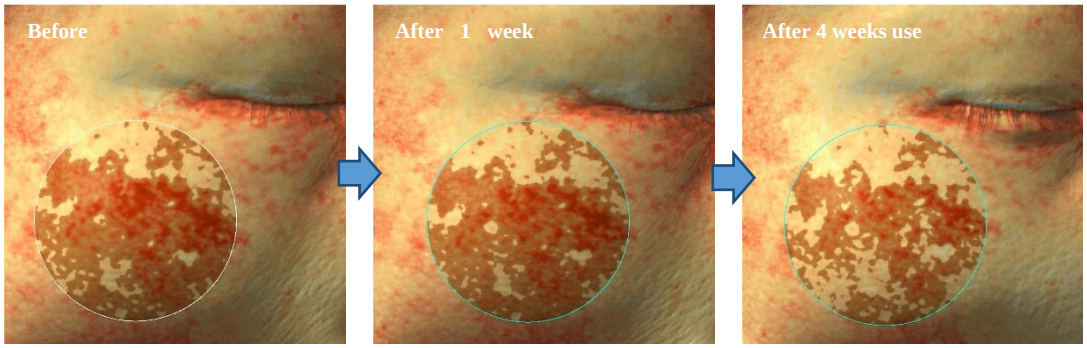


Figure 21. Images of melanin (area) of pigmentation such as melasma after using the product (Subject No. 21)

9-8. Analysis of skin hydration (outer moisture)

As a result of skin hydration (outer moisture) on the cheek, the value significantly increased by 7.46% after 1 week and 14.14% after 4 weeks use, compared to before (p<0.05), and it is confirmed that skin hydration (outer moisture) improved after using the test product for 1 week and 4 weeks (Table 12, Fig. 22, 23).

Table 12. Statistical analysis of skin hydration (outer moisture) (n=22)

Time point	Mean, A.U.	SD	p-value[1]	Average change rate (%)[2]
Before	54.56	7.09	-	-
After 1 week use	58.51	6.90	0.000*	7.46▲
After 4 weeks use	62.05	6.51	0.000*	14.14▲

Increment of the mean value (▲) represents of improving skin hydration (outer moisture)

[1] RM-ANOVA (p<0.05 Significant difference compared to before)

[2] Average change rate (%) = $\frac{\left[\sum_{k=1}^{n}\frac{(Measurement\ value\ after\ use\ k - Measurement\ value\ before\ use\ k)}{Measurement\ value\ before\ use\ k}\times 100\right]}{n}$, n= Subject number

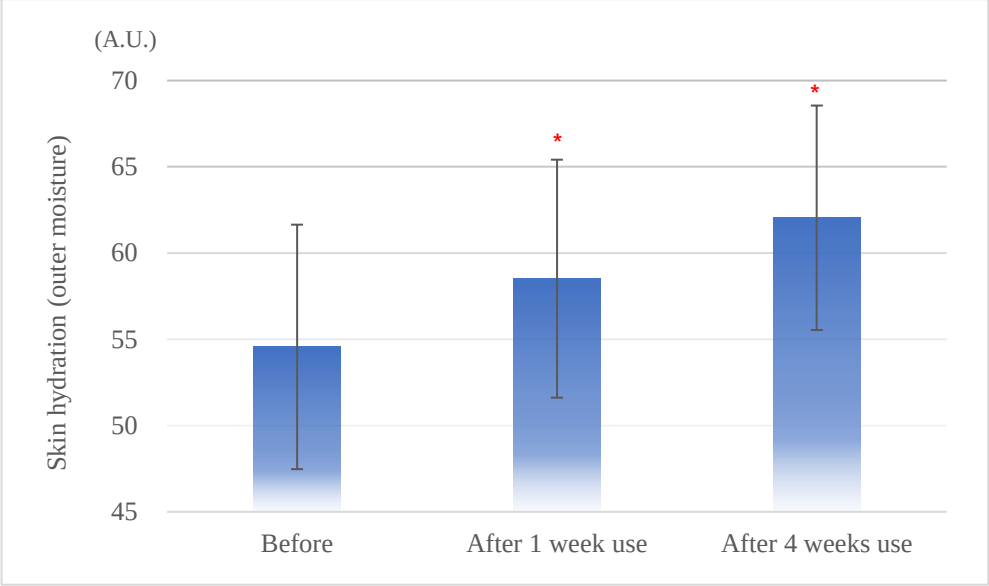


Figure 22. Measurement graph of skin hydration (outer moisture) after using the product (Mean ± SD, p<0.05*)

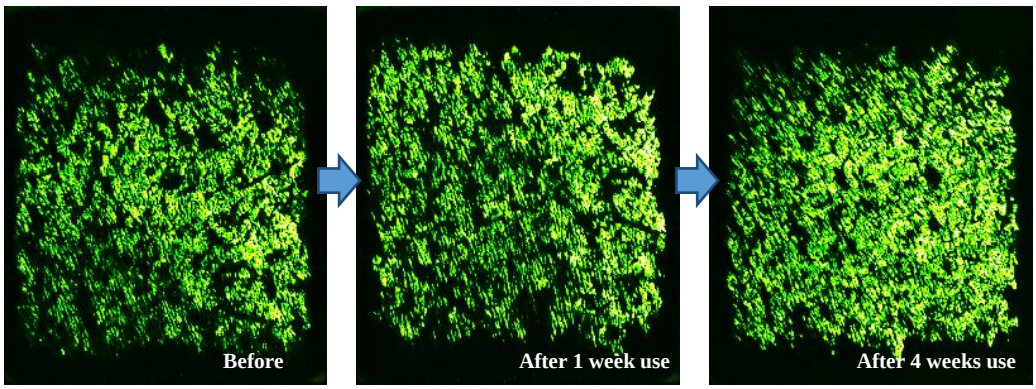


Figure 23. Images of skin hydration (outer moisture) after using the product (Subject No. 05)

9-9. Analysis of skin elasticity

As a result of skin elasticity on the cheek, the value significantly increased by 1.88% after 1 week and 4.29% after 4 weeks use, compared to before (p<0.05), and it is confirmed that skin elasticity improved after using the test product for 1 week and 4 weeks (Table 13, Fig. 24).

Table 13. Statistical analysis of skin elasticity (R2) (n=22)

Time point	Mean, Ratio	SD	p-value[1]	Average change rate (%)[2]
Before	0.6547	0.0488	-	-
After 1 week use	0.6669	0.0480	0.000*	1.88▲
After 4 weeks use	0.6826	0.0477	0.000*	4.29▲

Increment of the mean value (▲) to closer to 1 represents improvement of skin elasticity

[1] RM-ANOVA (p<0.05 Significant difference compared to before)

[2] Average change rate (%) = $\frac{\left[\sum_{k=1}^{n} \frac{(Measurement\ value\ after\ use\ k - Measurement\ value\ before\ use\ k)}{Measurement\ value\ before\ use\ k} \times 100\right]}{n}$, n= Subject number

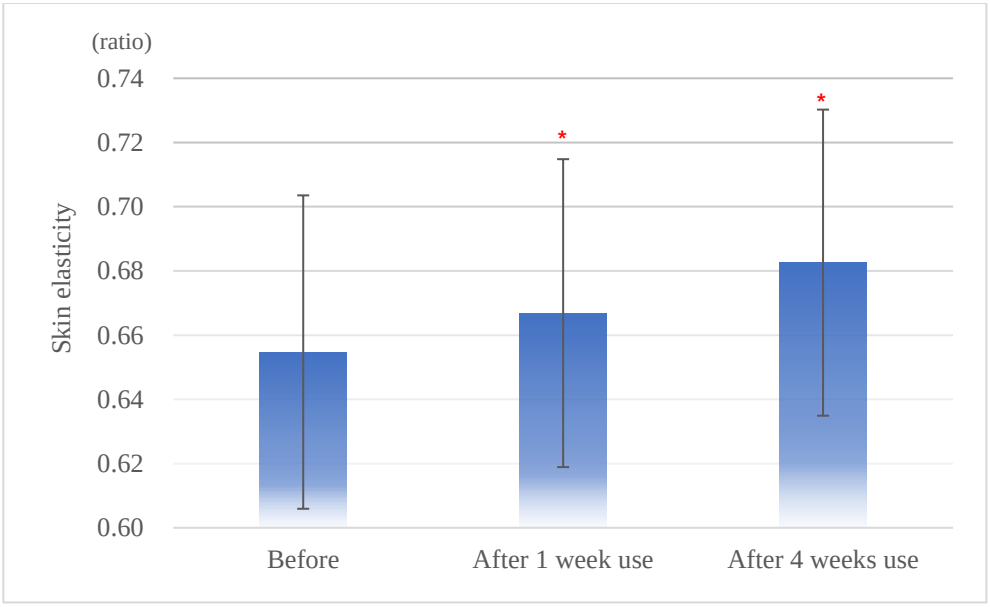


Figure 24. Measurement graph of skin elasticity after using the product (Mean ± SD, p<0.05*)

9-10. Analysis of skin gloss

As a result of skin gloss on the cheek, the value significantly increased by 9.90% after 1 week and 21.48% after 4 weeks use, compared to before (p<0.05), and it is confirmed that skin gloss improved after using the test product for 1 week and 4 weeks (Table 14, Fig. 25, 26).

Table 14. Statistical analysis of skin gloss (n=22)

Time point	Mean, G.U.	SD	p-value[1]	Average change rate (%)[2]
Before	2.32	0.54	-	-
After 1 week use	2.52	0.50	0.005*	9.90▲
After 4 weeks use	2.79	0.57	0.000*	21.48▲

Increment of the mean value (▲) represents of improving skin gloss

[1] RM-ANOVA (p<0.05 Significant difference compared to before)

[2] Average change rate (%) = $\frac{\left[\sum_{k=1}^{n}\frac{(Measurement\ value\ after\ use\ k - Measurement\ value\ before\ use\ k)}{Measurement\ value\ before\ use\ k}\times 100\right]}{n}$, n= Subject number

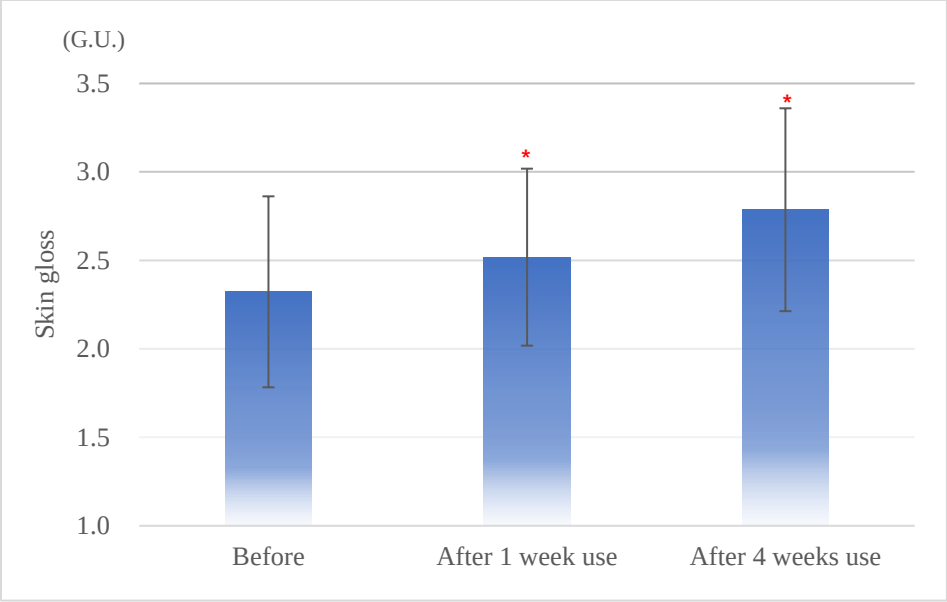


Figure 25. Measurement graph of skin gloss after using the product
(Mean ± SD, p<0.05*)



Figure 26. Images of skin gloss after using the product (Subject No. 12)

9-11. Analysis of skin transparency

As a result of skin transparency on the cheek, the value significantly increased by 3.42% after 1 week and 8.17% after 4 weeks use, compared to before (p<0.05), and it is confirmed that skin transparency improved after using the test product for 1 week and 4 weeks (Table 15, Fig. 27, 28).

Table 15. Statistical analysis of skin transparency (n=22)

Time point	Mean, A.U.	SD	p-value[1]	Average change rate (%)[2]
Before	200.09	5.50	-	-
After 1 week use	206.91	5.78	0.000*	3.42▲
After 4 weeks use	216.36	4.69	0.000*	8.17▲

Increment of the mean value (▲) represents of improving skin transparency

[1] RM-ANOVA (p<0.05 Significant difference compared to before)

[2] Average change rate (%) = $\frac{\left[\sum_{k=1}^{n}\frac{(Measurement\ value\ after\ use\ k - Measurement\ value\ before\ use\ k)}{Measurement\ value\ before\ use\ k}\times 100\right]}{n}$, n= Subject number

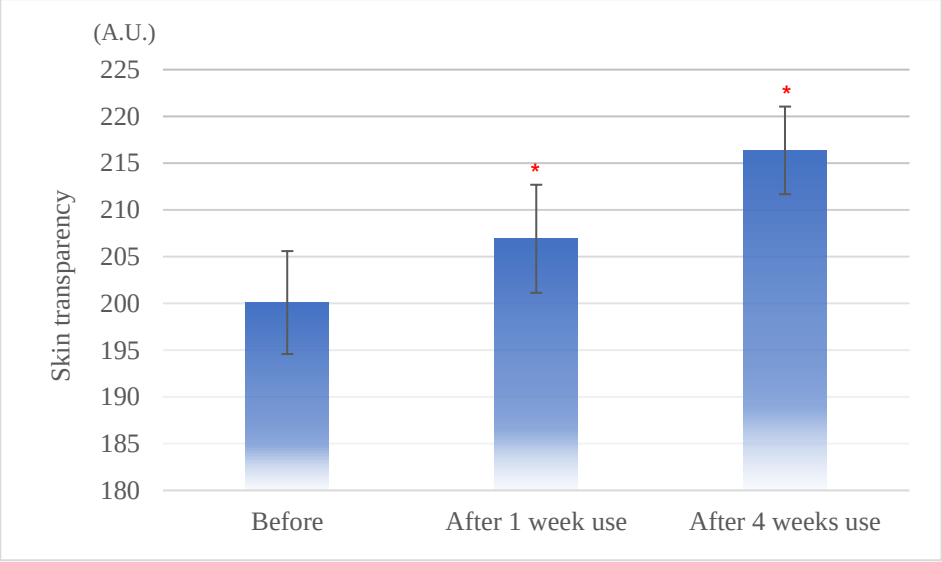


Figure 27. Measurement graph of skin transparency after using the product (Mean ± SD, p<0.05*)



Figure 28. Images of skin transparency after using the product (Subject No. 05)

9-12. Analysis of self-questionnaires by subjects

After 1 week and 4 weeks use, a questionnaire survey was conducted on the efficacy and usability of the product, and positive answers (choices 4, 5, and 6) were analyzed (Table 16, Fig. 29).

Table 16. Results of answers in self-questionnaires for efficacy and usability (n=22)

Items	After 1 week		After 4 weeks	
	N[1]	(%)[2]	N[1]	(%)[2]
Do you think the skin tone has improved compared to before using the product? (Skin tone improved)	19	86	21	95
Do you think the skin tone has become more even compared to before using the product? (Skin tone becomes more even)	20	91	20	91
Do you think the skin texture has improved compared to before using the product? (Skin texture improved)	21	95	21	95
Do you think the crow's feet has improved compared to before using the product? (Crow's feet improved)	19	86	20	91
Do you think the skin redness has improved compared to before using the product? (Skin redness improved)	19	86	21	95
Do you think the Melanin of skin pigmentation area becomes faded compared to before using the product (Melanin of skin pigmentation area becomes faded)	19	86	20	91
Do you think the skin hydration has improved compared to before using the product? (Skin hydration improved)	22	100	21	95
Do you think the skin elasticity has improved compared to before using the product? (Skin elasticity improved)	22	100	21	95
Do you think the skin gloss (radiance) has improved compared to before using the product? (Skin gloss (radiance) improved)	20	91	22	100
Do you think the skin tone has become clear and transparent compared to before using the product? (Skin becomes clear and transparent)	19	86	20	91
Are you satisfied with the product overall? (Overall satisfaction)	-	-	21	95

Scales: 1, Strongly disagree 2, Disagree 3, Slightly disagree 4, Slightly agree 5, Agree 6, Strongly agree

[1] N (Frequency) = Number of positive answers

[2] % (Percentage) = Number of positive answers / Total number of subjects (22) x 100

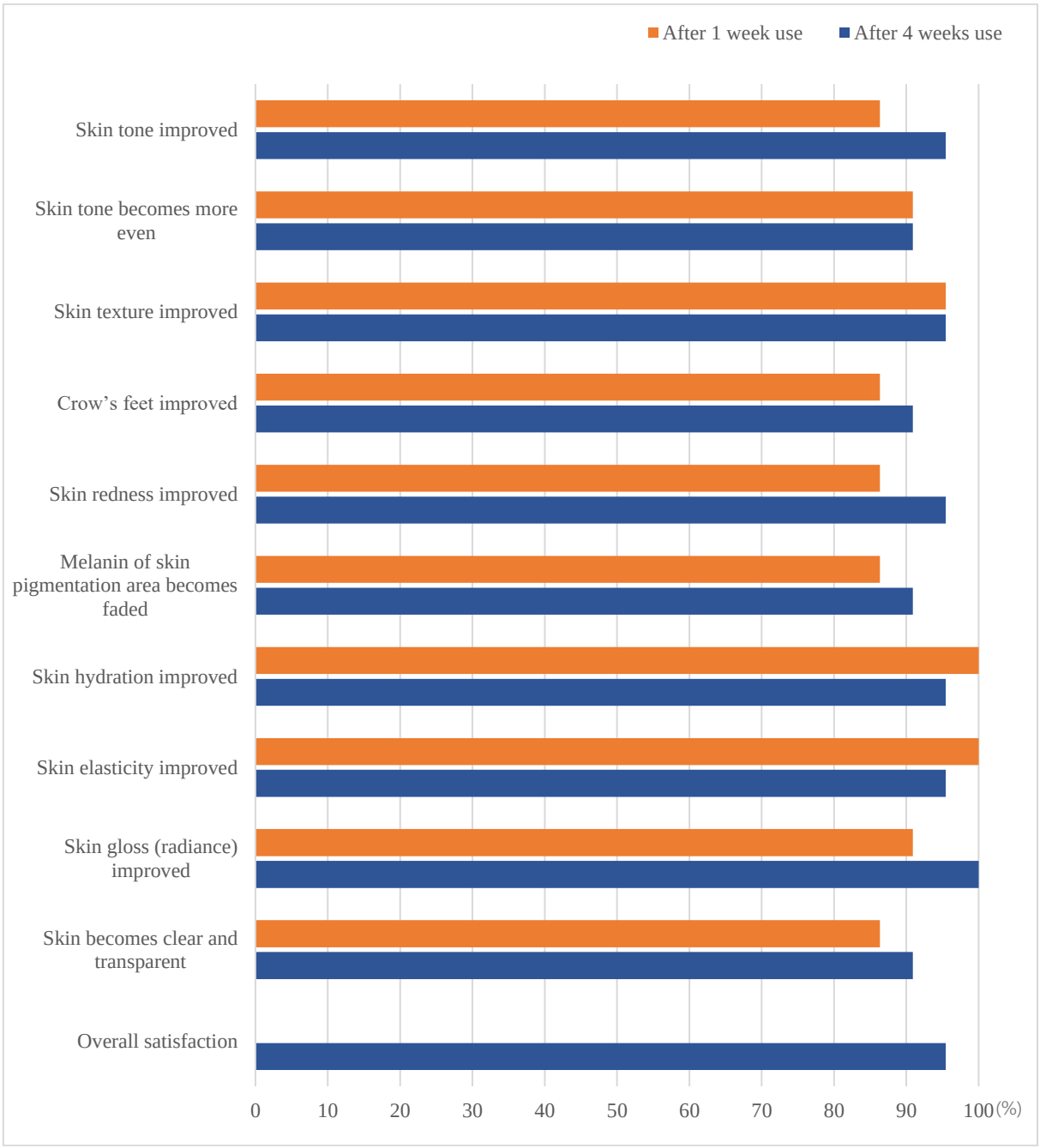


Figure 29. Sensorial profile for efficacy and usability of test product

10. SKIN ADVERSE REACTION

As a result of skin safety through interviews and observations, all subjects did not show any skin adverse reaction during this study (Table 17).

Table 17. Skin adverse reactions (n=22)

Symptom		After 1 time use	After 2 times use	After 3 times use	After 4 times use	After 4 weeks use
Subjective irritation	Itching	0	0	0	0	0
	Prickling	0	0	0	0	0
	Tickling	0	0	0	0	0
	Burning	0	0	0	0	0
	Tingling	0	0	0	0	0
	Stiffness	0	0	0	0	0
	Tightening	0	0	0	0	0
	etc.	0	0	0	0	0
Objective irritation	Erythema	0	0	0	0	0
	Edema	0	0	0	0	0
	Desquamation	0	0	0	0	0
	Papule	0	0	0	0	0
	etc.	0	0	0	0	0

11. CONCLUSION

COREDERM Inc. Skin Research Center was commissioned to conduct “A clinical study for skin improvement of ‘CELLTERMI REVIVE NX’ on human skin” as requested by the CHA Meditech Co., Ltd. This study was conducted from July 24 to August 22, 2023.

This study was conducted to evaluate the improvement of skin tone, skin tone evenness, skin texture (roughness), crow’s feet, skin redness (hemoglobin concentration and evenness), melanin (concentration, evenness and area) of pigmentation such as melasma, skin hydration (outer moisture), skin elasticity, skin gloss and skin transparency by using test product and treating MTS once a week for 4 weeks on human skin.

As a result of skin analysis, skin tone significantly increased by 0.43% after 1 week and 1.03% after 4 weeks use, skin tone unevenness (standard deviation) significantly decreased by 4.03% after 1 week and 8.28% after 4 weeks use, skin texture (roughness) significantly decreased by 6.96% after 1 week and 12.92% after 4 weeks use, crow’s feet significantly decreased by 7.63% after 1 week and 13.13% after 4 weeks use, skin redness (hemoglobin concentration) significantly decreased by 4.08% after 1 week and 7.31% after 4 weeks use, skin redness (hemoglobin evennness) significantly decreased by 5.81% after 1 week and 10.40% after 4 weeks use, melanin concentration significantly decreased by 0.63% after 1 week and 1.97% after 4 weeks use, melanin unevennness significantly decreased by 6.63% after 1 week and 10.30% after 4 weeks use, melanin area significantly decreased by 11.62% after 4 weeks use, skin hydration (outer moisture) significantly increased by 7.46% after 1 week and 14.14% after 4 weeks use, skin elasticity significantly increased by 1.88% after 1 week and 4.29% after 4 weeks use, skin gloss significantly increased by 9.90% after 1 week and 21.48% after 4 weeks use, skin transparency significantly increased by 3.42% after 1 week and 8.17% after 4 weeks use, compared to before ($p<0.05$).

As a result of skin safety through interviews and observations, all subjects did not show any skin adverse reaction during this study.

Based on the above results, the ‘CELLTERMI REVIVE NX’ is applied during MTS treatment once a week for 4 weeks, and is considered to help improve skin tone, skin tone evenness, skin texture (roughness), crow’s feet, skin redness (hemoglobin concentration and evenness), melanin (concentration and evenness) of pigmentation such as melasma, skin hydration (outer moisture), skin elasticity, skin gloss and skin transparency after 1 week use, and is considered to help improve skin tone, skin tone evenness, skin texture (roughness), crow’s feet, skin redness (hemoglobin concentration and evenness), melanin (concentration, evenness and area) of pigmentation such as melasma, skin hydration (outer moisture), skin elasticity, skin gloss, skin transparency after 4 weeks use of the test product.

12. REFERENCES

1) Frosch, PJ. And Kligman, A. M., Noninvasive methods for the quantification of skin function, *Berlin: Springer-Verlag.*, 1993; 190-203.

2) Kawada A, Kameyama H, Asai M, Shiraishi H, Aragane Y, Tezuka T, Iwakiri K. A new approach to the evaluation of whitening effect of a cosmetic using computer analysis of video-captured image. *J. Dermatol. Sci.*, 2002; 29(1): 10-18

3) Frankowski G, Chen M, Huth T. Optical 3D in vivo measurement of human skin by PRIMOS, Proc. Of the 4th Int. Workshopon Automatic Processing of Fringe Patterns, Bremen, 2001; 17-19: 646-653.

4) Messaraa C., et al. Wrinkle and roughness measurement by the Antera 3D and its application for evaluation of cosmetic products. *Skin Research and Technology*, 2018, 24.3: 359-366.

5) Ana Rita Matias, Marta Ferreira, Paulo Costa and Patricia Neto. Skin colour, skin redness and melanin biometric measurements: comparison study between Antera® 3D, Mexameter® and Colorimeter®. Skin Research and Technology. 2015; 21: 346-362.

6) Alanen E, Nuutinen J, Nicklen K, Lahtinen T, Monkkonen J, Measurement of hydration in the stratum corneum with the MoistureMeter and comparison with the Corneometer, Skin Research and Technology, 2004; 10(1): 32-37.

7) E. Xhauflaire-Uhoda, P. Paquet, P. Quatresooz, G.E. Piérard, Characterization of the skin using capacitance imaging, Expert Review of Dermatology, 2010; 5(2): 149-158.

8) M. S. Woo, K. J. Moon, H. Y. Jung, S.R. Park, T. K. Moon, N. S. Kim and B. C. Lee. Comparison of skin elasticity test results from the Ballistometer® and Cutometer®. *Skin Research and Technology.* 2014; 20(4): 422-428.

9) Benjamin O. Asamoah, Kai-Erik Peiponen., Scanning of skin gloss by a diffractive optical element-based handheld glossmeter, *Optical Review*, 2018; 25(6): 694-700.

10) Jacobi U, Chen M, Frankowski G, Sinkgraven R, Hund M, Rzany B, Sterry W, Lademann J. In vivo determination of skin surface topography using an optical 3D device. *Skin Research and Technology.* 2004; 10(4): 207-14.

11) J.L. Leveque, EEMCO guidance for the assessment of skin topography. *Journal of the European Academy of Dermatology and Venereology*, 2006; 12(2): 103-114.

12) Clinical trial and efficacy test guideline of cosmetics. *Ministry of Food and Drug Safety*, 2015. 8.

13) Guideline of testing method for cosmetics labeling and advertising substantiation. *M inistry of Food and Drug Safety*, 2018. 3.

APPENDIX I ~ IV.

Appendix Ⅰ. Data Results

1-1. Skin characteristics of subjects

Sub. No.	Name	Age	Gender	Skin type[1]	Skin moisture[2]	Skin sebum[3]	Body dryness[4]	Number of showers (weekly)[5]	Using body products[6]	UV exposure (daily)[7]	Sleep (daily)[8]	Smoking (daily)[9]	Sensitive skin[10]	Sting/Itching sensitivity[11]	Experience of adverse reaction to cosmetic[12]	Change of skin during the menstruation[13]	The current state[14]
1	K*S	47	F	2	3	2	3	4	2	1	2	1	2	2	2	2	3
2	K*K	48	F	2	2	2	2	1	2	2	2	1	2	2	2	3	5
3	L*A	52	F	1	3	3	3	3	1	2	2	1	2	2	2	3	5
4	K*S	52	F	1	2	2	2	4	2	2	2	1	2	2	2	2	3
5	S*H	54	F	1	3	3	3	4	1	2	2	1	2	2	2	2	4
6	I*H	55	F	1	3	3	3	4	2	2	2	1	2	2	2	3	5
7	C*A	59	F	1	4	3	3	3	2	2	2	1	2	2	2	3	5
8	K*Y	46	F	4	3	2	3	2	2	2	2	1	2	2	2	3	5
9	L*H	39	F	1	3	2	3	3	3	2	2	1	2	2	2	2	2
10	J*S	57	F	1	2	2	2	3	2	2	2	1	2	2	2	3	5
11	L*M	51	F	4	2	2	2	4	2	2	2	1	2	2	2	3	5
12	C*S	49	F	1	3	2	2	4	2	1	2	1	2	2	2	2	3
13	K*R	54	F	2	2	2	3	3	2	2	2	1	2	2	2	3	5
14	N*R	48	F	1	3	2	3	3	3	2	2	1	2	2	2	2	3
15	J*N	53	F	2	2	2	3	4	1	3	2	1	2	2	2	3	5
16	K*S	57	F	1	2	2	2	3	2	2	2	1	2	2	2	3	5
17	K*H	57	F	2	2	2	2	3	2	2	2	1	2	2	2	3	5
18	G*H	55	F	1	3	3	3	3	3	2	2	1	2	2	2	3	5
19	S*Y	56	F	1	2	2	2	4	2	2	2	1	2	2	2	3	5
20	B*S	56	F	2	2	3	2	4	1	1	2	1	2	2	2	3	5
21	J*K	50	F	4	3	3	3	4	2	2	2	1	2	2	2	3	5
22	P*A	45	F	1	2	2	2	3	2	2	2	1	2	2	2	2	4

*Items

1. Skin type: 1)Dry; 2)Normal; 3)Oily; 4)Combination; 5)Troubled skin **2. Skin moisture:** 1)Moist; 2)Normal; 3)Dry; 4)Very dry **3. Skin sebum:** 1)Glossy; 2)Normal; 3)Deficient **4. Body dryness:** 1)Moist; 2)Normal; 3)Dry; 4)Very dry **5. Number of showers:** 1)Less than 1 time; 2)2-3 times; 3)4-6 times; 4)Once a day; 5)More than twice a day **6. Using body products:** 1)Not used; 2)Occasionally used; 3)Always used **7. UV exposure:** 1)Less than 1 hrs; 2)1-3 hrs; 3)More than 3 hrs **8. Sleep:** 1)Less than 5 hrs; 2)5-8 hrs; 3)More than 8 hrs **9. Smoking:** 1)No; 2)Less than 10 cigarettes; 3)More than 10 cigarettes; 4)More than a pack of cigarettes **10. Sensitive skin:** 1)Yes; 2)No **11. Sting/Itching:** 1)Yes; 2)No **12. Experience of adverse reaction to cometic:** 1)Yes; 2)No **13. Change of skin during the menstruation:** 1)Yes; 2)No; 3)N/A **14. The current state:** 1)A week before menstruation; 2)Having a menstruation; 3)In a week after menstruation; 4)Etc; 5)N/A

1-2. Analysis of skin tone

Sub. No.	Before	After 1 week use	After 4 weeks use	Change rate of after 1 week use (%)	Change rate of after 4 weeks use (%)
1	136.57	137.99	143.76	1.04	5.27
2	151.01	151.57	152.74	0.37	1.14
3	139.08	140.39	142.80	0.94	2.68
4	151.74	152.44	151.90	0.46	0.10
5	140.96	141.05	143.12	0.06	1.53
6	147.12	146.99	148.84	-0.09	1.17
7	154.18	154.58	154.63	0.26	0.29
8	141.45	142.77	142.93	0.93	1.05
9	148.33	148.88	149.97	0.37	1.11
10	147.86	149.34	150.59	1.00	1.85
11	142.56	143.66	143.44	0.77	0.62
12	142.42	142.49	143.96	0.05	1.09
13	148.12	148.17	148.23	0.04	0.08
14	143.18	143.97	142.93	0.55	-0.18
15	134.99	135.15	135.96	0.12	0.73
16	138.76	138.30	137.98	-0.33	-0.56
17	143.85	144.72	145.83	0.61	1.37
18	141.39	142.97	141.80	1.12	0.29
19	150.88	151.01	151.21	0.08	0.22
20	146.47	147.68	149.71	0.83	2.22
21	145.03	145.37	145.53	0.24	0.34
22	136.92	137.04	137.12	0.09	0.14

1-3. Analysis of skin tone evenness

Sub. No.	Before	After 1 week use	After 4 weeks use	Change rate of after 1 week use (%)	Change rate of after 4 weeks use (%)
1	12.53	11.95	11.43	-4.67	-8.76
2	11.21	10.64	10.40	-5.04	-7.20
3	13.21	12.85	12.24	-2.69	-7.32
4	11.19	10.64	10.19	-4.94	-8.94
5	9.67	9.14	8.56	-5.43	-11.42
6	13.01	12.71	12.15	-2.36	-6.64
7	11.09	10.52	10.16	-5.19	-8.44
8	11.49	11.06	10.52	-3.74	-8.46
9	11.10	10.59	10.18	-4.60	-8.27
10	12.35	11.85	11.33	-4.00	-8.21
11	13.22	12.75	12.22	-3.56	-7.55
12	13.03	12.76	12.06	-2.07	-7.49
13	11.23	10.78	10.33	-4.04	-8.01
14	11.84	11.25	10.75	-4.95	-9.22
15	13.71	13.15	12.61	-4.11	-8.06
16	12.37	11.94	11.45	-3.50	-7.43
17	9.88	9.42	8.84	-4.65	-10.56
18	12.89	12.61	11.87	-2.17	-7.92
19	10.36	9.68	9.31	-6.58	-10.07
20	13.81	13.40	12.95	-2.94	-6.24
21	13.73	13.22	12.73	-3.76	-7.32
22	11.71	11.28	10.70	-3.69	-8.65

1-4. Analysis of skin texture (roughness)

Sub. No.	Before	After 1 week use	After 4 weeks use	Change rate of after 1 week use (%)	Change rate of after 4 weeks use (%)
1	22.540	21.046	17.877	-6.63	-20.69
2	22.370	22.285	20.495	-0.38	-8.38
3	15.103	14.819	13.864	-1.88	-8.20
4	19.393	17.853	16.018	-7.94	-17.40
5	20.820	17.686	17.258	-15.05	-17.11
6	18.174	16.073	15.735	-11.56	-13.42
7	16.261	14.697	13.963	-9.62	-14.13
8	19.554	18.769	18.457	-4.01	-5.61
9	18.721	18.013	15.982	-3.78	-14.63
10	18.586	15.896	15.006	-14.47	-19.26
11	17.490	15.179	14.493	-13.21	-17.14
12	25.950	24.469	20.469	-5.71	-21.12
13	25.212	24.891	24.184	-1.27	-4.08
14	20.174	19.105	16.945	-5.30	-16.01
15	16.815	16.409	16.089	-2.41	-4.32
16	22.364	19.477	18.796	-12.91	-15.95
17	18.859	18.630	17.378	-1.21	-7.85
18	30.872	28.339	25.462	-8.20	-17.52
19	19.131	17.501	16.481	-8.52	-13.85
20	18.875	17.536	16.696	-7.09	-11.54
21	20.017	19.732	19.665	-1.42	-1.76
22	28.813	25.801	24.703	-10.45	-14.26

1-5. Analysis of crow’s feet

Sub. No.	Before	After 1 week use	After 4 weeks use	Change rate of after 1 week use (%)	Change rate of after 4 weeks use (%)
1	0.087	0.080	0.066	-8.05	-24.14
2	0.075	0.075	0.075	0.00	0.00
3	0.086	0.087	0.078	1.16	-9.30
4	0.068	0.061	0.063	-10.29	-7.35
5	0.083	0.077	0.063	-7.23	-24.10
6	0.080	0.081	0.064	1.25	-20.00
7	0.104	0.099	0.093	-4.81	-10.58
8	0.067	0.067	0.068	0.00	1.49
9	0.103	0.102	0.101	-0.97	-1.94
10	0.089	0.062	0.067	-30.34	-24.72
11	0.113	0.098	0.097	-13.27	-14.16
12	0.080	0.082	0.080	2.50	0.00
13	0.083	0.077	0.068	-7.23	-18.07
14	0.064	0.055	0.058	-14.06	-9.38
15	0.139	0.096	0.084	-30.94	-39.57
16	0.057	0.050	0.048	-12.28	-15.79
17	0.061	0.057	0.059	-6.56	-3.28
18	0.081	0.076	0.075	-6.17	-7.41
19	0.096	0.080	0.084	-16.67	-12.50
20	0.086	0.082	0.060	-4.65	-30.23
21	0.059	0.059	0.054	0.00	-8.47
22	0.118	0.119	0.107	0.85	-9.32

1-6. Analysis of skin redness (hemoglobin concentration and evenness)

1-6-1. Analysis of hemoglobin concentration

Sub. No.	Before	After 1 week use	After 4 weeks use	Change rate of after 1 week use (%)	Change rate of after 4 weeks use (%)
1	1.214	1.092	1.037	-10.05	-14.58
2	0.968	0.915	0.816	-5.48	-15.70
3	1.048	1.049	1.051	0.10	0.29
4	1.056	0.988	0.963	-6.44	-8.81
5	1.226	1.228	1.174	0.16	-4.24
6	1.314	1.245	1.180	-5.25	-10.20
7	1.195	1.179	1.090	-1.34	-8.79
8	1.392	1.071	1.040	-23.06	-25.29
9	1.176	1.154	1.093	-1.87	-7.06
10	1.146	1.159	1.125	1.13	-1.83
11	1.258	1.170	1.170	-7.00	-7.00
12	1.150	1.211	1.135	5.30	-1.30
13	1.205	1.218	1.136	1.08	-5.73
14	1.348	1.233	1.242	-8.53	-7.86
15	1.213	1.120	1.056	-7.67	-12.94
16	1.108	1.053	1.048	-4.96	-5.42
17	1.517	1.590	1.423	4.81	-6.20
18	1.090	1.071	1.083	-1.74	-0.64
19	1.149	1.014	1.136	-11.75	-1.13
20	1.195	1.130	1.113	-5.44	-6.86
21	1.313	1.256	1.180	-4.34	-10.13
22	1.419	1.456	1.429	2.61	0.70

1-6-2. Analysis of hemoglobin evenness

Sub. No.	Before	After 1 week use	After 4 weeks use	Change rate of after 1 week use (%)	Change rate of after 4 weeks use (%)
1	0.146	0.128	0.123	-12.33	-15.75
2	0.078	0.075	0.073	-3.85	-6.41
3	0.117	0.109	0.109	-6.84	-6.84
4	0.123	0.118	0.113	-4.07	-8.13
5	0.092	0.098	0.083	6.52	-9.78
6	0.147	0.142	0.138	-3.40	-6.12
7	0.170	0.153	0.136	-10.00	-20.00
8	0.146	0.142	0.144	-2.74	-1.37
9	0.185	0.173	0.147	-6.49	-20.54
10	0.128	0.128	0.120	0.00	-6.25
11	0.151	0.137	0.133	-9.27	-11.92
12	0.164	0.166	0.121	1.22	-26.22
13	0.162	0.148	0.141	-8.64	-12.96
14	0.219	0.190	0.190	-13.24	-13.24
15	0.167	0.154	0.151	-7.78	-9.58
16	0.114	0.093	0.110	-18.42	-3.51
17	0.238	0.216	0.188	-9.24	-21.01
18	0.134	0.123	0.133	-8.21	-0.75
19	0.139	0.131	0.133	-5.76	-4.32
20	0.195	0.194	0.180	-0.51	-7.69
21	0.203	0.202	0.201	-0.49	-0.99
22	0.168	0.161	0.142	-4.17	-15.48

1-7. Analysis of melanin (concentration, evenness and area) of pigmentation such as melasma

Sub. No.	concentration					evenness					area				
	Before	After 1 week use	After 4 weeks use	Change rate of after 1 week use (%)	Change rate of after 4 weeks use (%)	Before	After 1 week use	After 4 weeks use	Change rate of after 1 week use (%)	Change rate of after 4 weeks use (%)	Before	After 1 week use	After 4 weeks use	Change rate of after 1 week use (%)	Change rate of after 4 weeks use (%)
1	0.638	0.631	0.602	-1.097	-5.643	0.033	0.027	0.031	-18.182	-6.061	430.198	402.543	191.160	-6.428	-55.565
2	0.570	0.575	0.557	0.877	-2.281	0.026	0.027	0.025	3.846	-3.846	112.252	155.312	63.774	38.360	-43.187
3	0.626	0.627	0.607	0.160	-3.035	0.034	0.034	0.028	0.000	-17.647	347.792	355.835	208.362	2.313	-40.090
4	0.514	0.506	0.512	-1.556	-0.389	0.030	0.027	0.025	-10.000	-16.667	69.368	66.891	92.014	-3.571	32.646
5	0.645	0.630	0.629	-2.326	-2.481	0.046	0.045	0.036	-2.174	-21.739	407.606	371.010	370.507	-8.978	-9.102
6	0.558	0.559	0.559	0.179	0.179	0.025	0.022	0.020	-12.000	-20.000	51.349	69.667	95.049	35.674	85.104
7	0.555	0.545	0.554	-1.802	-0.180	0.043	0.038	0.038	-11.628	-11.628	90.572	81.331	99.404	-10.203	9.751
8	0.605	0.599	0.607	-0.992	0.331	0.039	0.039	0.033	0.000	-15.385	253.764	185.362	283.310	-26.955	11.643
9	0.538	0.537	0.534	-0.186	-0.743	0.051	0.038	0.041	-25.490	-19.608	172.297	152.100	144.697	-11.722	-16.019
10	0.515	0.515	0.514	0.000	-0.194	0.029	0.029	0.027	0.000	-6.897	50.437	57.038	49.267	13.088	-2.320
11	0.580	0.564	0.546	-2.759	-5.862	0.035	0.033	0.033	-5.714	-5.714	288.890	184.491	173.780	-36.138	-39.846
12	0.603	0.604	0.602	0.166	-0.166	0.036	0.033	0.031	-8.333	-13.889	218.175	312.911	211.969	43.422	-2.845
13	0.551	0.554	0.551	0.544	0.000	0.041	0.031	0.030	-24.390	-26.829	135.156	173.413	155.135	28.306	14.782
14	0.596	0.570	0.561	-4.362	-5.872	0.036	0.034	0.033	-5.556	-8.333	368.833	180.694	158.565	-51.009	-57.009
15	0.647	0.649	0.635	0.309	-1.855	0.030	0.029	0.029	-3.333	-3.333	480.336	546.070	378.727	13.685	-21.154
16	0.667	0.656	0.663	-1.649	-0.600	0.031	0.027	0.029	-12.903	-6.452	521.491	433.750	500.532	-16.825	-4.019
17	0.619	0.619	0.602	0.000	-2.746	0.041	0.040	0.035	-2.439	-14.634	401.985	397.617	306.623	-1.087	-23.723
18	0.606	0.606	0.607	0.000	0.165	0.044	0.041	0.040	-6.818	-9.091	375.134	364.831	410.600	-2.746	9.454
19	0.597	0.607	0.594	1.675	-0.503	0.035	0.035	0.035	0.000	0.000	150.154	251.600	152.155	67.561	1.333
20	0.572	0.569	0.547	-0.524	-4.371	0.029	0.029	0.035	0.000	20.690	139.389	121.969	93.062	-12.497	-33.236
21	0.672	0.670	0.638	-0.298	-5.060	0.055	0.053	0.049	-3.636	-10.909	648.740	638.860	492.230	-1.523	-24.125
22	0.620	0.619	0.607	-0.161	-2.097	0.035	0.036	0.032	2.857	-8.571	332.645	282.426	172.379	-15.097	-48.179

1-8. Analysis of skin hydration (outer moisture)

Sub. No.	Before	After 1 week use	After 4 weeks use	Change rate of after 1 week use (%)	Change rate of after 4 weeks use (%)
1	56.33	59.33	63.00	5.33	11.83
2	62.67	67.33	70.33	7.45	12.23
3	54.67	58.67	62.00	7.32	13.41
4	54.00	59.00	61.33	9.26	13.58
5	67.67	71.33	74.00	5.42	9.36
6	57.00	62.67	65.33	9.94	14.62
7	42.67	47.67	50.67	11.72	18.75
8	49.00	52.67	60.33	7.48	23.13
9	60.00	61.33	65.67	2.22	9.44
10	56.33	61.33	63.33	8.88	12.43
11	50.00	55.33	57.67	10.67	15.33
12	52.00	55.67	57.67	7.05	10.90
13	53.33	57.00	60.67	6.87	13.75
14	48.00	49.67	54.00	3.47	12.50
15	39.67	46.00	49.67	15.97	25.21
16	65.00	68.33	70.67	5.13	8.72
17	44.33	47.33	52.00	6.77	17.29
18	55.67	59.33	62.67	6.59	12.57
19	53.67	58.33	65.00	8.70	21.12
20	61.67	66.00	68.67	7.03	11.35
21	61.00	64.67	67.67	6.01	10.93
22	55.67	58.33	62.67	4.79	12.57

1-9. Analysis of skin elasticity

Sub. No.	Before	After 1 week use	After 4 weeks use	Change rate of after 1 week use (%)	Change rate of after 4 weeks use (%)
1	0.6983	0.7176	0.7298	2.76	4.51
2	0.6233	0.6451	0.6549	3.50	5.07
3	0.6431	0.6516	0.6837	1.32	6.31
4	0.6654	0.6697	0.6832	0.65	2.68
5	0.6065	0.6126	0.6355	1.01	4.78
6	0.6157	0.6227	0.6478	1.14	5.21
7	0.6547	0.6624	0.6880	1.18	5.09
8	0.5516	0.5738	0.5847	4.02	6.00
9	0.7394	0.7500	0.7685	1.43	3.94
10	0.6260	0.6312	0.6465	0.83	3.27
11	0.6454	0.6638	0.6837	2.85	5.93
12	0.6366	0.6546	0.6631	2.83	4.16
13	0.6694	0.6761	0.6877	1.00	2.73
14	0.7176	0.7295	0.7351	1.66	2.44
15	0.7727	0.7828	0.8003	1.31	3.57
16	0.6607	0.6754	0.6867	2.22	3.94
17	0.6653	0.6713	0.6927	0.90	4.12
18	0.6292	0.6404	0.6564	1.78	4.32
19	0.6271	0.6439	0.6627	2.68	5.68
20	0.6986	0.7141	0.7227	2.22	3.45
21	0.6519	0.6606	0.6764	1.33	3.76
22	0.6056	0.6217	0.6267	2.66	3.48

1-10. Analysis of skin gloss

Sub. No.	Before	After 1 week use	After 4 weeks use	Change rate of after 1 week use (%)	Change rate of after 4 weeks use (%)
1	1.70	1.70	1.90	0.00	11.76
2	1.73	1.97	2.30	13.87	32.95
3	2.00	2.00	2.07	0.00	3.50
4	1.87	2.70	2.90	44.39	55.08
5	2.10	2.03	2.60	-3.33	23.81
6	2.70	2.53	3.00	-6.30	11.11
7	2.50	2.60	3.20	4.00	28.00
8	2.73	3.00	2.60	9.89	-4.76
9	2.40	2.43	2.47	1.25	2.92
10	2.47	2.60	3.20	5.26	29.55
11	1.93	2.51	2.33	30.05	20.73
12	1.80	1.97	2.80	9.44	55.56
13	3.20	2.83	4.00	-11.56	25.00
14	2.63	2.90	2.90	10.27	10.27
15	2.57	2.50	2.93	-2.72	14.01
16	1.83	1.97	2.20	7.65	20.22
17	2.50	3.10	3.00	24.00	20.00
18	1.70	2.00	1.97	17.65	15.88
19	2.23	2.80	2.73	25.56	22.42
20	3.00	3.00	3.47	0.00	15.67
21	1.80	2.43	2.70	35.00	50.00
22	3.70	3.83	4.03	3.51	8.92

1-11. Analysis of skin transparency

Sub. No.	Before	After 1 week use	After 4 weeks use	Change rate of after 1 week use (%)	Change rate of after 4 weeks use (%)
1	210	212	218	0.95	3.81
2	210	216	226	2.86	7.62
3	198	200	216	1.01	9.09
4	198	208	218	5.05	10.10
5	194	200	216	3.09	11.34
6	192	198	208	3.13	8.33
7	206	212	218	2.91	5.83
8	198	202	222	2.02	12.12
9	202	206	218	1.98	7.92
10	208	210	218	0.96	4.81
11	198	208	212	5.05	7.07
12	194	202	216	4.12	11.34
13	200	210	220	5.00	10.00
14	198	208	218	5.05	10.10
15	200	212	220	6.00	10.00
16	202	216	220	6.93	8.91
17	208	216	222	3.85	6.73
18	198	208	212	5.05	7.07
19	192	202	210	5.21	9.38
20	202	206	210	1.98	3.96
21	200	202	212	1.00	6.00
22	194	198	210	2.06	8.25

1-12. Analysis of self-questionnaires by subjects

1-12-1. After 1 week

Sub. No.	Skin tone improved[1]	Skin tone becomes more even[2]	Skin texture improved[3]	Crow's feet improved[4]	Skin redness improved[5]	Melanin of skin pigmentation area becomes faded[6]	Skin hydration improved[7]	Skin elasticity improved[8]	Skin gloss (radiance) improved[9]	Skin becomes clear and transparent[10]
1	3	2	2	3	2	3	4	4	4	3
2	5	5	5	5	5	5	6	5	5	5
3	4	4	4	4	4	4	4	4	4	4
4	4	4	5	4	5	4	5	4	4	4
5	3	3	4	3	3	3	4	4	3	3
6	5	5	5	4	5	5	5	4	4	4
7	6	6	5	6	6	6	5	6	6	6
8	4	4	4	4	4	4	4	4	4	4
9	4	4	4	4	4	4	4	4	4	4
10	4	4	4	3	4	4	4	4	4	4
11	4	4	5	4	4	4	5	4	4	4
12	3	4	4	4	3	3	4	5	3	3
13	4	4	4	5	4	4	4	4	4	4
14	4	4	5	4	5	4	5	4	5	5
15	4	4	5	4	5	4	4	4	4	4
16	4	4	4	5	5	4	5	4	5	5
17	4	4	4	4	4	4	4	4	4	4
18	4	4	4	4	4	4	4	4	4	4
19	4	4	4	4	4	4	4	4	4	4
20	4	4	5	4	4	4	5	4	4	4
21	4	4	5	5	5	4	5	5	4	5
22	5	5	6	6	5	5	5	5	5	6
*Items	1. Do you think the skin tone has improved compared to before using the product? 2. Do you think the skin tone has become more even compared to before using the product? 3. Do you think the skin texture has improved compared to before using the product? 4. Do you think the crow's feet has improved compared to before using the product? 5. Do you think the skin redness has improved compared to before using the product? 6. Do you think the melanin of skin pigmentation area becomes faded compared to before using the product? 7. Do you think the skin hydration has improved compared to before using the product? 8. Do you think the skin elasticity has improved compared to before using the product? 9. Do you think the skin gloss (radiance) has improved compared to before using the product? 10. Do you think the skin tone has become clear and transparent compared to before using the product?									
*Scales	1) Strongly disagree; 2) Disagree 3) Slightly disagree; 4) Slightly agree; 5) Agree; 6) Strongly agree									

1-12-2. After 4 weeks

Sub. No.	Skin tone improved[1]	Skin tone becomes more even[2]	Skin texture improved[3]	Crow's feet improved[4]	Skin redness improved[5]	Melanin of skin pigmentation area becomes faded[6]	Skin hydration improved[7]	Skin elasticity improved[8]	Skin gloss (radiance) improved[9]	Skin becomes clear and transparent[10]	Overall satisfaction[11]
1	3	3	3	3	3	1	1	3	4	2	2
2	6	6	6	6	5	6	6	6	5	5	6
3	6	6	5	5	5	5	5	5	5	5	5
4	5	5	6	5	5	5	6	6	6	6	6
5	4	3	4	3	4	3	4	4	4	3	4
6	6	6	6	5	6	6	6	6	6	6	6
7	6	5	6	5	6	6	6	6	6	6	6
8	6	6	6	6	6	6	6	6	6	6	6
9	6	6	6	5	5	5	6	6	6	6	6
10	5	5	5	5	5	5	6	6	5	5	6
11	6	6	6	6	6	6	6	6	6	6	6
12	5	5	5	4	5	4	5	5	4	4	5
13	5	5	6	6	5	6	5	6	6	6	6
14	5	5	6	5	5	5	6	6	6	5	5
15	5	5	5	5	5	5	5	5	5	6	6
16	5	5	5	5	5	5	5	5	5	5	5
17	5	5	5	5	5	5	5	5	5	5	5
18	5	5	5	5	5	5	5	5	5	5	5
19	5	5	5	5	5	5	5	5	5	5	5
20	5	5	5	5	5	6	5	5	5	5	5
21	4	4	4	4	4	4	4	4	4	4	5
22	5	5	6	5	5	5	6	6	6	5	5
*Items	1. Do you think the skin tone has improved compared to before using the product? 2. Do you think the skin tone has become more even compared to before using the product? 3. Do you think the skin texture has improved compared to before using the product? 4. Do you think the crow's feet has improved compared to before using the product? 5. Do you think the skin redness has improved compared to before using the product? 6. Do you think the melanin of skin pigmentation area becomes faded compared to before using the product? 7. Do you think the skin hydration has improved compared to before using the product? 8. Do you think the skin elasticity has improved compared to before using the product? 9. Do you think the skin gloss (radiance) has improved compared to before using the product? 10. Do you think the skin tone has become clear and transparent compared to before using the product? 11. Are you satisfied with the product overall?										
*Scales	1) Strongly disagree; 2) Disagree 3) Slightly disagree; 4) Slightly agree; 5) Agree; 6) Strongly agree										

Appendix II. Statistical Data

2-1. Test of Normality

Explore

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
tone	.078	22	.200*	.976	22	.847
tone_evenness	.121	22	.200*	.949	22	.304
texture	.192	22	.034	.898	22	.027
crows_feet	.158	22	.162	.939	22	.192
hemoglobin_concentration	.144	22	.200*	.977	22	.863
hemoglobin_evenness	.113	22	.200*	.988	22	.991
melanin_concentration	.098	22	.200*	.974	22	.793
melanin_evenness	.164	22	.127	.952	22	.340
melanin_area	.137	22	.200*	.947	22	.274
hydration	.113	22	.200*	.981	22	.932
elasticity	.155	22	.186	.959	22	.473
gloss	.134	22	.200*	.916	22	.062
transparency	.148	22	.200*	.925	22	.095

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
tone	22	144.2214	5.31150	.077	.491	-.830	.953
tone_evenness	22	12.0286	1.23510	-.270	.491	-.867	.953
texture	22	20.7315	3.96585	1.175	.491	1.100	.953
crows_feet	22	.0854	.02056	.867	.491	.815	.953
hemoglobin_concentration	22	1.2136	.13097	.455	.491	.229	.953
hemoglobin_evenness	22	.1539	.03912	.219	.491	.079	.953
melanin_concentration	22	.5952	.04531	-.139	.491	-.708	.953
melanin_evenness	22	.0365	.00782	.729	.491	.164	.953
melanin_area	22	274.8438	168.89533	.396	.491	-.665	.953
hydration	22	54.5614	7.08655	-.277	.491	-.104	.953

elasticity	22	.6547	.04881	.533	.491	.961	.953
gloss	22	2.3223	.53972	.830	.491	.389	.953
transparency	22	200.0909	5.50246	.431	.491	-.633	.953
Valid N (listwise)	22						

2-2. Analysis of skin tone

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

Tone	Dependent Variable
1	Before_use
2	After_1week_use
3	After_4weeks_use

Descriptive Statistics

	Mean	Std. Deviation	N
Before_use	144.2214	5.31150	22
After_1week_use	144.8423	5.30356	22
After_4weeks_use	145.6809	5.15583	22

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
Tone	Pillai's Trace	.561	12.776[b]	2.000	20.000	.000
	Wilks' Lambda	.439	12.776[b]	2.000	20.000	.000
	Hotelling's Trace	1.278	12.776[b]	2.000	20.000	.000
	Roy's Largest Root	1.278	12.776[b]	2.000	20.000	.000

a. Design: Intercept
Within Subjects Design: Tone

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Tone	.298	24.247	2	.000	.587	.601	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: Tone

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Tone	Sphericity Assumed	23.607	2	11.803	12.861	.000
	Greenhouse-Geisser	23.607	1.175	20.095	12.861	.001
	Huynh-Feldt	23.607	1.203	19.628	12.861	.001
	Lower-bound	23.607	1.000	23.607	12.861	.002
Error(Tone)	Sphericity Assumed	38.547	42	.918		
	Greenhouse-Geisser	38.547	24.670	1.563		
	Huynh-Feldt	38.547	25.257	1.526		
	Lower-bound	38.547	21.000	1.836		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	Tone	Type III Sum of Squares	df	Mean Square	F	Sig.
Tone	Level 2 vs. Level 1	8.482	1	8.482	24.012	.000
	Level 3 vs. Level 1	46.866	1	46.866	15.977	.001
Error(Tone)	Level 2 vs. Level 1	7.418	21	.353		
	Level 3 vs. Level 1	61.601	21	2.933		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	462006.893	1	462006.893	17093.056	.000
Error	567.607	21	27.029		

Estimated Marginal Means

Tone

Measure: MEASURE_1

Tone	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	144.221	1.132	141.866	146.576
2	144.842	1.131	142.491	147.194
3	145.681	1.099	143.395	147.967

Average change rate of skin tone

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation
After_1week_use	22	.4323	.41942
After_4weeks_use	22	1.0250	1.23891
Valid N (listwise)	22		

2-3. Analysis of skin tone evenness

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

evenness	Dependent Variable
1	Before_use
2	After_1week_use
3	After_4weeks_use

Descriptive Statistics

	Mean	Std. Deviation	N
Before_use	12.0286	1.23510	22
After_1week_use	11.5541	1.28569	22
After_4weeks_use	11.0445	1.24920	22

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
evenness	Pillai's Trace	.993	1467.662[b]	2.000	20.000	.000
	Wilks' Lambda	.007	1467.662[b]	2.000	20.000	.000
	Hotelling's Trace	146.766	1467.662[b]	2.000	20.000	.000
	Roy's Largest Root	146.766	1467.662[b]	2.000	20.000	.000

a. Design: Intercept
Within Subjects Design: evenness

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
evenness	.897	2.174	2	.337	.907	.987	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: evenness

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
evenness	Sphericity Assumed	10.657	2	5.329	1050.762	.000
	Greenhouse-Geisser	10.657	1.813	5.878	1050.762	.000
	Huynh-Feldt	10.657	1.975	5.397	1050.762	.000
	Lower-bound	10.657	1.000	10.657	1050.762	.000
Error(evenness)	Sphericity Assumed	.213	42	.005		
	Greenhouse-Geisser	.213	38.077	.006		
	Huynh-Feldt	.213	41.471	.005		
	Lower-bound	.213	21.000	.010		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	evenness	Type III Sum of Squares	df	Mean Square	F	Sig.
evenness	Level 2 vs. Level 1	4.954	1	4.954	436.507	.000
	Level 3 vs. Level 1	21.306	1	21.306	3078.589	.000
Error(evenness)	Level 2 vs. Level 1	.238	21	.011		
	Level 3 vs. Level 1	.145	21	.007		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	2931.006	1	2931.006	1859.454	.000
Error	33.102	21	1.576		

Estimated Marginal Means

evenness

Measure: MEASURE_1

evenness	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	12.029	.263	11.481	12.576
2	11.554	.274	10.984	12.124
3	11.045	.266	10.491	11.598

Average change rate of skin tone evenness

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation
After_1week_use	22	-4.0309	1.14387
After_4weeks_use	22	-8.2809	1.23448
Valid N (listwise)	22		

2-4. Analysis of skin texture (roughness)

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

texture	Dependent Variable
1	Before_use
2	After_1week_use
3	After_4weeks_use

Descriptive Statistics

	Mean	Std. Deviation	N
Before_use	20.7315	3.96585	22
After_1week_use	19.2821	3.75560	22
After_4weeks_use	18.0007	3.32603	22

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
texture	Pillai's Trace	.792	37.989[b]	2.000	20.000	.000
	Wilks' Lambda	.208	37.989[b]	2.000	20.000	.000
	Hotelling's Trace	3.799	37.989[b]	2.000	20.000	.000
	Roy's Largest Root	3.799	37.989[b]	2.000	20.000	.000

a. Design: Intercept
Within Subjects Design: texture

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
texture	.741	5.989	2	.050	.794	.849	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: texture

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
texture	Sphericity Assumed	82.135	2	41.067	59.689	.000
	Greenhouse-Geisser	82.135	1.589	51.694	59.689	.000
	Huynh-Feldt	82.135	1.698	48.379	59.689	.000
	Lower-bound	82.135	1.000	82.135	59.689	.000
Error(texture)	Sphericity Assumed	28.897	42	.688		
	Greenhouse-Geisser	28.897	33.366	.866		
	Huynh-Feldt	28.897	35.652	.811		
	Lower-bound	28.897	21.000	1.376		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	texture	Type III Sum of Squares	df	Mean Square	F	Sig.
texture	Level 2 vs. Level 1	46.220	1	46.220	46.534	.000
	Level 3 vs. Level 1	164.062	1	164.062	79.067	.000
Error(texture)	Level 2 vs. Level 1	20.858	21	.993		
	Level 3 vs. Level 1	43.574	21	2.075		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	8227.185	1	8227.185	624.550	.000
Error	276.633	21	13.173		

Estimated Marginal Means

texture

Measure: MEASURE_1

texture	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	20.732	.846	18.973	22.490
2	19.282	.801	17.617	20.947
3	18.001	.709	16.526	19.475

Average change rate of skin texture (roughness)

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation
After_1week_use	22	-6.9555	4.63349
After_4weeks_use	22	-12.9195	5.65272
Valid N (listwise)	22		

2-5. Analysis of crow's feet

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

crowsfeet	Dependent Variable
1	Before_use
2	After_1week_use
3	After_4weeks_use

Descriptive Statistics

	Mean	Std. Deviation	N
Before_use	.0854	.02056	22
After_1week_use	.0783	.01738	22
After_4weeks_use	.0733	.01578	22

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
crowsfeet	Pillai's Trace	.512	10.477[b]	2.000	20.000	.001
	Wilks' Lambda	.488	10.477[b]	2.000	20.000	.001
	Hotelling's Trace	1.048	10.477[b]	2.000	20.000	.001
	Roy's Largest Root	1.048	10.477[b]	2.000	20.000	.001

a. Design: Intercept
Within Subjects Design: crowsfeet

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
crowsfeet	.735	6.165	2	.046	.790	.844	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: crowsfeet

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
crowsfeet	Sphericity Assumed	.002	2	.001	15.371	.000
	Greenhouse-Geisser	.002	1.581	.001	15.371	.000
	Huynh-Feldt	.002	1.688	.001	15.371	.000
	Lower-bound	.002	1.000	.002	15.371	.001
Error(crowsfeet)	Sphericity Assumed	.002	42	5.325E-5		
	Greenhouse-Geisser	.002	33.195	6.737E-5		
	Huynh-Feldt	.002	35.443	6.310E-5		
	Lower-bound	.002	21.000	.000		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	crowsfeet	Type III Sum of Squares	df	Mean Square	F	Sig.
crowsfeet	Level 2 vs. Level 1	.001	1	.001	10.104	.005
	Level 3 vs. Level 1	.003	1	.003	21.368	.000
Error(crowsfeet)	Level 2 vs. Level 1	.002	21	.000		
	Level 3 vs. Level 1	.003	21	.000		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	.137	1	.137	474.634	.000
Error	.006	21	.000		

Estimated Marginal Means

crowsfeet

Measure: MEASURE_1

crowsfeet	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	.085	.004	.076	.095
2	.078	.004	.071	.086
3	.073	.003	.066	.080

Average change rate of crow's feet

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation
After_1week_use	22	-7.6255	9.29140
After_4weeks_use	22	-13.1282	10.61418
Valid N (listwise)	22		

2-6. Analysis of skin redness (hemoglobin concentration and evenness)

2-6-1. Analysis of hemoglobin concentration

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

concentration	Dependent Variable
1	Before_use
2	After_1week_use
3	After_4weeks_use

Descriptive Statistics

	Mean	Std. Deviation	N
Before_use	1.2136	.13097	22
After_1week_use	1.1637	.14844	22
After_4weeks_use	1.1236	.13142	22

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
concentration	Pillai's Trace	.602	15.125[b]	2.000	20.000	.000
	Wilks' Lambda	.398	15.125[b]	2.000	20.000	.000
	Hotelling's Trace	1.512	15.125[b]	2.000	20.000	.000
	Roy's Largest Root	1.512	15.125[b]	2.000	20.000	.000

a. Design: Intercept
Within Subjects Design: concentration

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Epsilon[b] Huynh-Feldt	Epsilon[b] Lower-bound
concentration	.811	4.187	2	.123	.841	.906	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: concentration

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
concentration	Sphericity Assumed	.089	2	.045	16.358	.000
	Greenhouse-Geisser	.089	1.682	.053	16.358	.000
	Huynh-Feldt	.089	1.812	.049	16.358	.000
	Lower-bound	.089	1.000	.089	16.358	.001
Error(concentration)	Sphericity Assumed	.115	42	.003		
	Greenhouse-Geisser	.115	35.327	.003		
	Huynh-Feldt	.115	38.058	.003		
	Lower-bound	.115	21.000	.005		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	concentration	Type III Sum of Squares	df	Mean Square	F	Sig.
concentration	Level 2 vs. Level 1	.055	1	.055	7.908	.010
	Level 3 vs. Level 1	.178	1	.178	28.012	.000
Error(concentration)	Level 2 vs. Level 1	.146	21	.007		
	Level 3 vs. Level 1	.134	21	.006		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	29.962	1	29.962	1762.801	.000
Error	.357	21	.017		

Estimated Marginal Means

concentration

Measure: MEASURE_1

concentration	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	1.214	.028	1.156	1.272
2	1.164	.032	1.098	1.230
3	1.124	.028	1.065	1.182

Average change rate of hemoglobin concentration

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation
After_1week_use	22	-4.0786	6.27306
After_4weeks_use	22	-7.3055	6.12220
Valid N (listwise)	22		

2-6-2. Analysis of hemoglobin evenness

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

evenness	Dependent Variable
1	Before_use
2	After_1week_use
3	After_4weeks_use

Descriptive Statistics

	Mean	Std. Deviation	N
Before_use	.1539	.03912	22
After_1week_use	.1446	.03620	22
After_4weeks_use	.1368	.03209	22

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
evenness	Pillai's Trace	.663	19.654[b]	2.000	20.000	.000
	Wilks' Lambda	.337	19.654[b]	2.000	20.000	.000
	Hotelling's Trace	1.965	19.654[b]	2.000	20.000	.000
	Roy's Largest Root	1.965	19.654[b]	2.000	20.000	.000

a. Design: Intercept
Within Subjects Design: evenness

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Epsilon[b] Huynh-Feldt	Epsilon[b] Lower-bound
evenness	.737	6.103	2	.047	.792	.846	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: evenness

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
evenness	Sphericity Assumed	.003	2	.002	21.115	.000
	Greenhouse-Geisser	.003	1.584	.002	21.115	.000
	Huynh-Feldt	.003	1.691	.002	21.115	.000
	Lower-bound	.003	1.000	.003	21.115	.000
Error(evenness)	Sphericity Assumed	.003	42	7.669E-5		
	Greenhouse-Geisser	.003	33.255	9.685E-5		
	Huynh-Feldt	.003	35.517	9.069E-5		
	Lower-bound	.003	21.000	.000		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	evenness	Type III Sum of Squares	df	Mean Square	F	Sig.
evenness	Level 2 vs. Level 1	.002	1	.002	25.249	.000
	Level 3 vs. Level 1	.006	1	.006	31.873	.000
Error(evenness)	Level 2 vs. Level 1	.002	21	7.566E-5		
	Level 3 vs. Level 1	.004	21	.000		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	.463	1	.463	373.673	.000
Error	.026	21	.001		

Estimated Marginal Means

evenness

Measure: MEASURE_1

evenness	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	.154	.008	.137	.171
2	.145	.008	.129	.161
3	.137	.007	.123	.151

Average change rate of hemoglobin evenness

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation
After_1week_use	22	-5.8050	5.49279
After_4weeks_use	22	-10.4027	7.08627
Valid N (listwise)	22		

2-7. Analysis of Analysis of melanin (concentration, evenness and area) of pigmentation such as melasma

2-7-1. Analysis of melanin concentration

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

concentration	Dependent Variable
1	Before_use
2	After_1week_use
3	After_4weeks_use

Descriptive Statistics

	Mean	Std. Deviation	N
Before_use	.5952	.04531	22
After_1week_use	.5914	.04518	22
After_4weeks_use	.5831	.04153	22

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
concentration	Pillai's Trace	.467	8.766[b]	2.000	20.000	.002
	Wilks' Lambda	.533	8.766[b]	2.000	20.000	.002
	Hotelling's Trace	.877	8.766[b]	2.000	20.000	.002
	Roy's Largest Root	.877	8.766[b]	2.000	20.000	.002

a. Design: Intercept

Within Subjects Design: concentration

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
concentration	.739	6.060	2	.048	.793	.847	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept

Within Subjects Design: concentration

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
concentration	Sphericity Assumed	.002	2	.001	13.158	.000
	Greenhouse-Geisser	.002	1.586	.001	13.158	.000
	Huynh-Feldt	.002	1.694	.001	13.158	.000
	Lower-bound	.002	1.000	.002	13.158	.002
Error(concentration)	Sphericity Assumed	.003	42	6.399E-5		
	Greenhouse-Geisser	.003	33.296	8.071E-5		
	Huynh-Feldt	.003	35.567	7.556E-5		
	Lower-bound	.003	21.000	.000		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	concentration	Type III Sum of Squares	df	Mean Square	F	Sig.
concentration	Level 2 vs. Level 1	.000	1	.000	4.800	.040
	Level 3 vs. Level 1	.003	1	.003	18.334	.000
Error(concentration)	Level 2 vs. Level 1	.001	21	6.523E-5		
	Level 3 vs. Level 1	.004	21	.000		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	7.655	1	7.655	4035.692	.000
Error	.040	21	.002		

Estimated Marginal Means

concentration

Measure: MEASURE_1

concentration	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	.595	.010	.575	.615
2	.591	.010	.571	.611
3	.583	.009	.565	.602

Average change rate of melanin concentration

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation
After_1week_use	22	-.6274	1.35297
After_4weeks_use	22	-1.9729	2.15251
Valid N (listwise)	22		

2-7-2. Analysis of melanin evenness

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

evenness	Dependent Variable
1	Before_use
2	After_1week_use
3	After_4weeks_use

Descriptive Statistics

	Mean	Std. Deviation	N
Before_use	.0365	.00782	22
After_1week_use	.0340	.00709	22
After_4weeks_use	.0325	.00624	22

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
evenness	Pillai's Trace	.559	12.690[b]	2.000	20.000	.000
	Wilks' Lambda	.441	12.690[b]	2.000	20.000	.000
	Hotelling's Trace	1.269	12.690[b]	2.000	20.000	.000
	Roy's Largest Root	1.269	12.690[b]	2.000	20.000	.000

a. Design: Intercept
Within Subjects Design: evenness

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Epsilon[b] Huynh-Feldt	Epsilon[b] Lower-bound
evenness	.989	.220	2	.896	.989	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: evenness

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
evenness	Sphericity Assumed	.000	2	9.238E-5	14.628	.000
	Greenhouse-Geisser	.000	1.978	9.339E-5	14.628	.000
	Huynh-Feldt	.000	2.000	9.238E-5	14.628	.000
	Lower-bound	.000	1.000	.000	14.628	.001
Error(evenness)	Sphericity Assumed	.000	42	6.315E-6		
	Greenhouse-Geisser	.000	41.546	6.384E-6		
	Huynh-Feldt	.000	42.000	6.315E-6		
	Lower-bound	.000	21.000	1.263E-5		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	evenness	Type III Sum of Squares	df	Mean Square	F	Sig.
evenness	Level 2 vs. Level 1	.000	1	.000	12.340	.002
	Level 3 vs. Level 1	.000	1	.000	25.809	.000
Error(evenness)	Level 2 vs. Level 1	.000	21	1.197E-5		
	Level 3 vs. Level 1	.000	21	1.395E-5		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	.026	1	.026	565.193	.000
Error	.001	21	4.588E-5		

Estimated Marginal Means

evenness

Measure: MEASURE_1

evenness	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	.037	.002	.033	.040
2	.034	.002	.031	.037
3	.033	.001	.030	.035

Average change rate of melanin evenness

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation
After_1week_use	22	-6.6315	8.13811
After_4weeks_use	22	-10.2974	9.68389
Valid N (listwise)	22		

2-7-3. Analysis of melanin area

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

area	Dependent Variable
1	Before_use
2	After_1week_use
3	After_4weeks_use

Descriptive Statistics

	Mean	Std. Deviation	N
Before_use	274.8438	168.89533	22
After_1week_use	262.9873	160.92566	22
After_4weeks_use	218.3319	135.98493	22

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
area	Pillai's Trace	.331	4.947[b]	2.000	20.000	.018
	Wilks' Lambda	.669	4.947[b]	2.000	20.000	.018
	Hotelling's Trace	.495	4.947[b]	2.000	20.000	.018
	Roy's Largest Root	.495	4.947[b]	2.000	20.000	.018

a. Design: Intercept
Within Subjects Design: area

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
area	.915	1.778	2	.411	.922	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: area

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
area	Sphericity Assumed	39074.061	2	19537.030	6.570	.003
	Greenhouse-Geisser	39074.061	1.843	21198.608	6.570	.004
	Huynh-Feldt	39074.061	2.000	19537.030	6.570	.003
	Lower-bound	39074.061	1.000	39074.061	6.570	.018
Error(area)	Sphericity Assumed	124888.015	42	2973.524		
	Greenhouse-Geisser	124888.015	38.708	3226.415		
	Huynh-Feldt	124888.015	42.000	2973.524		
	Lower-bound	124888.015	21.000	5947.048		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	area	Type III Sum of Squares	df	Mean Square	F	Sig.
area	Level 2 vs. Level 1	3092.661	1	3092.661	.733	.402
	Level 3 vs. Level 1	70259.109	1	70259.109	10.138	.004
Error(area)	Level 2 vs. Level 1	88580.590	21	4218.123		
	Level 3 vs. Level 1	145530.665	21	6930.032		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	1397690.345	1	1397690.345	62.613	.000
Error	468772.882	21	22322.518		

Estimated Marginal Means

area

Measure: MEASURE_1

area	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	274.844	36.009	199.960	349.728
2	262.987	34.309	191.637	334.338
3	218.332	28.992	158.040	278.624

Average change rate of melanin area

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation
After_1week_use	22	1.7105	27.58857
After_4weeks_use	22	-11.6230	32.84990
Valid N (listwise)	22		

2-8. Analysis of skin hydration (outer moisture)

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

hydration	Dependent Variable
1	Before_use
2	After_1week_use
3	After_4weeks_use

Descriptive Statistics

	Mean	Std. Deviation	N
Before_use	54.5614	7.08655	22
After_1week_use	58.5145	6.89795	22
After_4weeks_use	62.0464	6.50741	22

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
hydration	Pillai's Trace	.960	243.026[b]	2.000	20.000	.000
	Wilks' Lambda	.040	243.026[b]	2.000	20.000	.000
	Hotelling's Trace	24.303	243.026[b]	2.000	20.000	.000
	Roy's Largest Root	24.303	243.026[b]	2.000	20.000	.000

a. Design: Intercept
Within Subjects Design: hydration

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
hydration	.915	1.787	2	.409	.921	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: hydration

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
hydration	Sphericity Assumed	616.928	2	308.464	307.353	.000
	Greenhouse-Geisser	616.928	1.842	334.834	307.353	.000
	Huynh-Feldt	616.928	2.000	308.464	307.353	.000
	Lower-bound	616.928	1.000	616.928	307.353	.000
Error(hydration)	Sphericity Assumed	42.152	42	1.004		
	Greenhouse-Geisser	42.152	38.692	1.089		
	Huynh-Feldt	42.152	42.000	1.004		
	Lower-bound	42.152	21.000	2.007		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	hydration	Type III Sum of Squares	df	Mean Square	F	Sig.
hydration	Level 2 vs. Level 1	343.808	1	343.808	230.026	.000
	Level 3 vs. Level 1	1232.555	1	1232.555	490.853	.000
Error(hydration)	Level 2 vs. Level 1	31.388	21	1.495		
	Level 3 vs. Level 1	52.732	21	2.511		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	74965.759	1	74965.759	1628.038	.000
Error	966.981	21	46.047		

Estimated Marginal Means

hydration

Measure: MEASURE_1

hydration	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	54.561	1.511	51.419	57.703
2	58.515	1.471	55.456	61.573
3	62.046	1.387	59.161	64.932

Average change rate of skin hydration (outer moisture)

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation
After_1week_use	22	7.4577	2.94802
After_4weeks_use	22	14.1373	4.40958
Valid N (listwise)	22		

2-9. Analysis of skin elasticity

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

elasticity	Dependent Variable
1	Before_use
2	After_1week_use
3	After_4weeks_use

Descriptive Statistics

	Mean	Std. Deviation	N
Before_use	.6547	.04881	22
After_1week_use	.6669	.04795	22
After_4weeks_use	.6826	.04767	22

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
elasticity	Pillai's Trace	.953	201.772[b]	2.000	20.000	.000
	Wilks' Lambda	.047	201.772[b]	2.000	20.000	.000
	Hotelling's Trace	20.177	201.772[b]	2.000	20.000	.000
	Roy's Largest Root	20.177	201.772[b]	2.000	20.000	.000

a. Design: Intercept
Within Subjects Design: elasticity

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
elasticity	.945	1.125	2	.570	.948	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: elasticity

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
elasticity	Sphericity Assumed	.009	2	.004	212.600	.000
	Greenhouse-Geisser	.009	1.896	.005	212.600	.000
	Huynh-Feldt	.009	2.000	.004	212.600	.000
	Lower-bound	.009	1.000	.009	212.600	.000
Error(elasticity)	Sphericity Assumed	.001	42	2.018E-5		
	Greenhouse-Geisser	.001	39.822	2.128E-5		
	Huynh-Feldt	.001	42.000	2.018E-5		
	Lower-bound	.001	21.000	4.035E-5		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	elasticity	Type III Sum of Squares	df	Mean Square	F	Sig.
elasticity	Level 2 vs. Level 1	.003	1	.003	101.924	.000
	Level 3 vs. Level 1	.017	1	.017	413.043	.000
Error(elasticity)	Level 2 vs. Level 1	.001	21	3.174E-5		
	Level 3 vs. Level 1	.001	21	4.131E-5		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	9.819	1	9.819	4260.835	.000
Error	.048	21	.002		

Estimated Marginal Means

elasticity

Measure: MEASURE_1

elasticity	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	.655	.010	.633	.676
2	.667	.010	.646	.688
3	.683	.010	.661	.704

Average change rate of skin elasticity

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation
After_1week_use	22	1.8764	.94233
After_4weeks_use	22	4.2927	1.11164
Valid N (listwise)	22		

2-10. Analysis of skin gloss

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

gloss	Dependent Variable
1	Before_use
2	After_1week_use
3	After_4weeks_use

Descriptive Statistics

	Mean	Std. Deviation	N
Before_use	2.3223	.53972	22
After_1week_use	2.5182	.50023	22
After_4weeks_use	2.7864	.57326	22

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
gloss	Pillai's Trace	.716	25.222[b]	2.000	20.000	.000
	Wilks' Lambda	.284	25.222[b]	2.000	20.000	.000
	Hotelling's Trace	2.522	25.222[b]	2.000	20.000	.000
	Roy's Largest Root	2.522	25.222[b]	2.000	20.000	.000

a. Design: Intercept

Within Subjects Design: gloss

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Huynh-Feldt	Lower-bound
gloss	.932	1.411	2	.494	.936	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept

Within Subjects Design: gloss

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
gloss	Sphericity Assumed	2.388	2	1.194	23.254	.000
	Greenhouse-Geisser	2.388	1.872	1.276	23.254	.000
	Huynh-Feldt	2.388	2.000	1.194	23.254	.000
	Lower-bound	2.388	1.000	2.388	23.254	.000
Error(gloss)	Sphericity Assumed	2.157	42	.051		
	Greenhouse-Geisser	2.157	39.322	.055		
	Huynh-Feldt	2.157	42.000	.051		
	Lower-bound	2.157	21.000	.103		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	gloss	Type III Sum of Squares	df	Mean Square	F	Sig.
gloss	Level 2 vs. Level 1	.844	1	.844	9.716	.005
	Level 3 vs. Level 1	4.738	1	4.738	51.581	.000
Error(gloss)	Level 2 vs. Level 1	1.825	21	.087		
	Level 3 vs. Level 1	1.929	21	.092		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	142.189	1	142.189	555.828	.000
Error	5.372	21	.256		

Estimated Marginal Means

gloss

Measure: MEASURE_1

gloss	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	2.322	.115	2.083	2.562
2	2.518	.107	2.296	2.740
3	2.786	.122	2.532	3.041

Average change rate of skin gloss

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation
After_1week_use	22	9.9036	14.26645
After_4weeks_use	22	21.4818	15.92942
Valid N (listwise)	22		

2-11. Analysis of skin transparency

General Linear Model

Within-Subjects Factors

Measure: MEASURE_1

transparency	Dependent Variable
1	Before_use
2	After_1week_use
3	After_4weeks_use

Descriptive Statistics

	Mean	Std. Deviation	N
Before_use	200.0909	5.50246	22
After_1week_use	206.9091	5.78100	22
After_4weeks_use	216.3636	4.68580	22

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.
transparency	Pillai's Trace	.934	140.465[b]	2.000	20.000	.000
	Wilks' Lambda	.066	140.465[b]	2.000	20.000	.000
	Hotelling's Trace	14.046	140.465[b]	2.000	20.000	.000
	Roy's Largest Root	14.046	140.465[b]	2.000	20.000	.000

a. Design: Intercept
Within Subjects Design: transparency

b. Exact statistic

Mauchly's Test of Sphericity[a]

Measure: MEASURE_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Epsilon[b] Huynh-Feldt	Epsilon[b] Lower-bound
transparency	.935	1.355	2	.508	.939	1.000	.500

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. Design: Intercept
Within Subjects Design: transparency

b. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

Tests of Within-Subjects Effects

Measure: MEASURE_1

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
transparency	Sphericity Assumed	2938.303	2	1469.152	171.228	.000
	Greenhouse-Geisser	2938.303	1.877	1565.363	171.228	.000
	Huynh-Feldt	2938.303	2.000	1469.152	171.228	.000
	Lower-bound	2938.303	1.000	2938.303	171.228	.000
Error(transparency)	Sphericity Assumed	360.364	42	8.580		
	Greenhouse-Geisser	360.364	39.419	9.142		
	Huynh-Feldt	360.364	42.000	8.580		
	Lower-bound	360.364	21.000	17.160		

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

Source	transparency	Type III Sum of Squares	df	Mean Square	F	Sig.
transparency	Level 2 vs. Level 1	1022.727	1	1022.727	79.760	.000
	Level 3 vs. Level 1	5825.636	1	5825.636	292.421	.000
Error(transparency)	Level 2 vs. Level 1	269.273	21	12.823		
	Level 3 vs. Level 1	418.364	21	19.922		

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	949867.657	1	949867.657	41603.987	.000
Error	479.455	21	22.831		

Estimated Marginal Means

transparency

Measure: MEASURE_1

transparency	Mean	Std. Error	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
1	200.091	1.173	197.651	202.531
2	206.909	1.233	204.346	209.472
3	216.364	.999	214.286	218.441

Average change rate of skin transparency

Descriptives

Descriptive Statistics

	N	Mean	Std. Deviation
After_1week_use	22	3.4209	1.80634
After_4weeks_use	22	8.1718	2.34830
Valid N (listwise)	22		

Appendix III. Image data
III-I. Images of skin tone and tone evenness

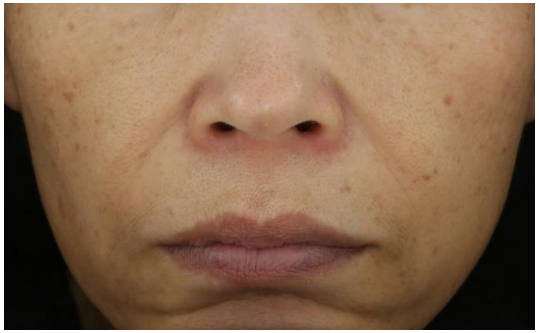
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02			
03			

Sub. No.	Before	After 1 week use	After 4 weeks use
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05			
06			

Sub. No.	Before	After 1 week use	After 4 weeks use
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08			
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11			
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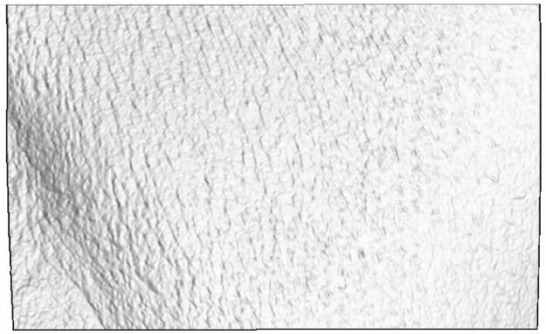
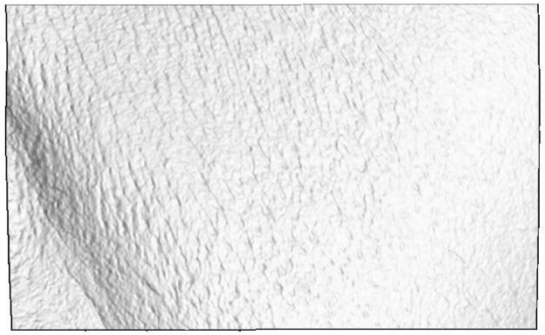
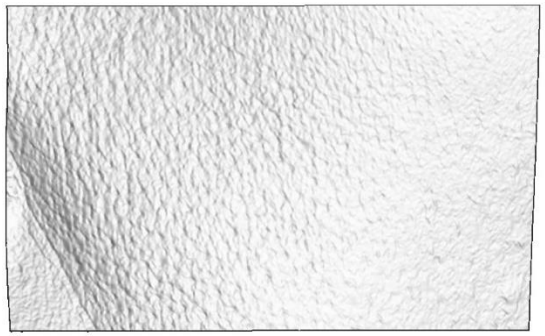
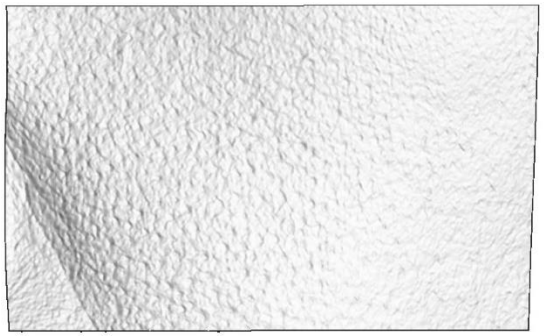
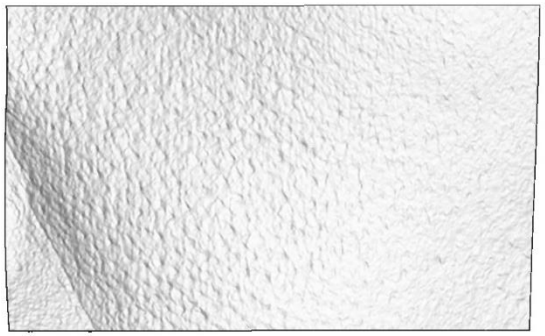
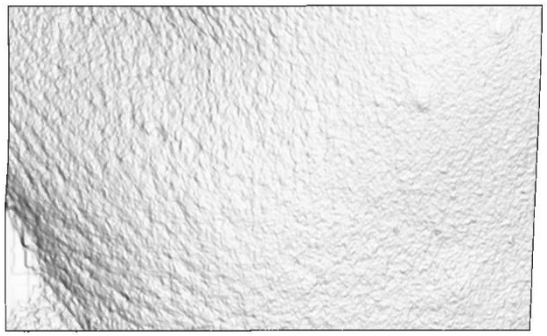
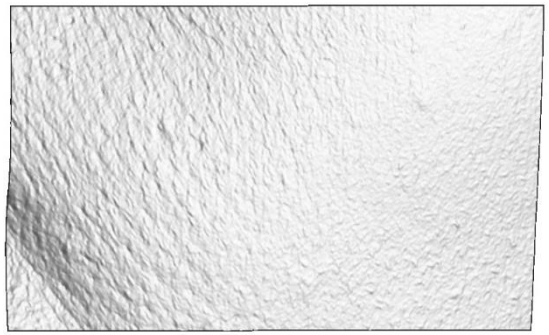
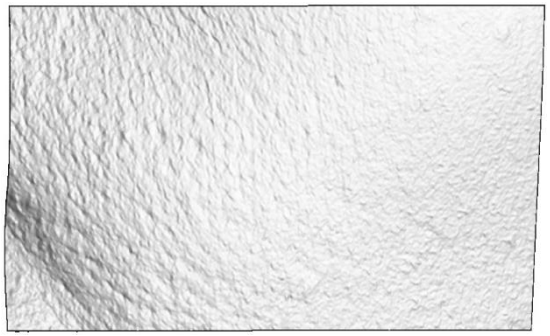
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14			
15			

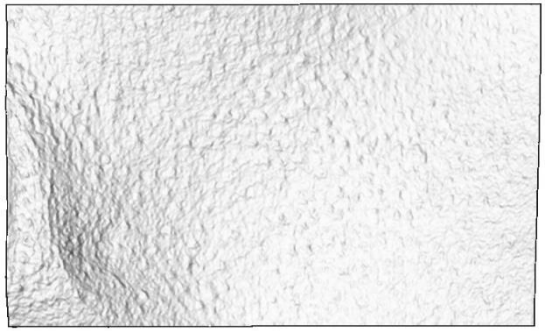
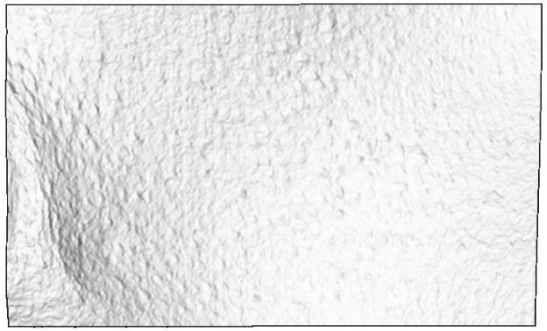
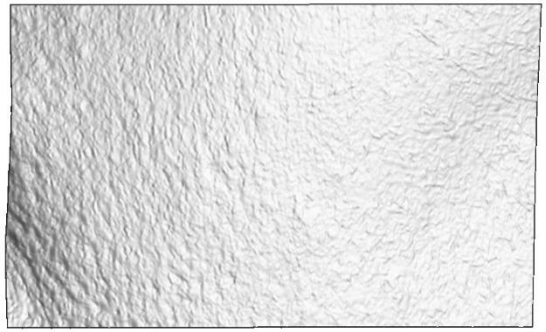
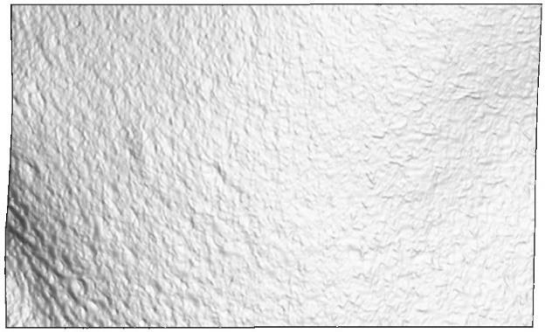
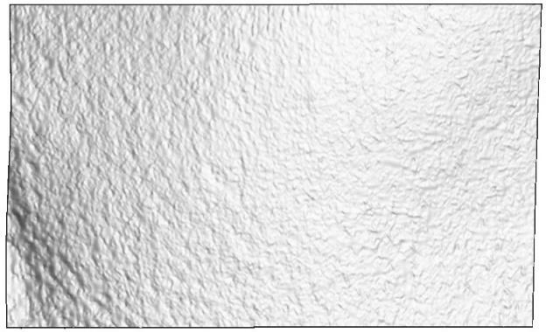
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18			

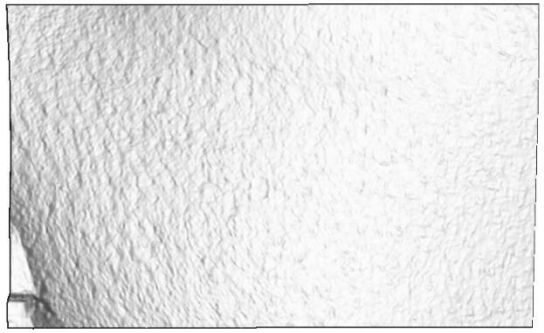
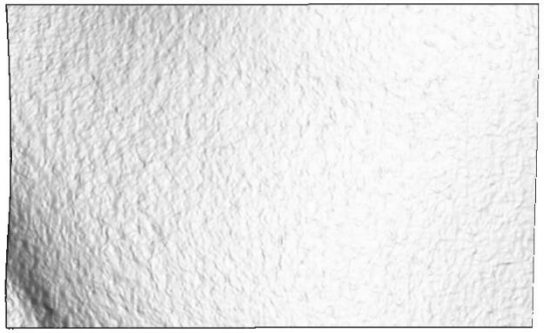
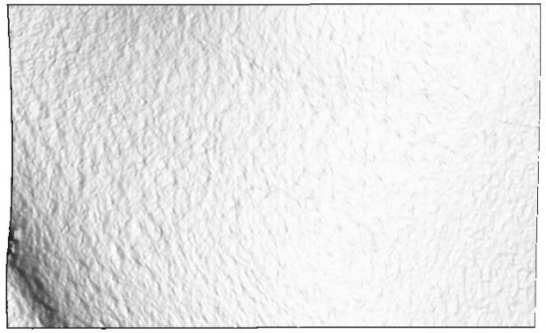
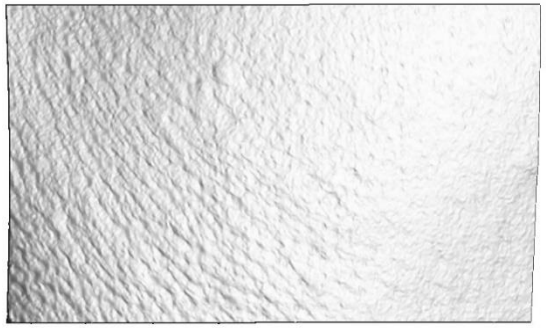
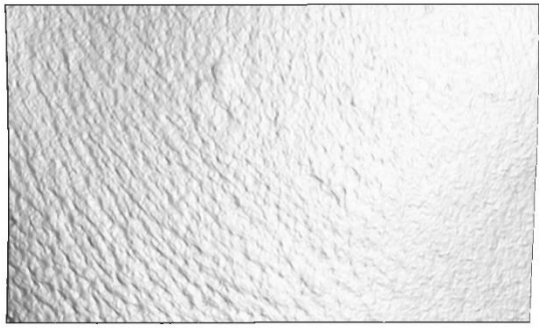
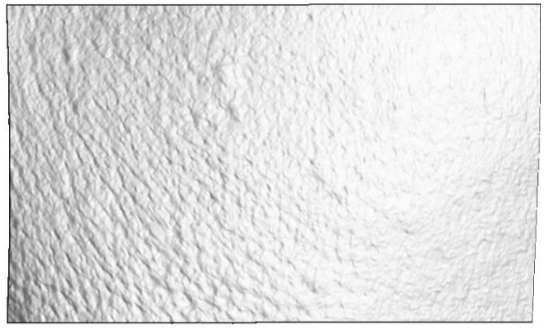
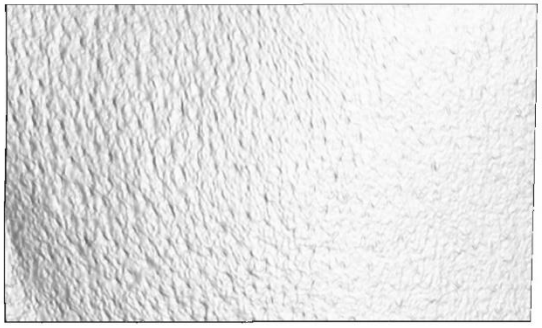
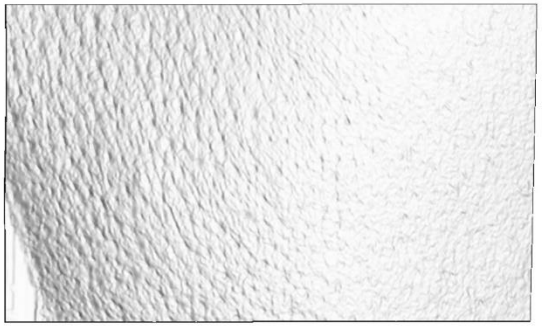
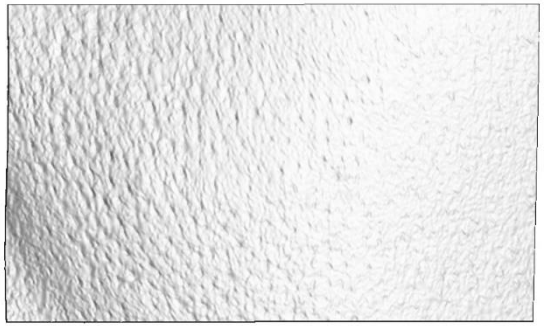
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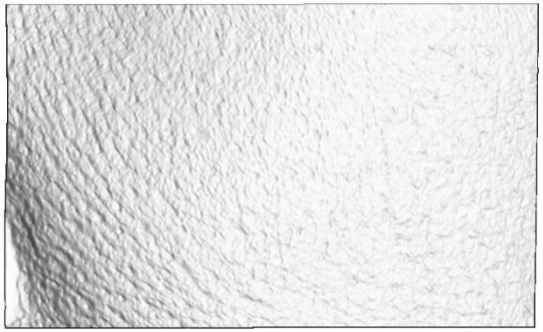
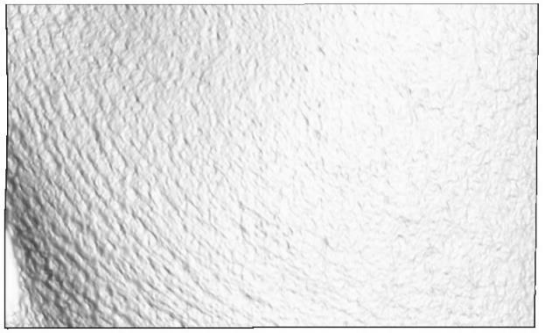
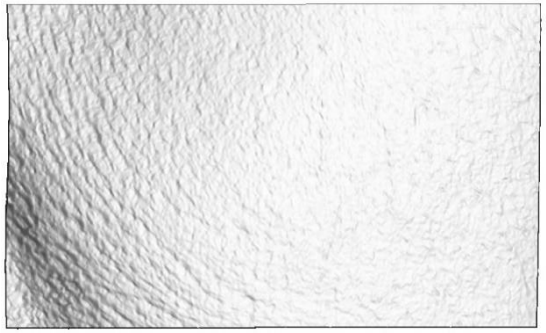
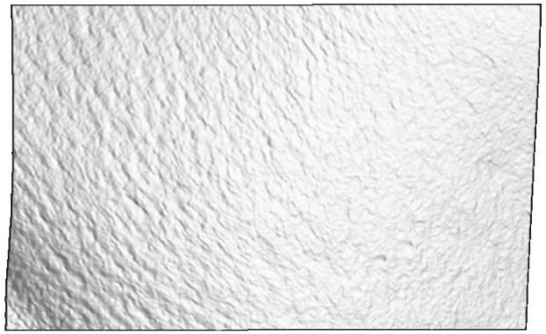
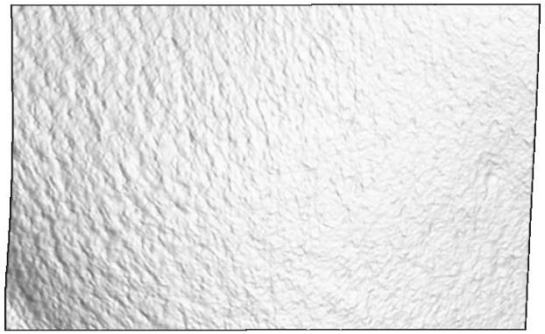
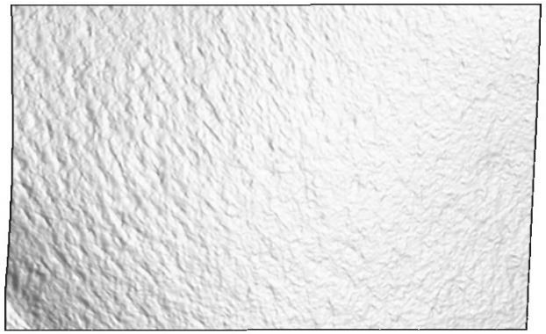
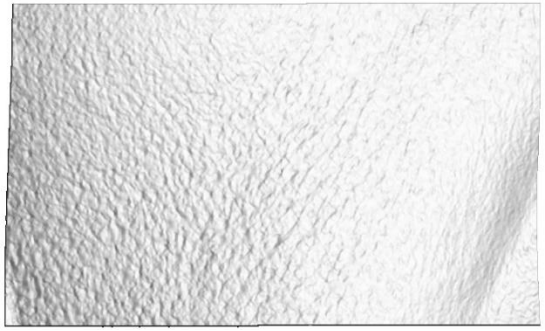
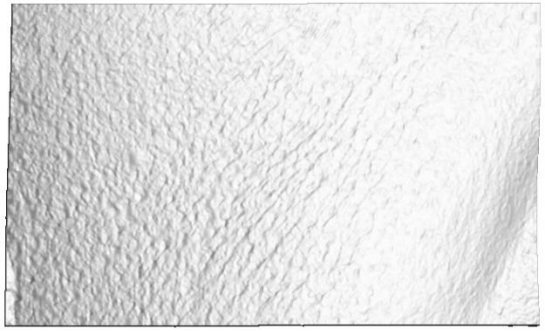
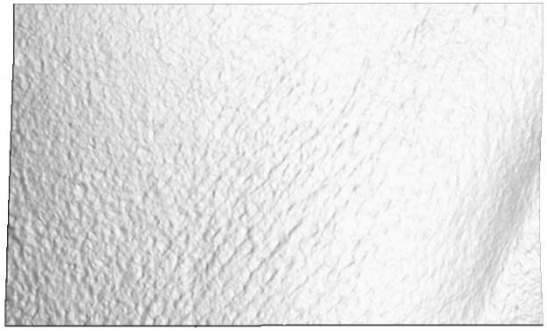
Sub. No.	Before	After 1 week use	After 4 weeks use
22			

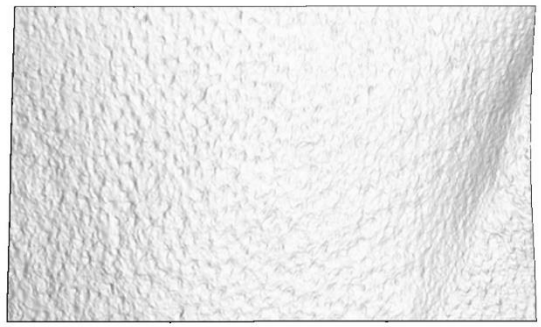
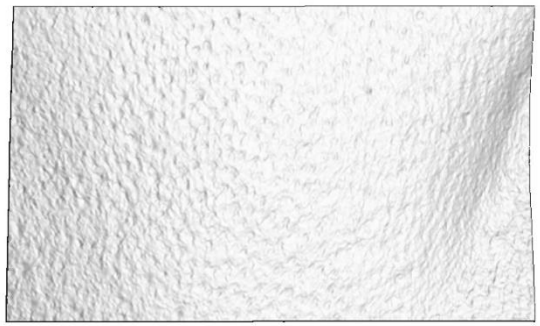
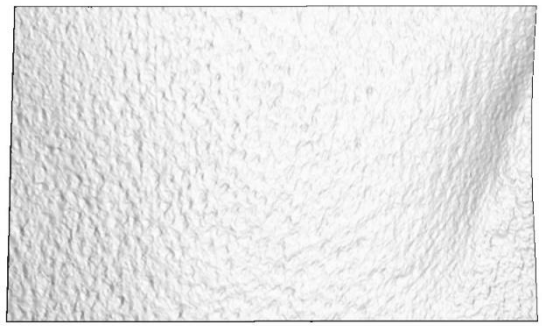
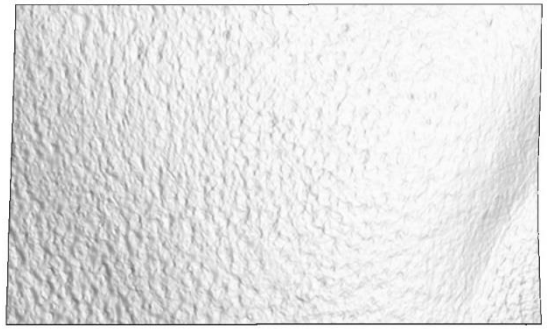
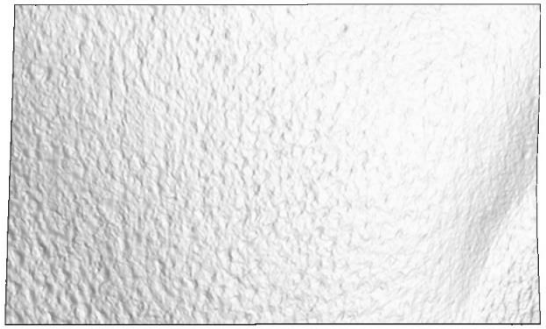
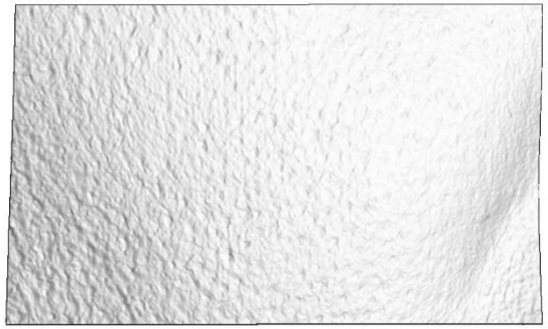
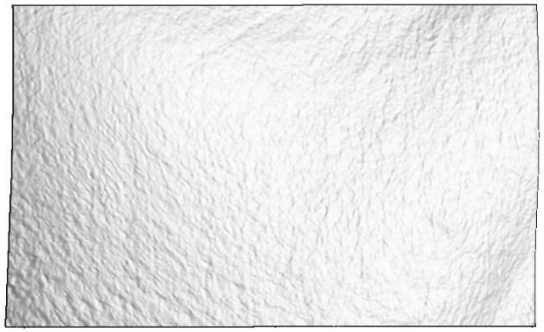
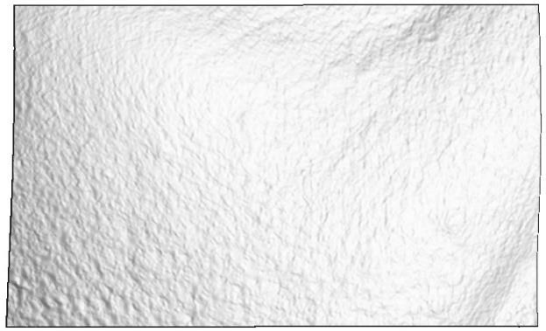
III-II. Images of skin texture(roughness)

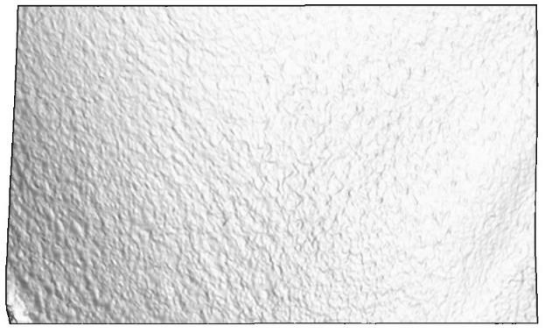
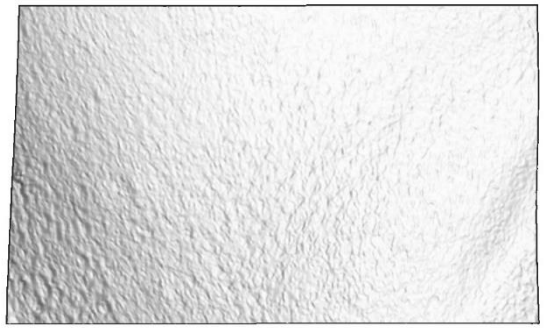
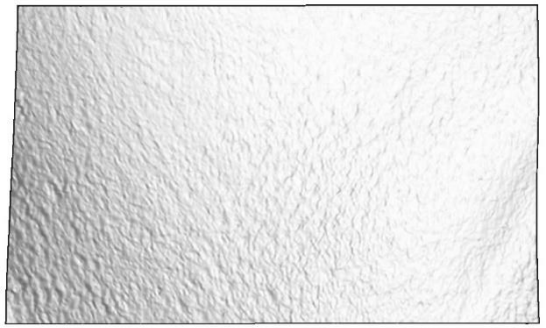
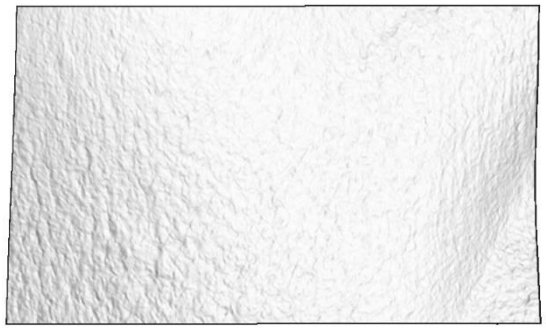
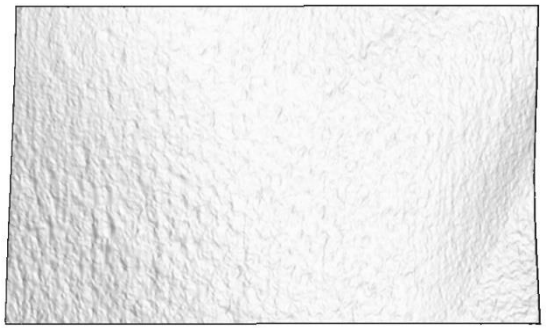
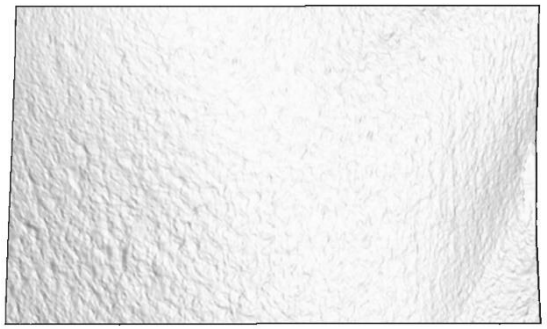
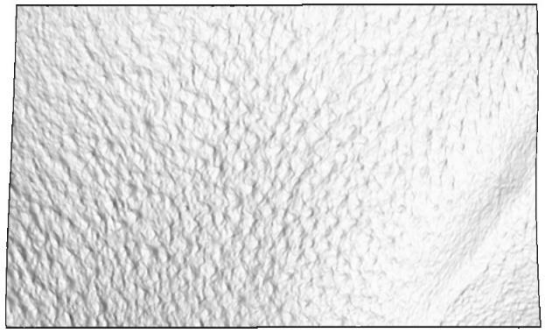
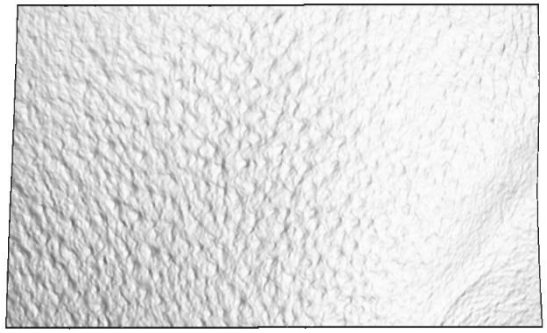
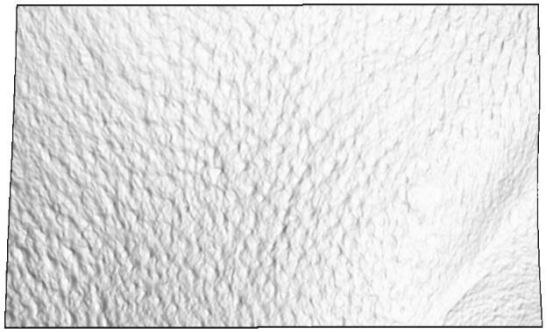
Sub. No.	Before	After 1 week use	After 4 weeks use
01			
02			
03			

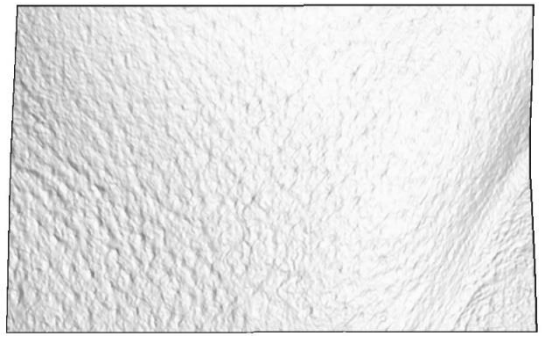
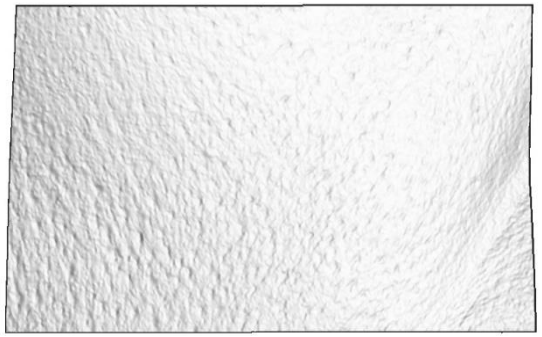
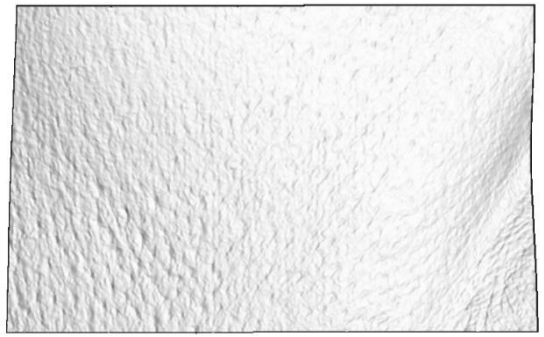
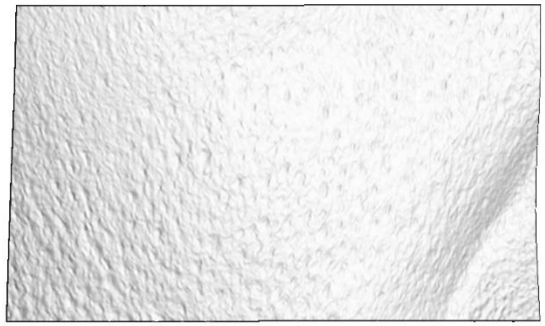
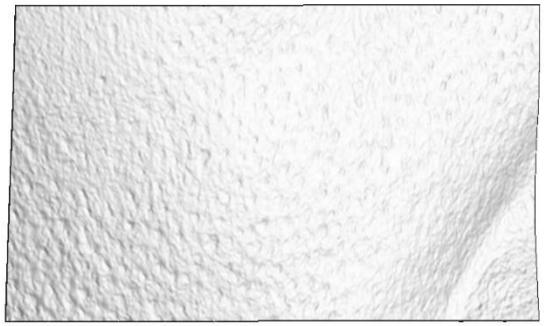
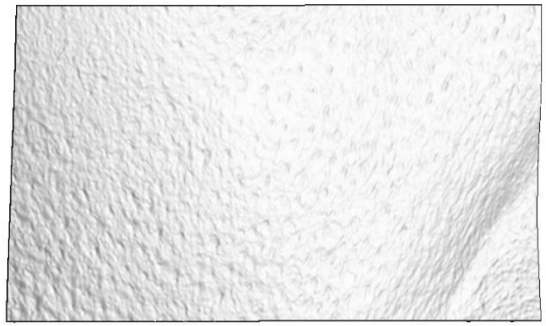
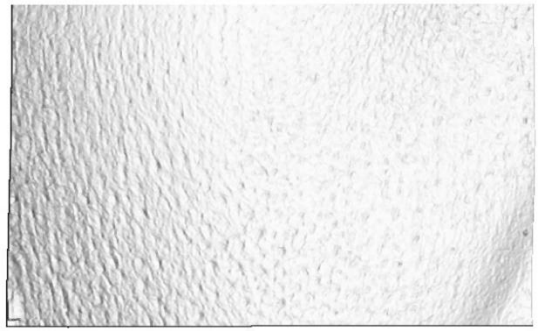
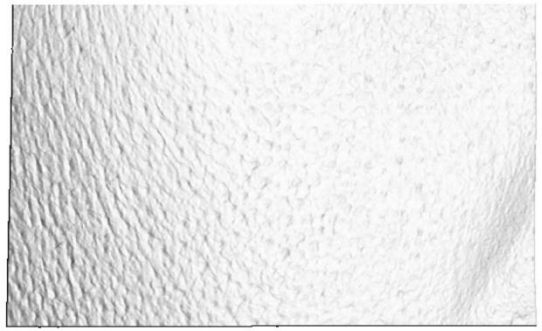
Sub. No.	Before	After 1 week use	After 4 weeks use
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05			
06			

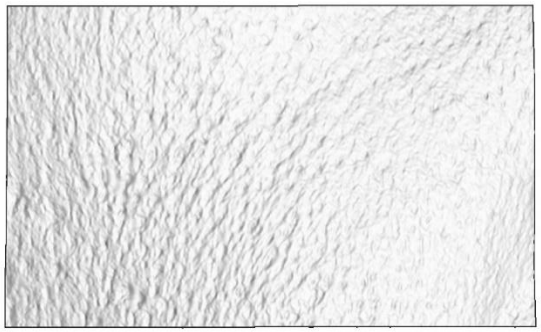
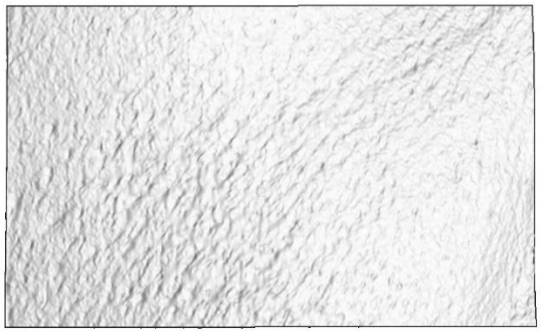
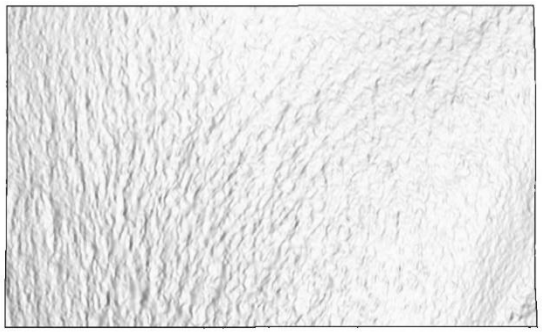
Sub. No.	Before	After 1 week use	After 4 weeks use
07			
08			
09			

Sub. No.	Before	After 1 week use	After 4 weeks use
10			
11			
12			

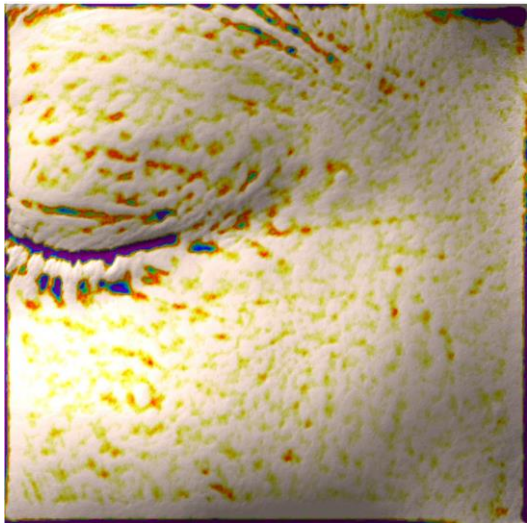
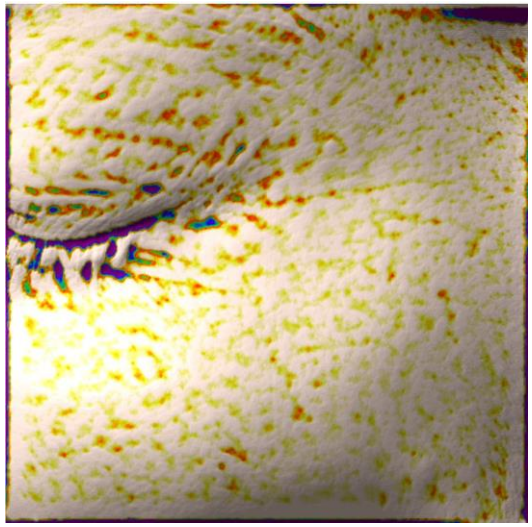
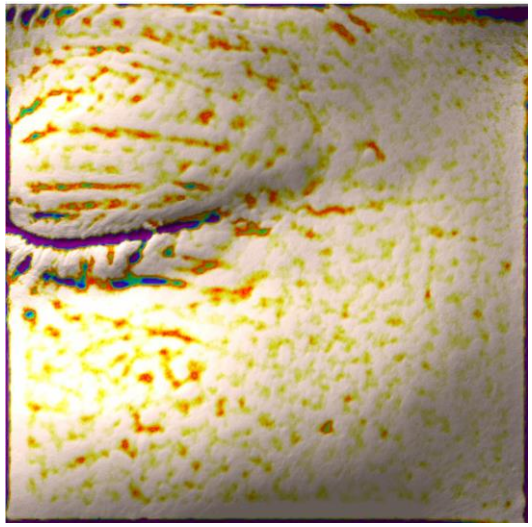
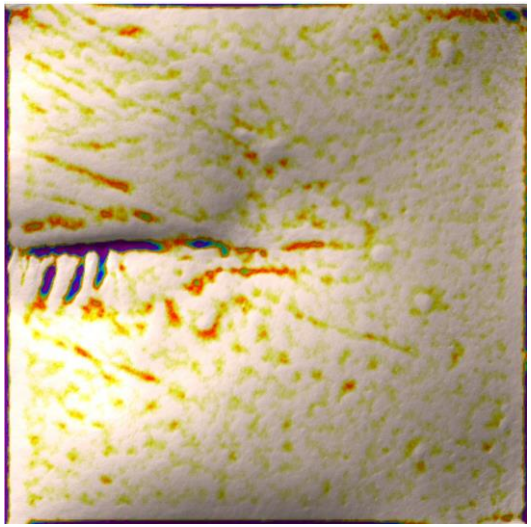
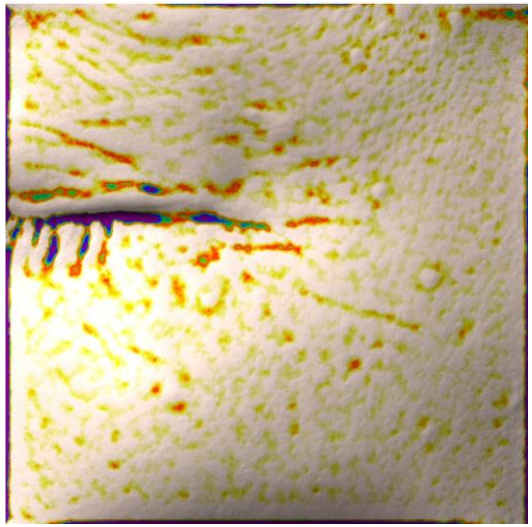
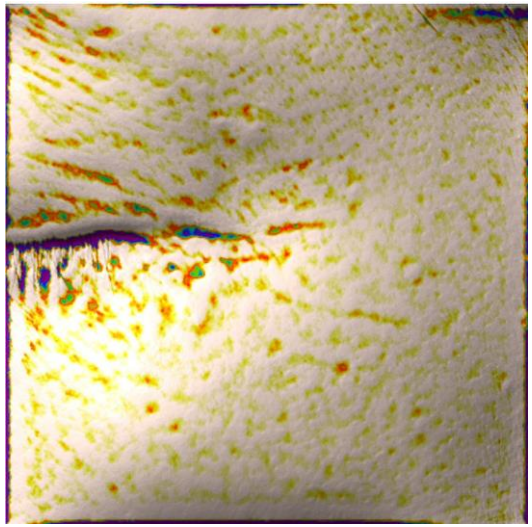
Sub. No.	Before	After 1 week use	After 4 weeks use
13			
14			
15			

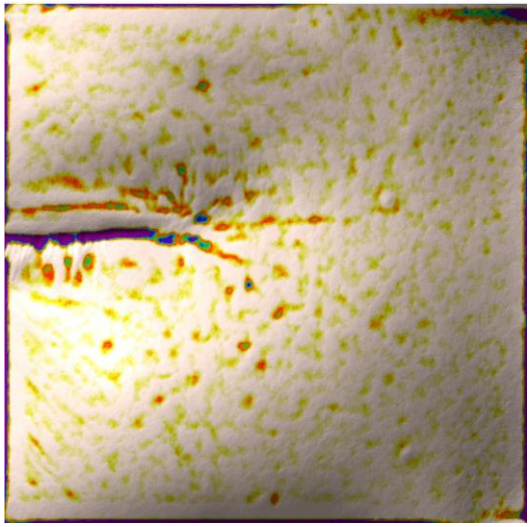
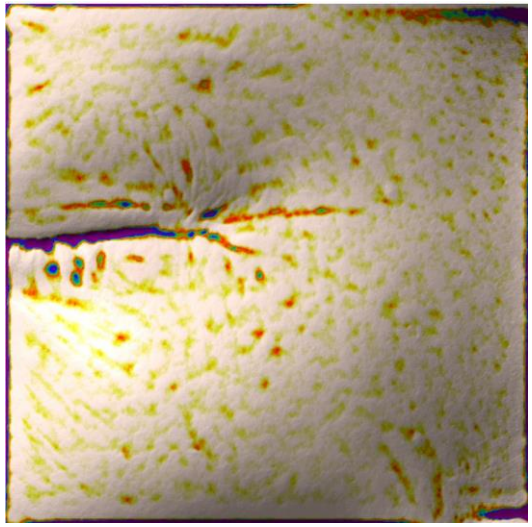
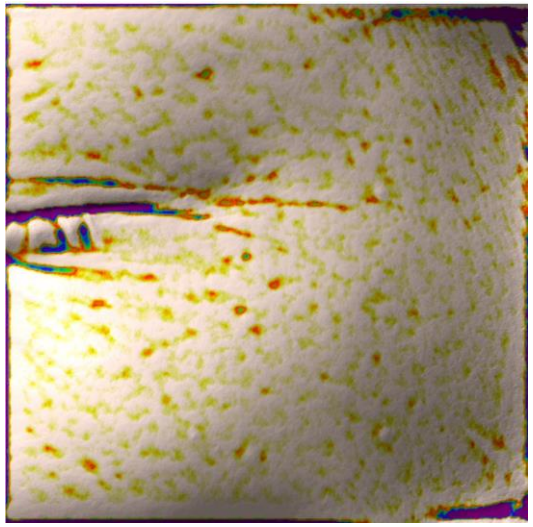
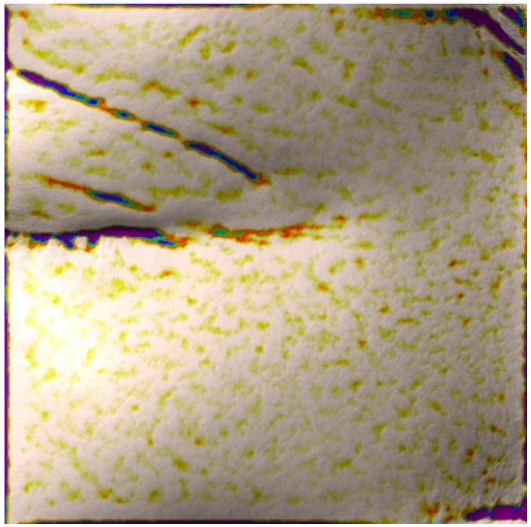
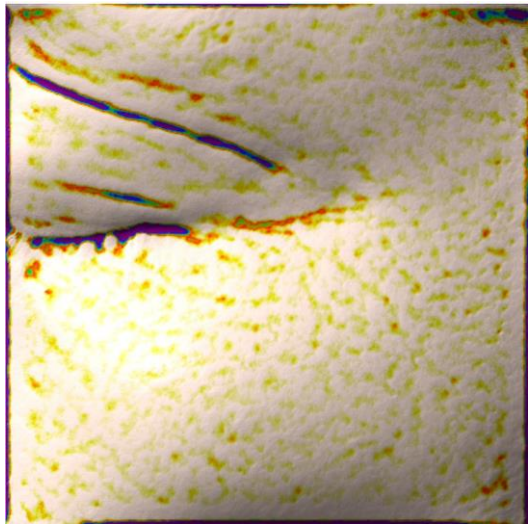
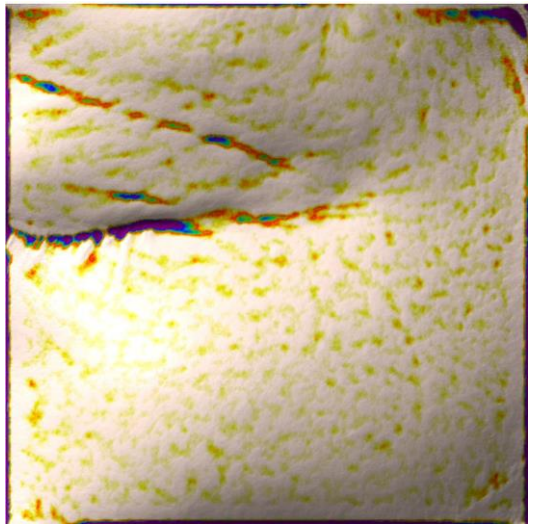
Sub. No.	Before	After 1 week use	After 4 weeks use
16			
17			
18			

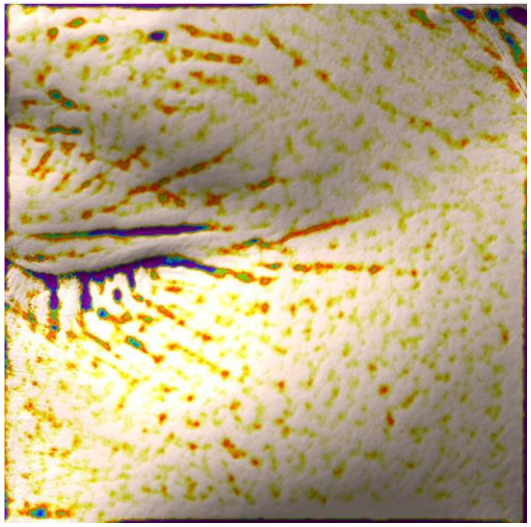
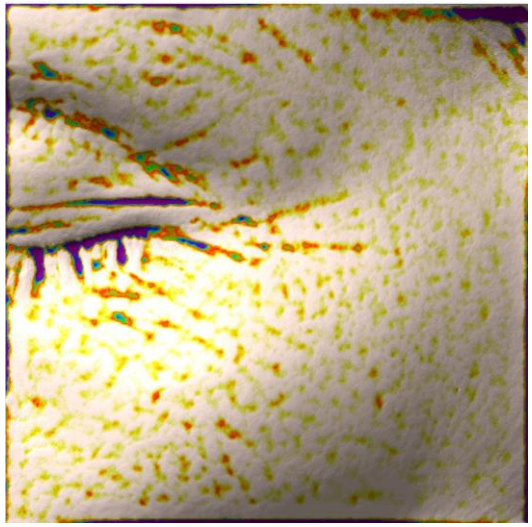
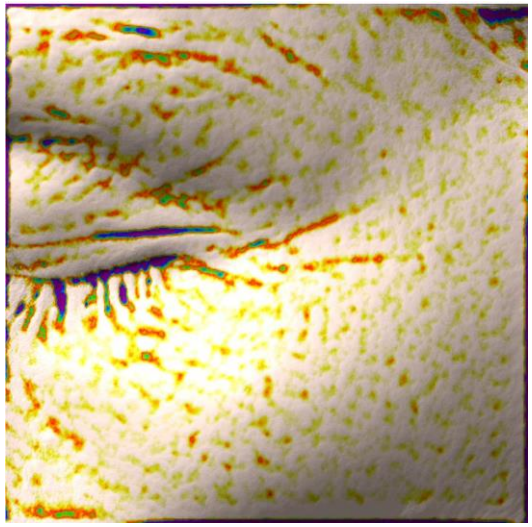
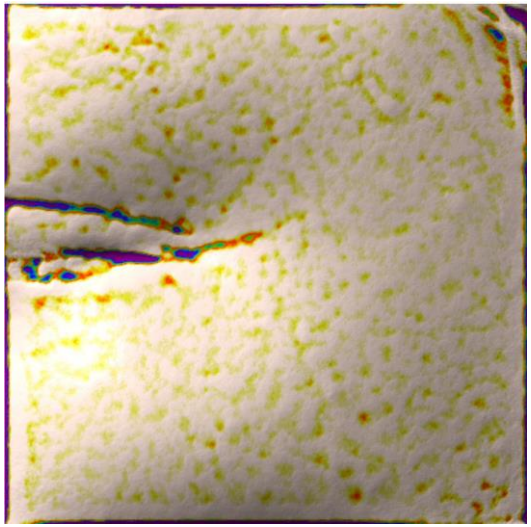
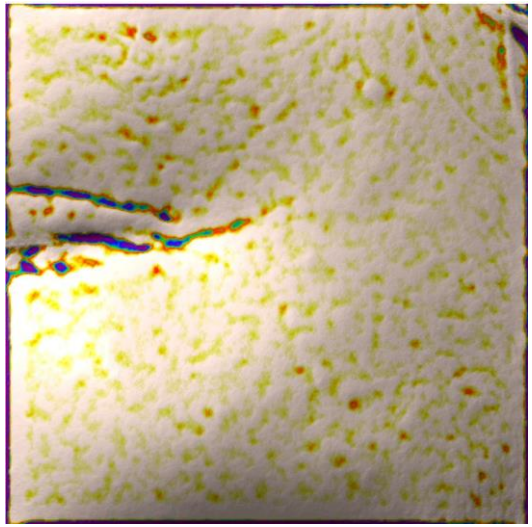
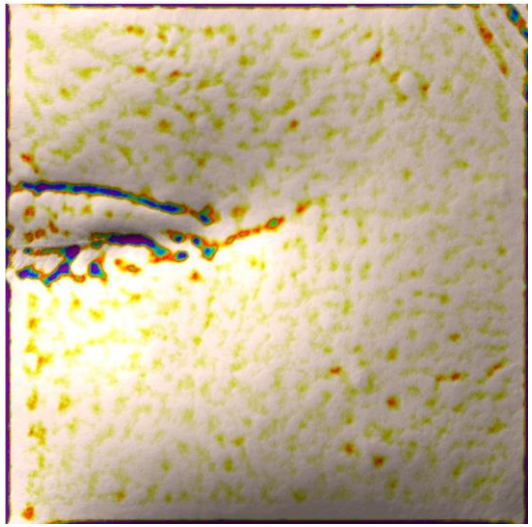
Sub. No.	Before	After 1 week use	After 4 weeks use
19			
20			
21			

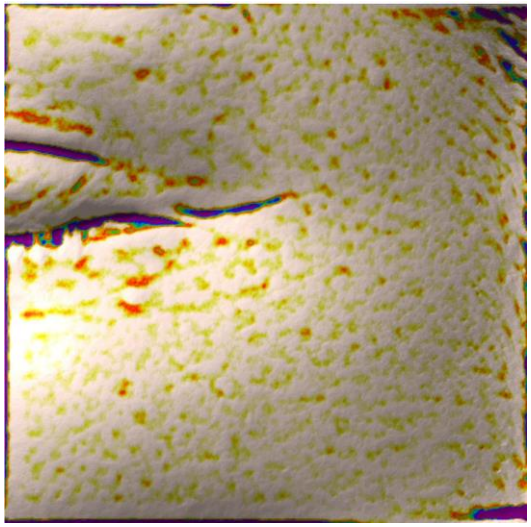
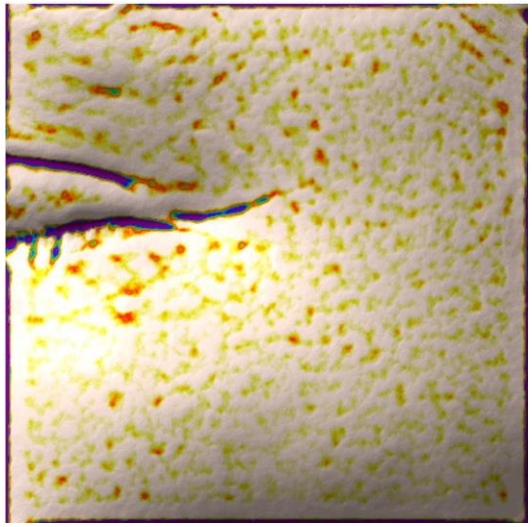
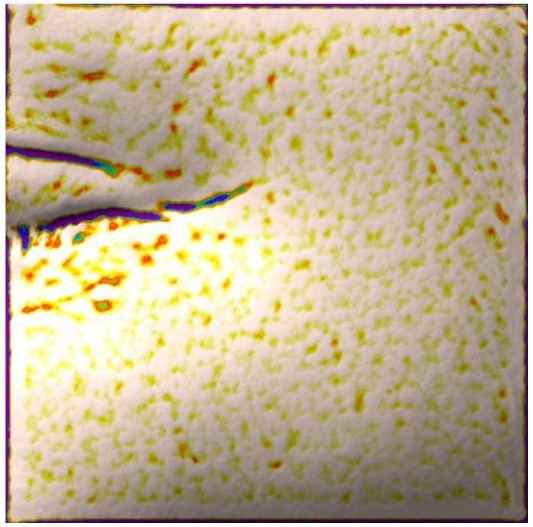
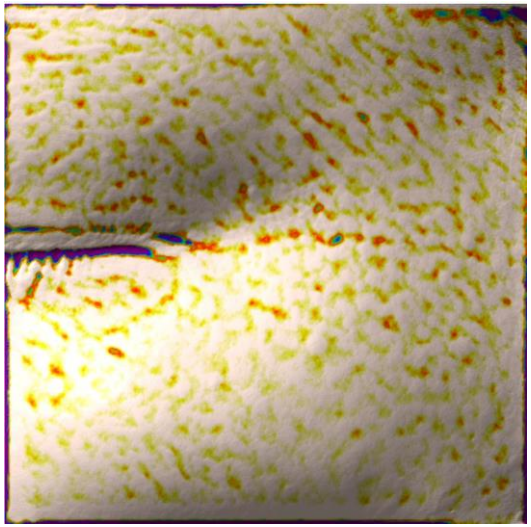
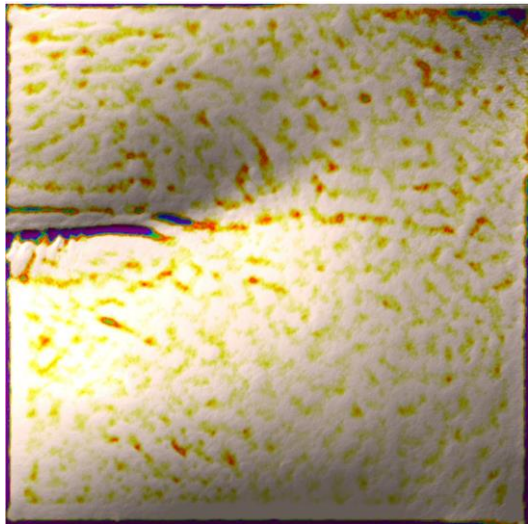
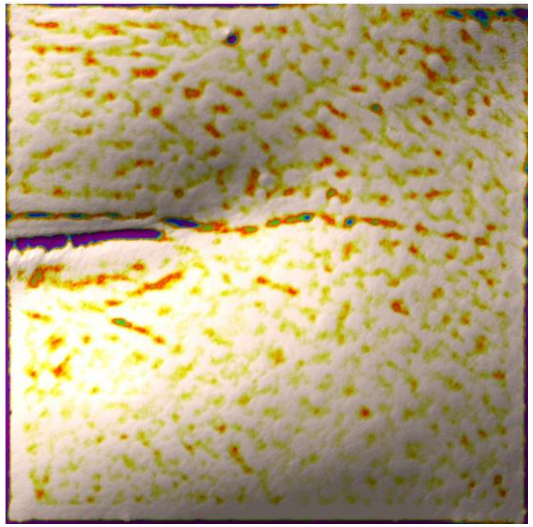
Sub. No.	Before	After 1 week use	After 4 weeks use
22			

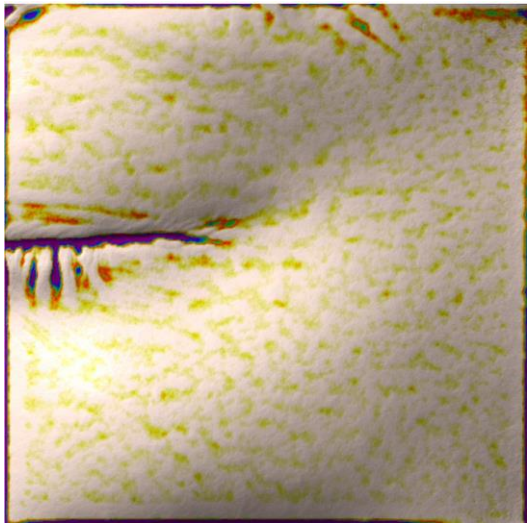
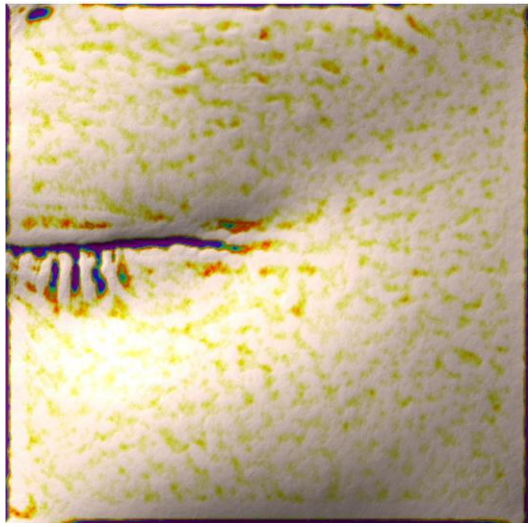
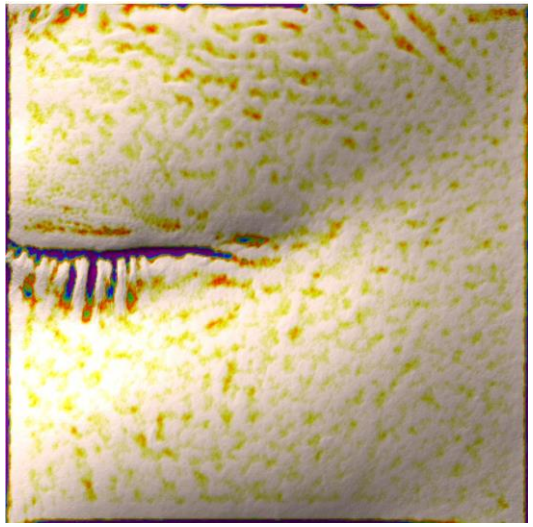
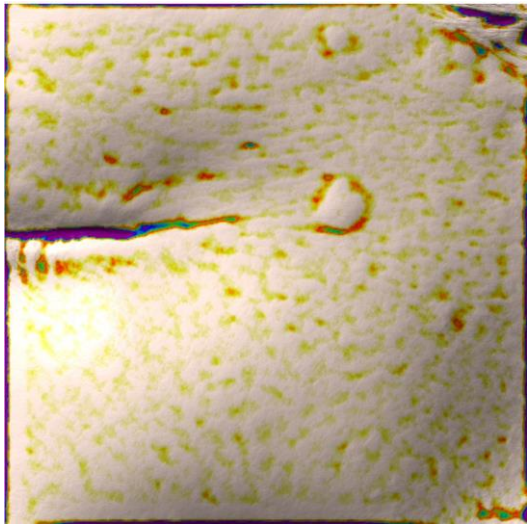
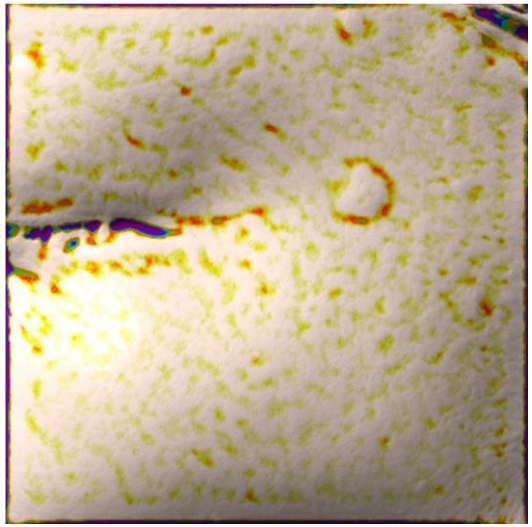
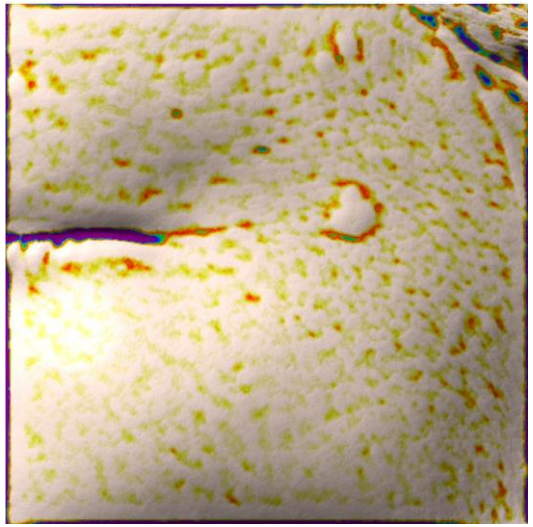
III-III. Images of crow's feet

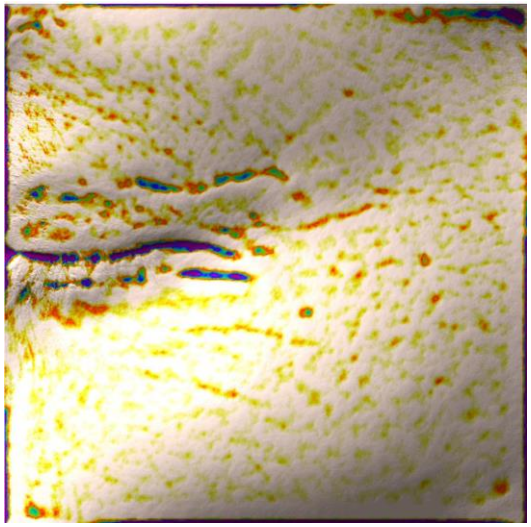
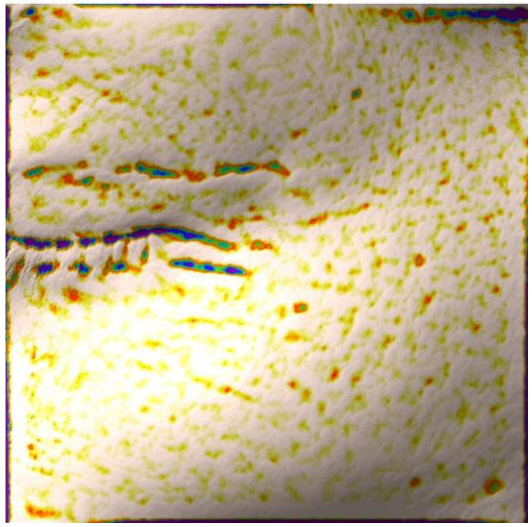
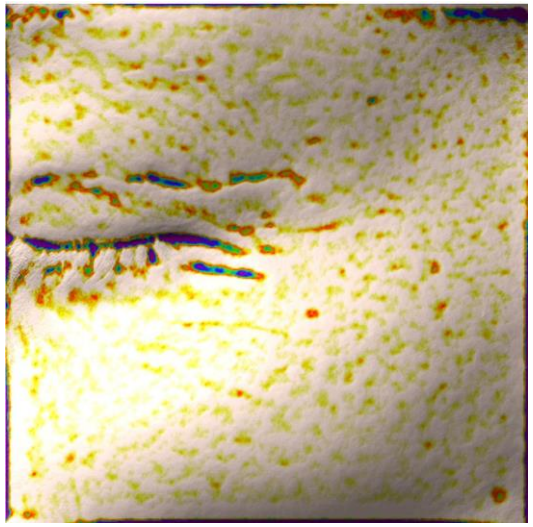
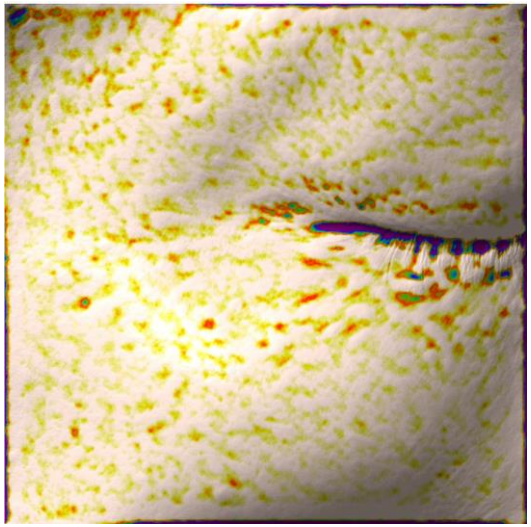
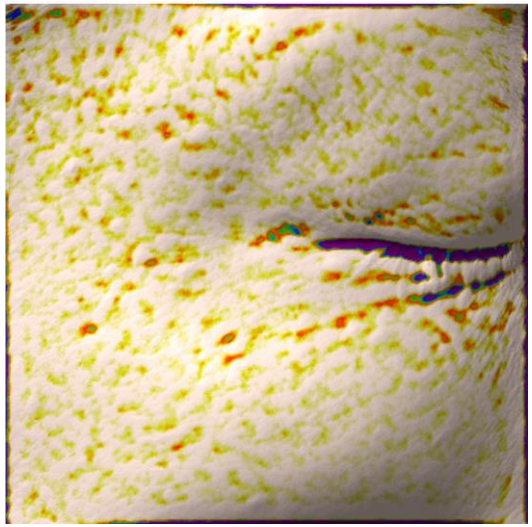
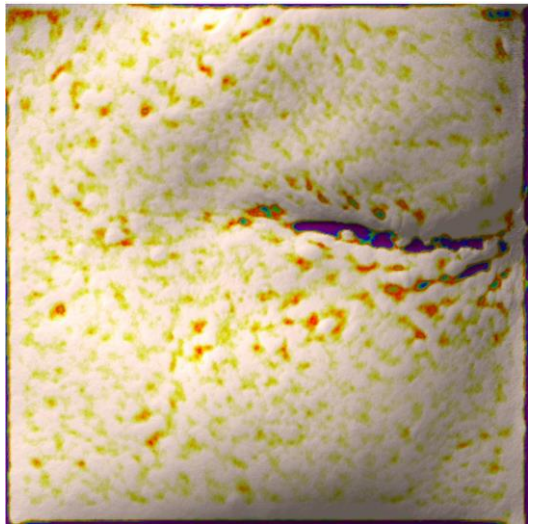
Sub. No.	Before	After 1 week use	After 4 weeks use
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02			

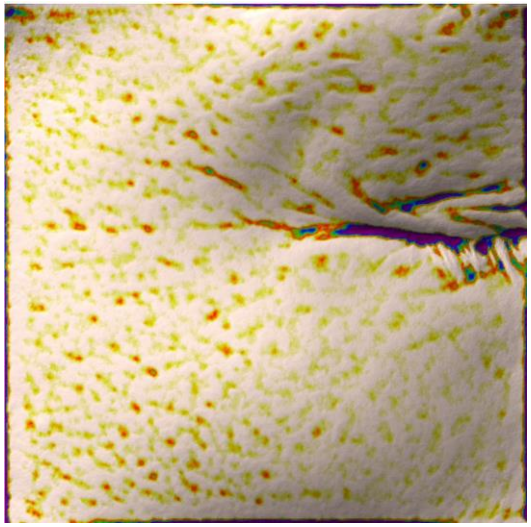
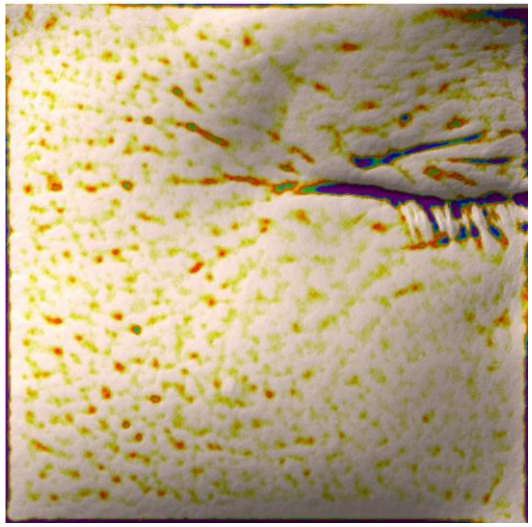
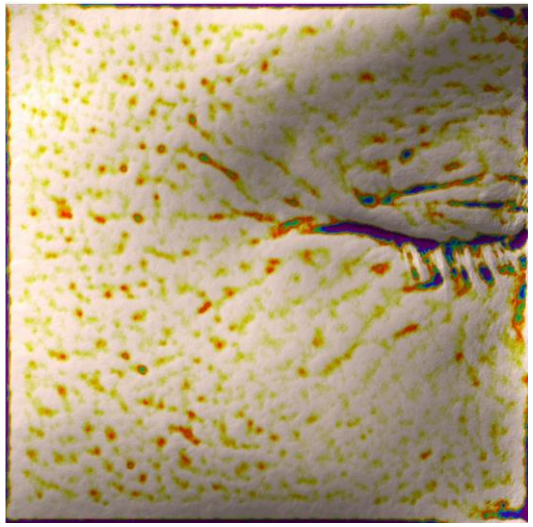
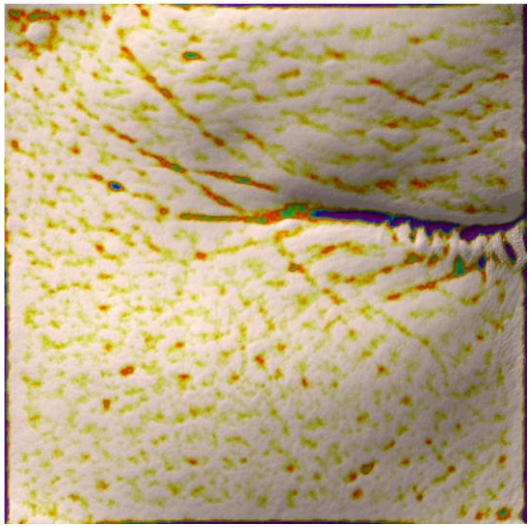
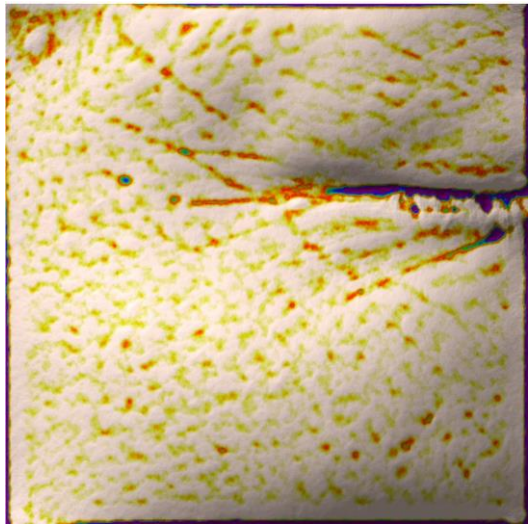
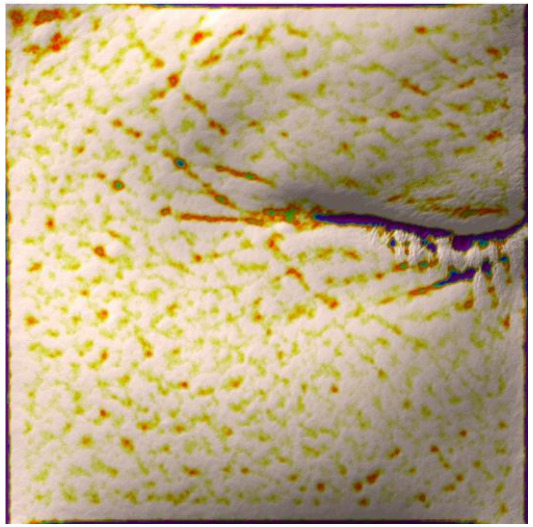
Sub. No.	Before	After 1 week use	After 4 weeks use
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04			

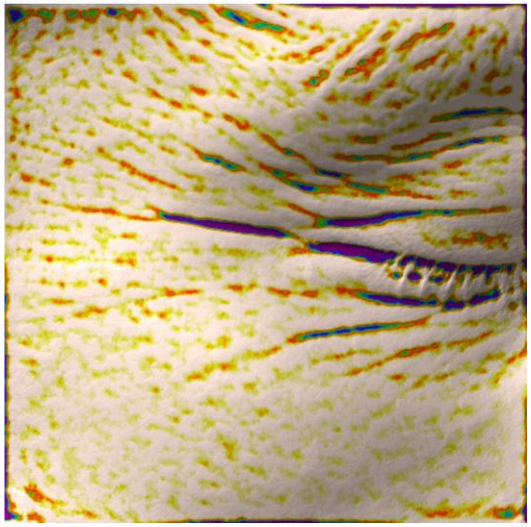
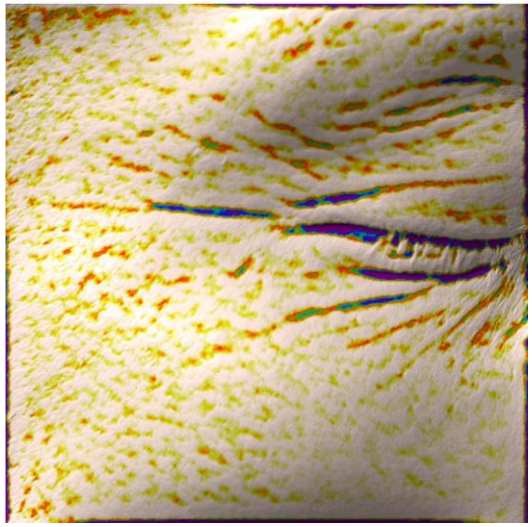
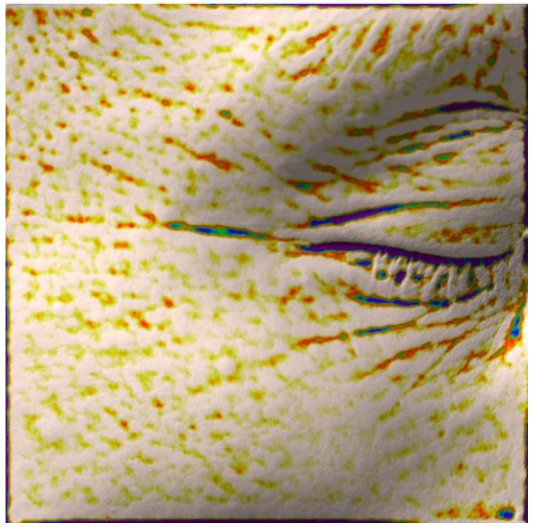
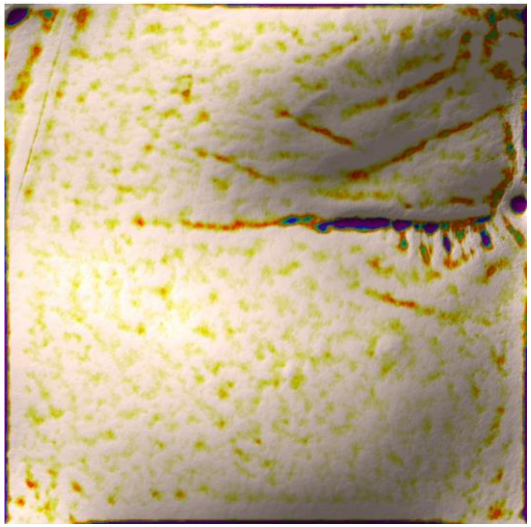
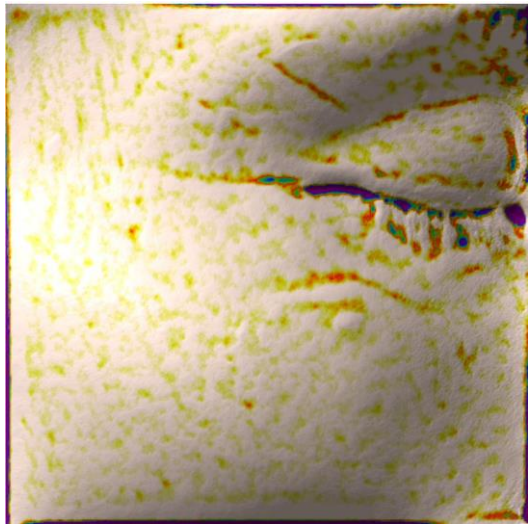
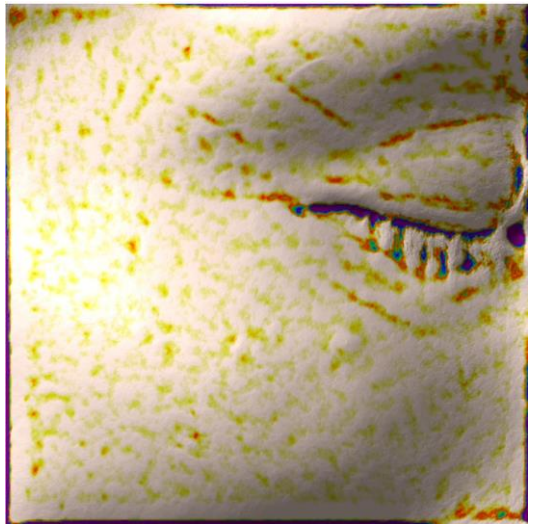
Sub. No.	Before	After 1 week use	After 4 weeks use
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06			

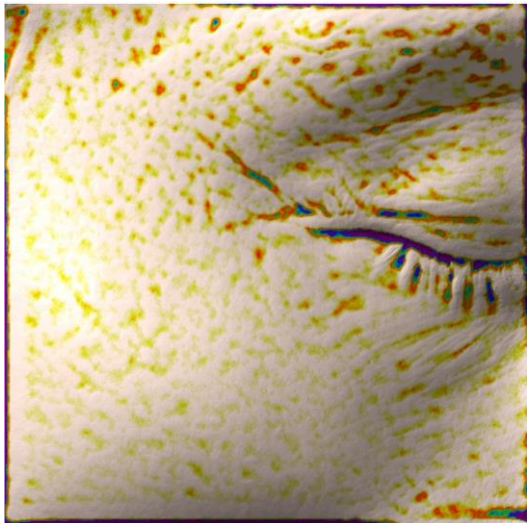
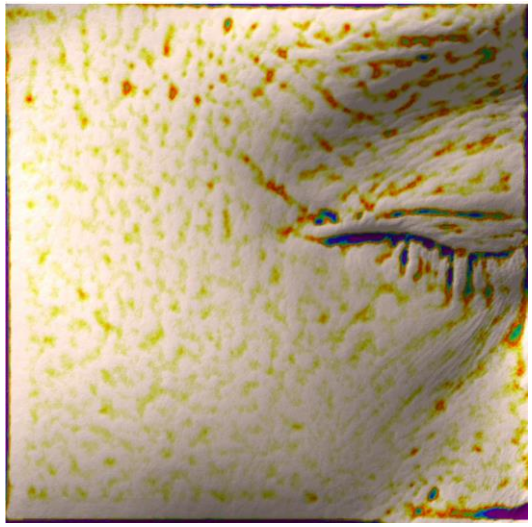
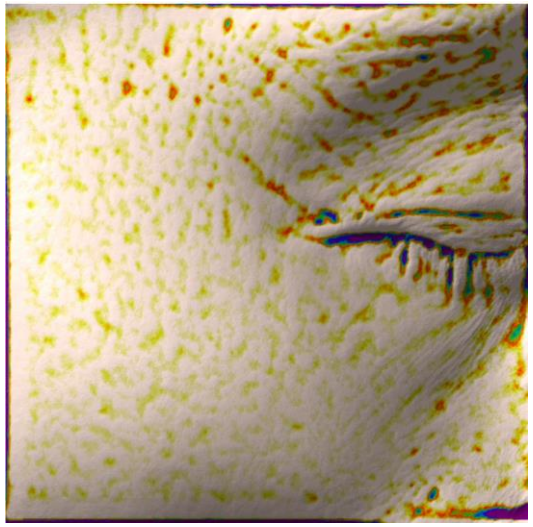
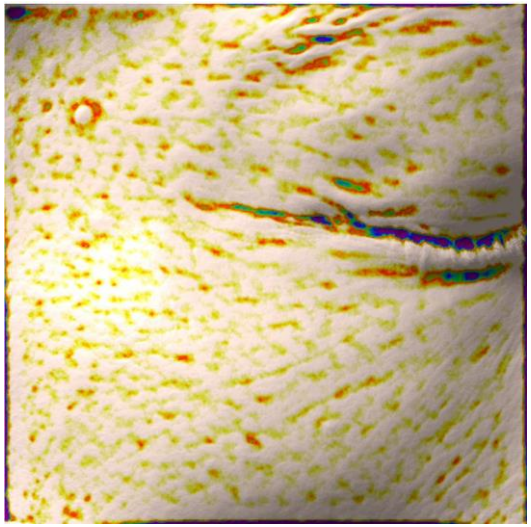
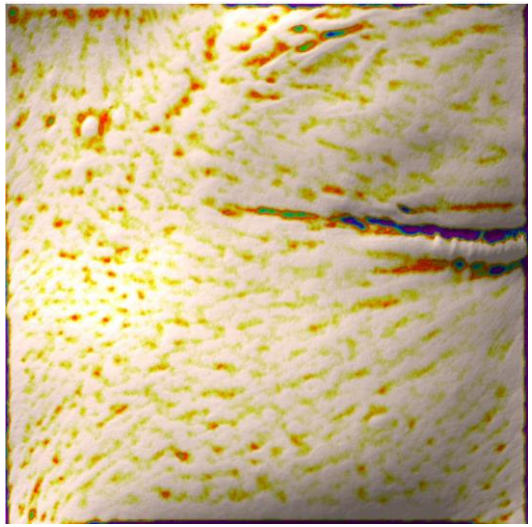
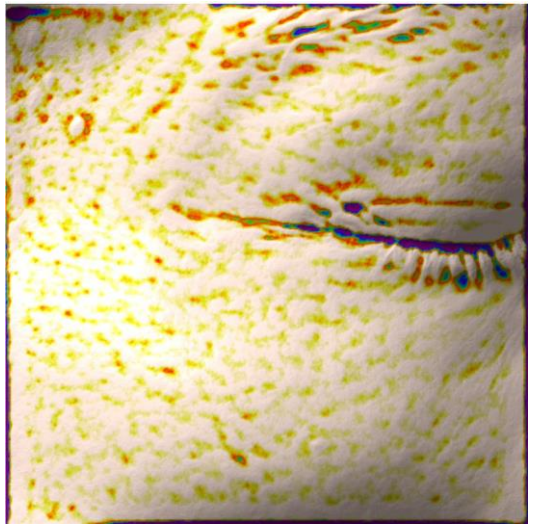
Sub. No.	Before	After 1 week use	After 4 weeks use
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08			

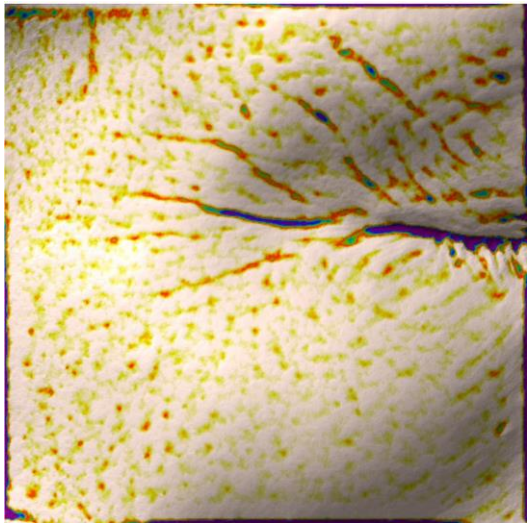
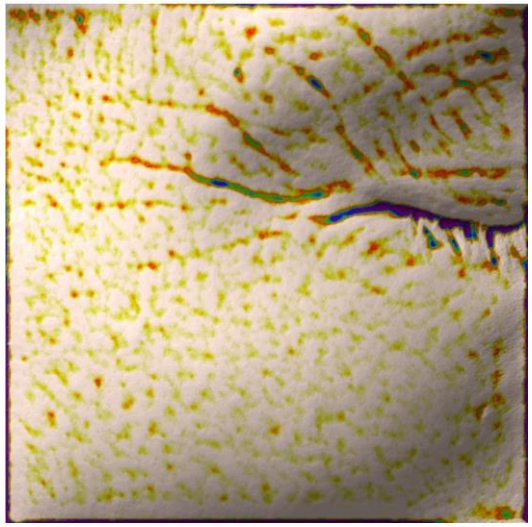
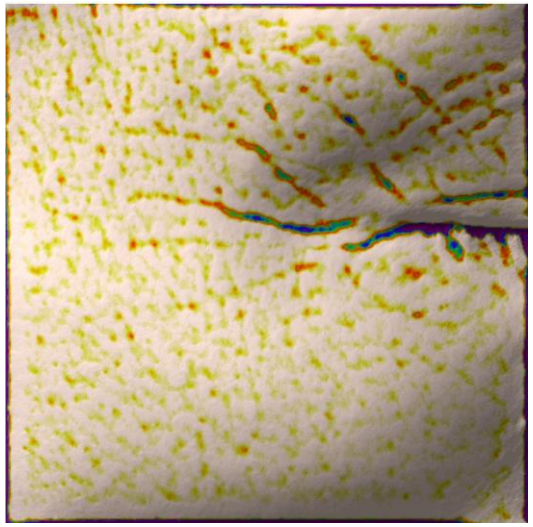
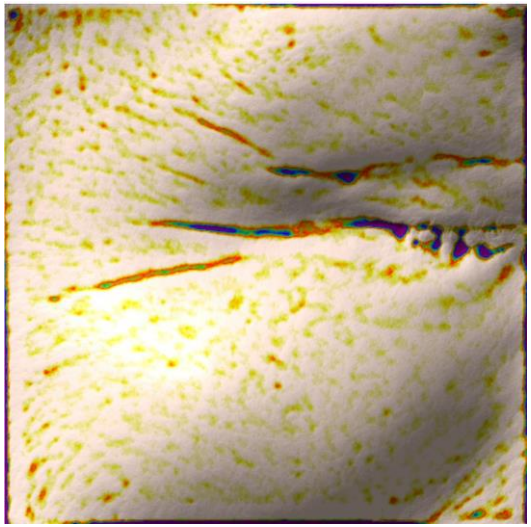
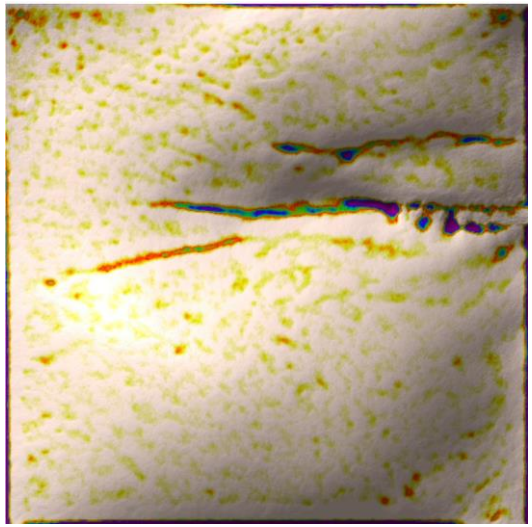
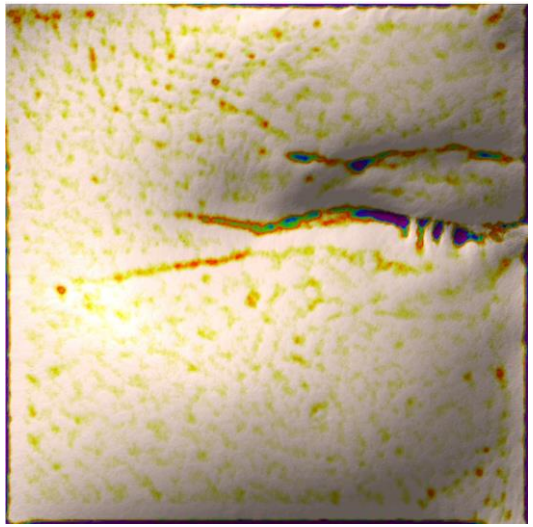
Sub. No.	Before	After 1 week use	After 4 weeks use
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10			

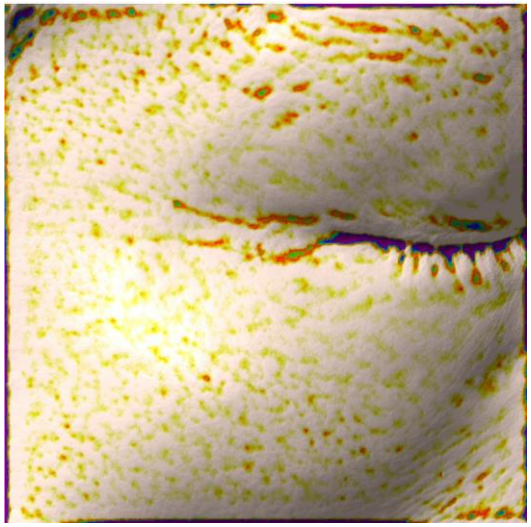
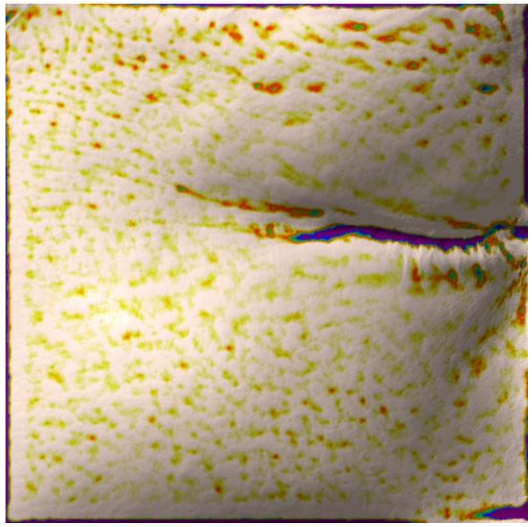
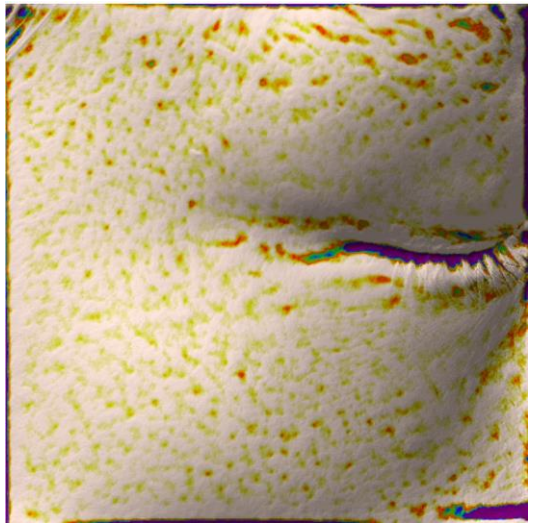
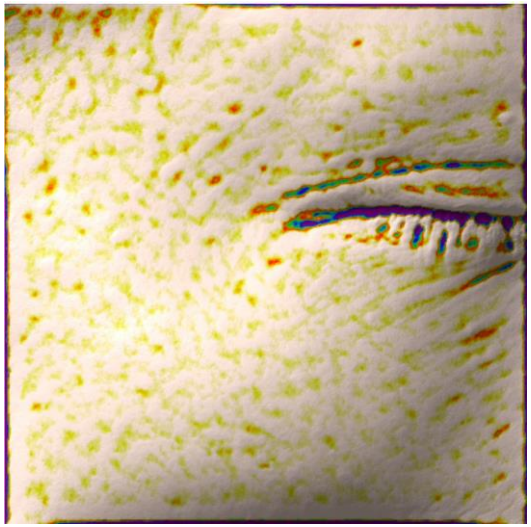
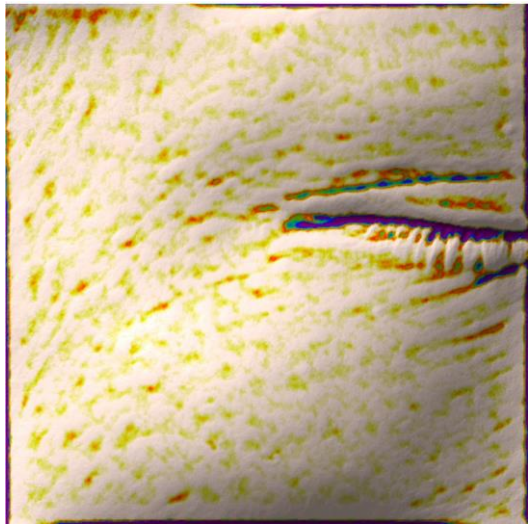
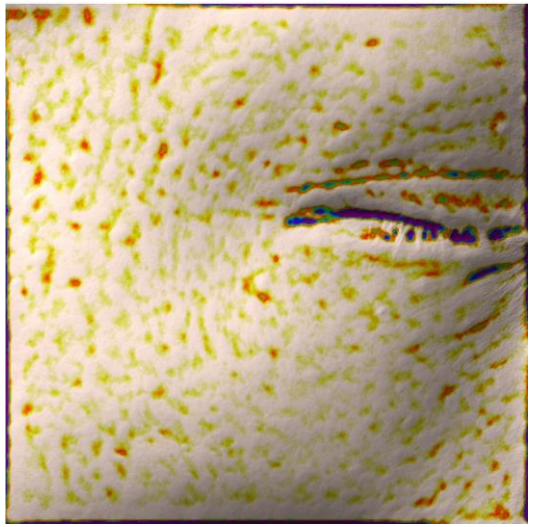
Sub. No.	Before	After 1 week use	After 4 weeks use
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12			

Sub. No.	Before	After 1 week use	After 4 weeks use
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14			

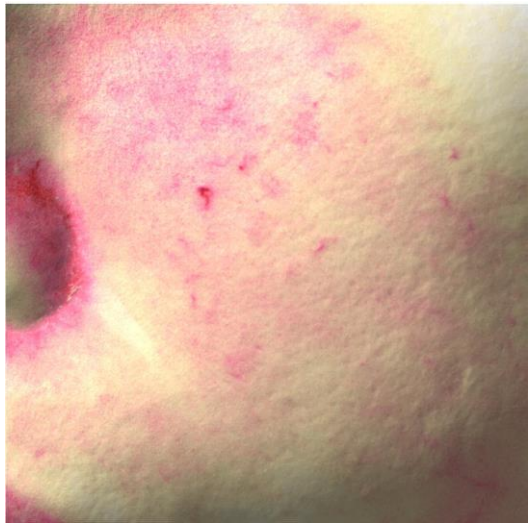
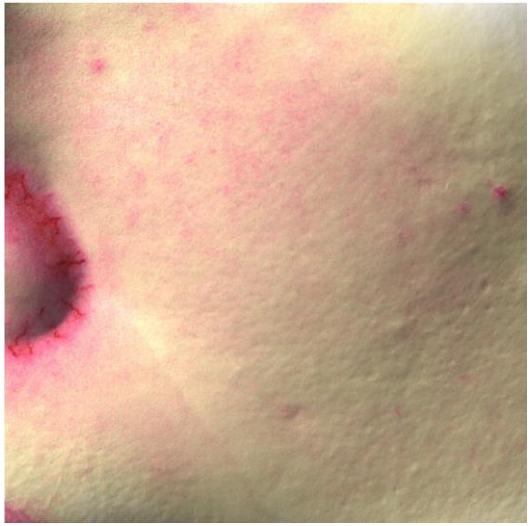
Sub. No.	Before	After 1 week use	After 4 weeks use
15			
16			

Sub. No.	Before	After 1 week use	After 4 weeks use
17			
18			

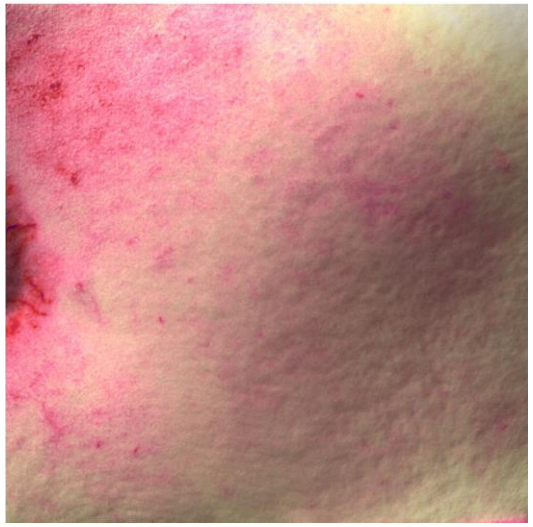
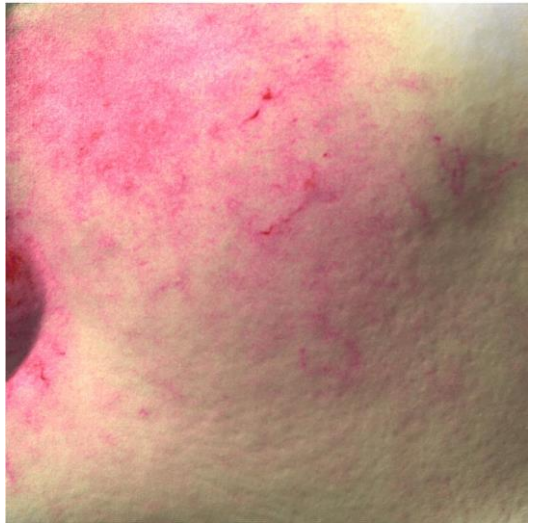
Sub. No.	Before	After 1 week use	After 4 weeks use
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20			

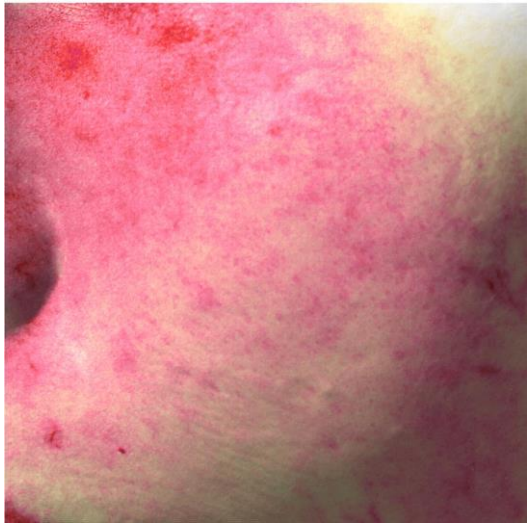
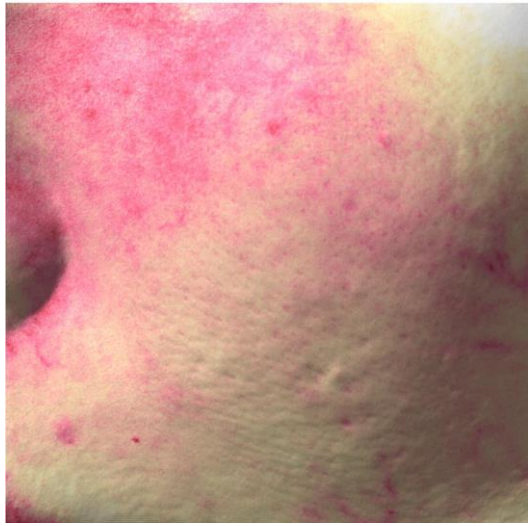
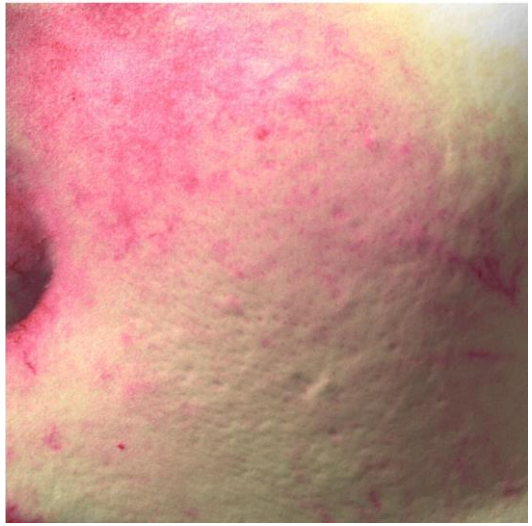
Sub. No.	Before	After 1 week use	After 4 weeks use
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22			

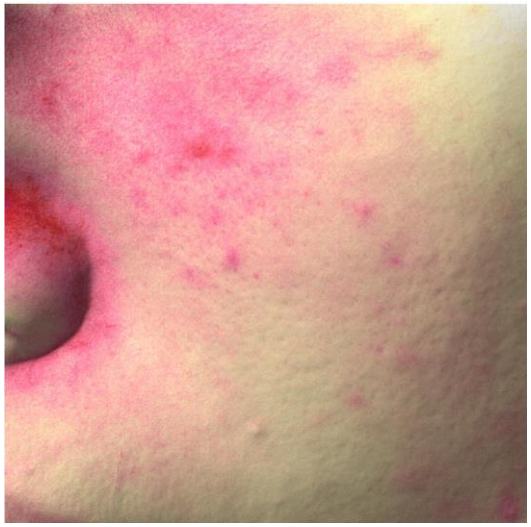
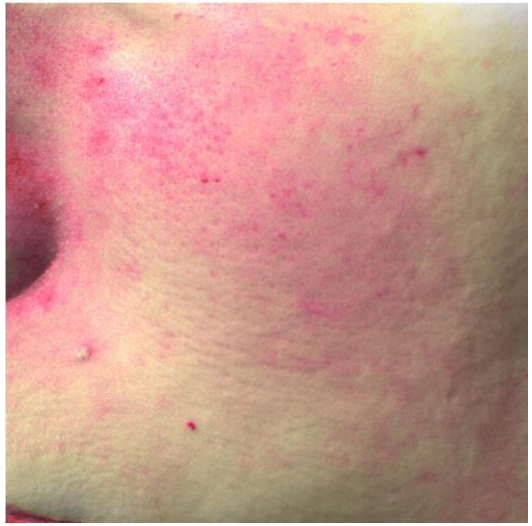
III-IV. Images of skin redness (hemoglobin concentration and evenness)

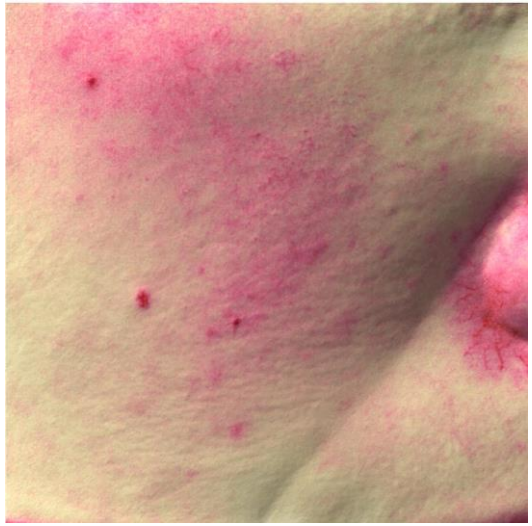
Sub. No.	Before	After 1 week use	After 4 weeks use
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02			

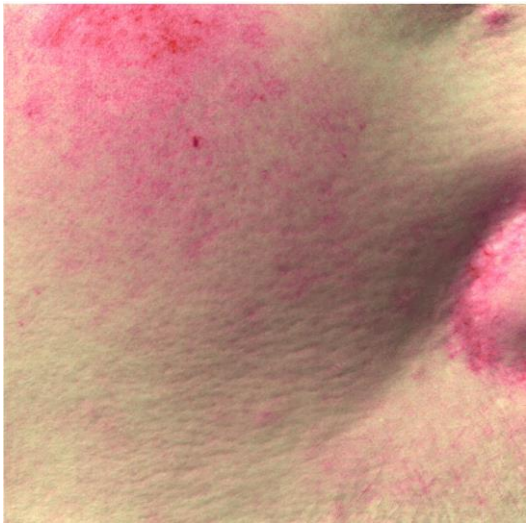
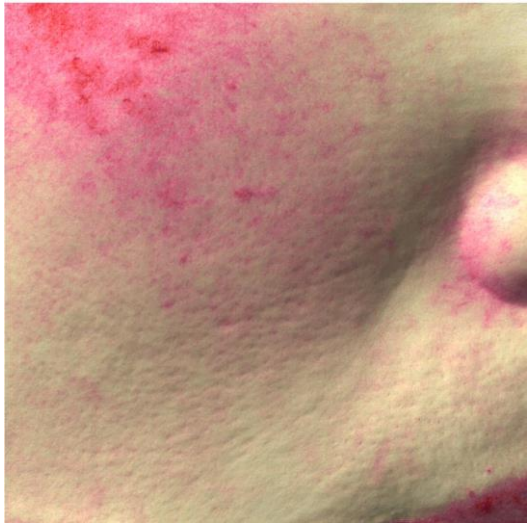
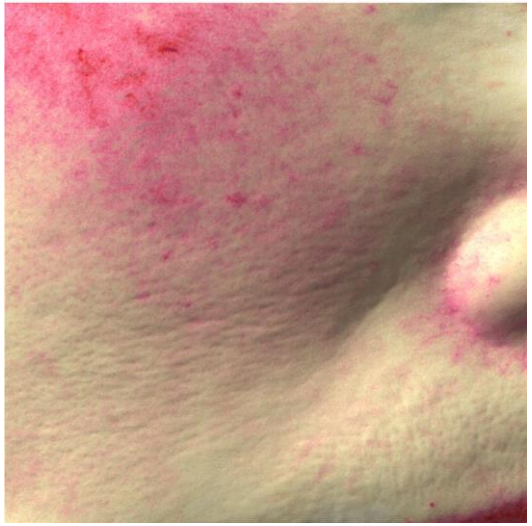
Sub. No.	Before	After 1 week use	After 4 weeks use
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04			

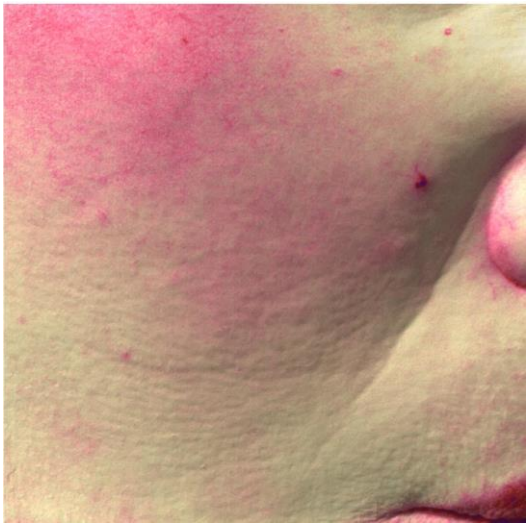
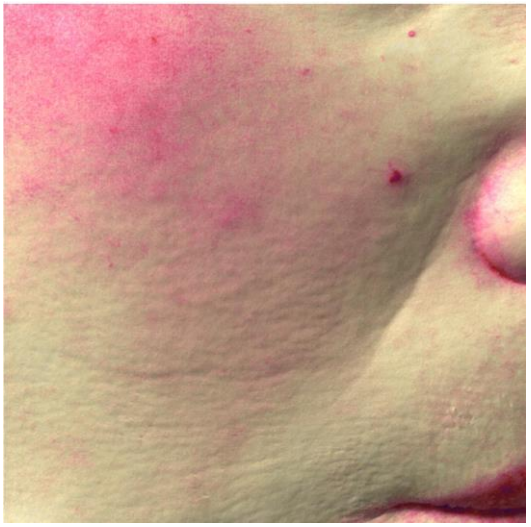
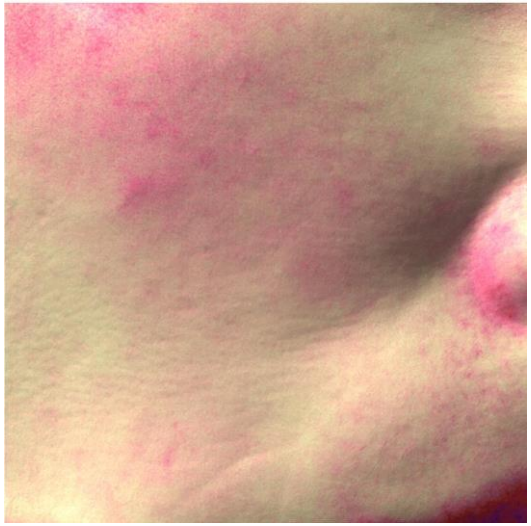
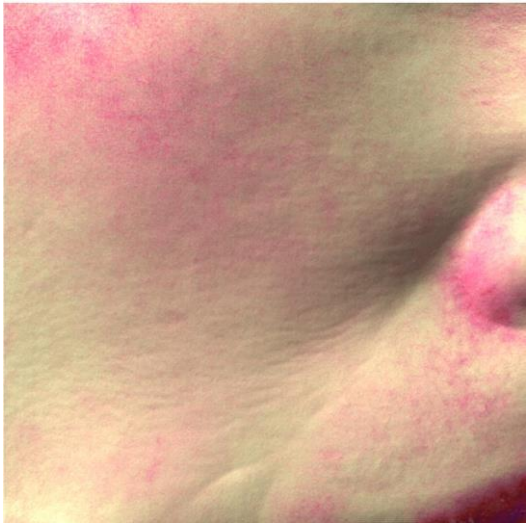
Sub. No.	Before	After 1 week use	After 4 weeks use
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06			

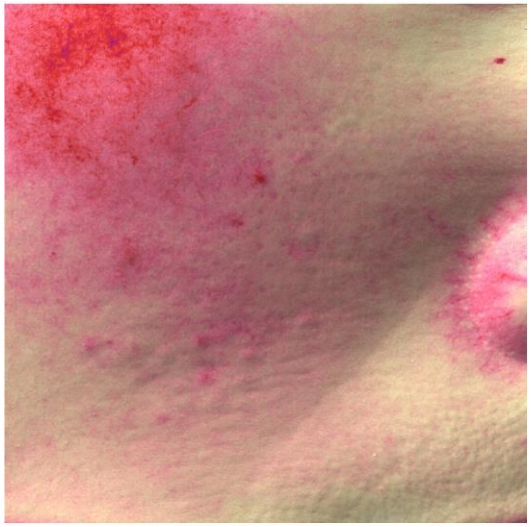
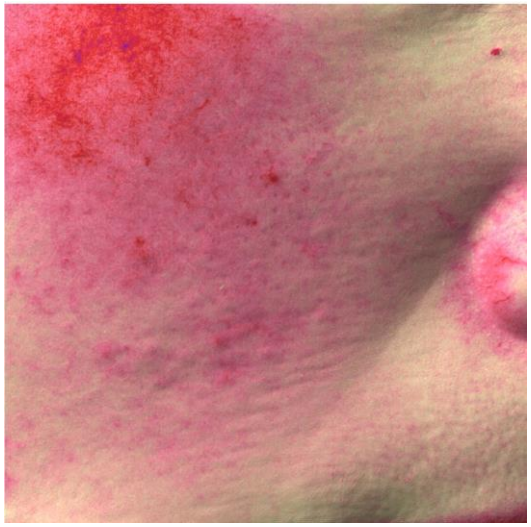
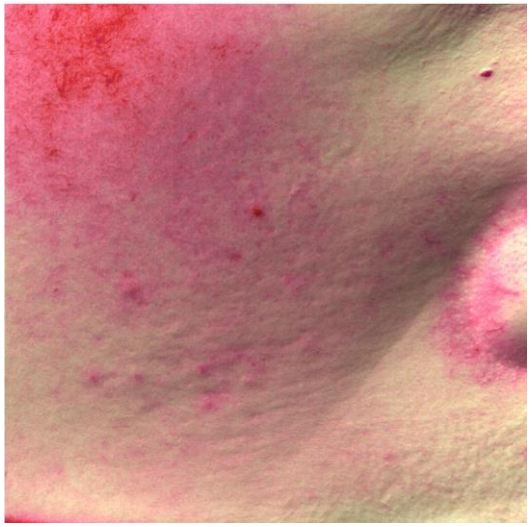
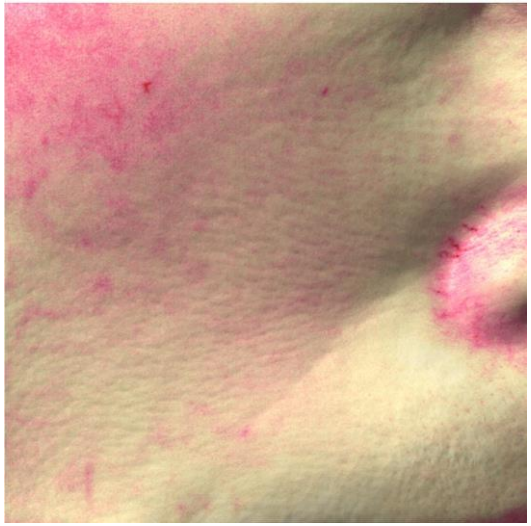
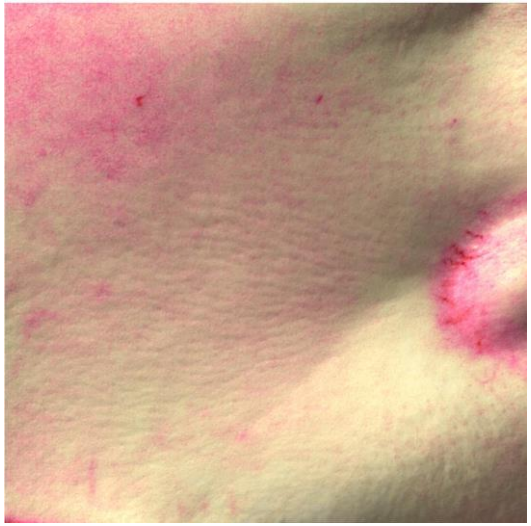
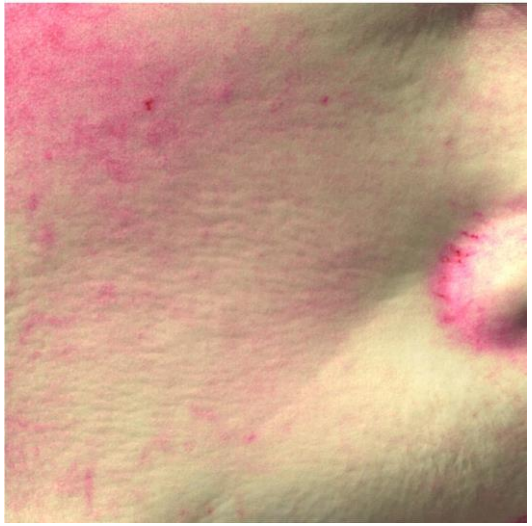
Sub. No.	Before	After 1 week use	After 4 weeks use
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08			

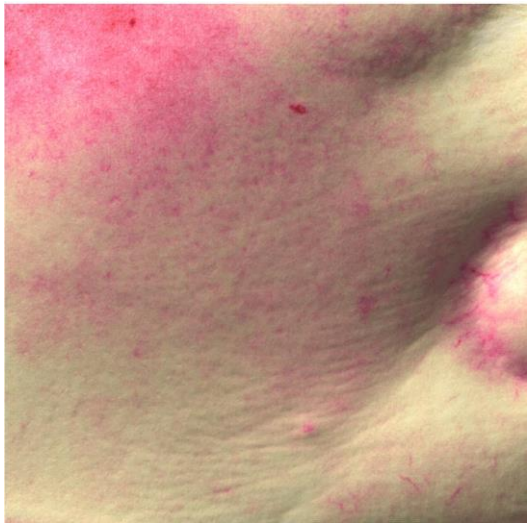
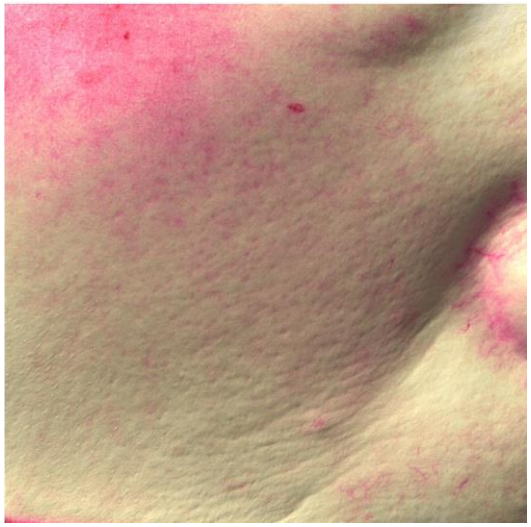
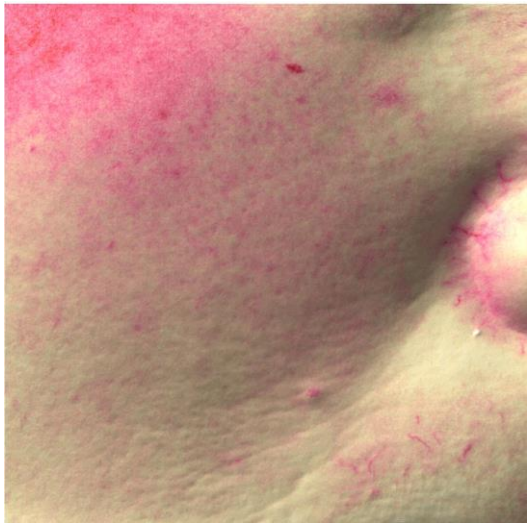
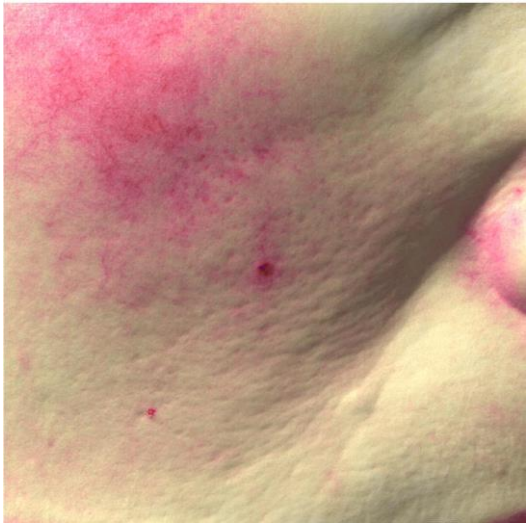
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10			

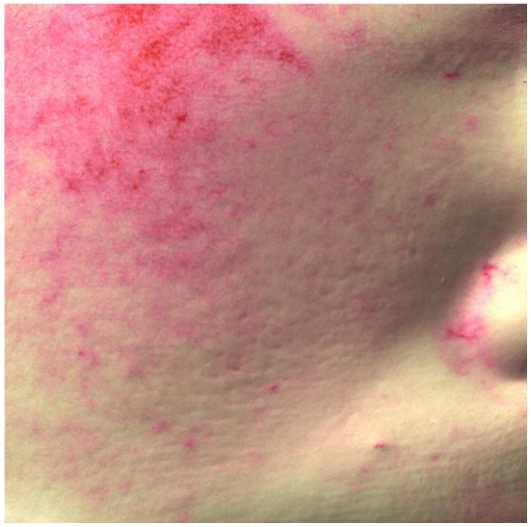
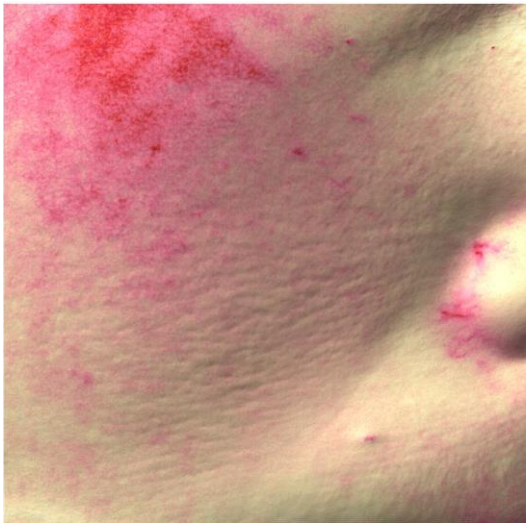
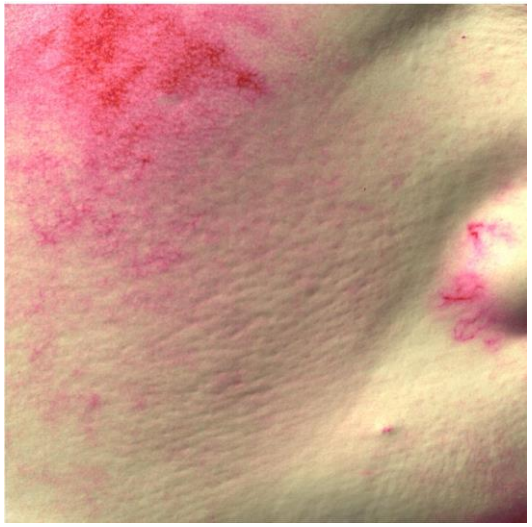
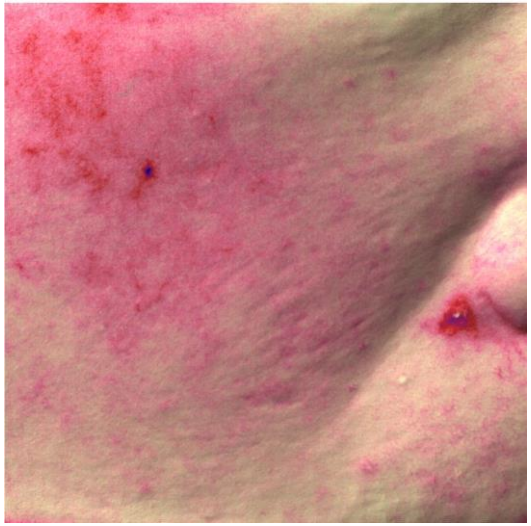
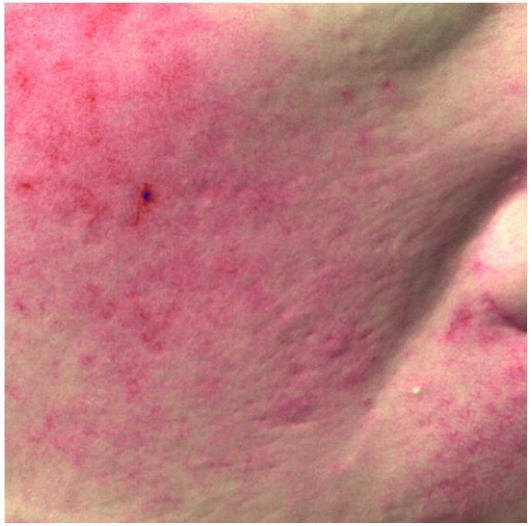
Sub. No.	Before	After 1 week use	After 4 weeks use
11			
12			

Sub. No.	Before	After 1 week use	After 4 weeks use
13			
14			

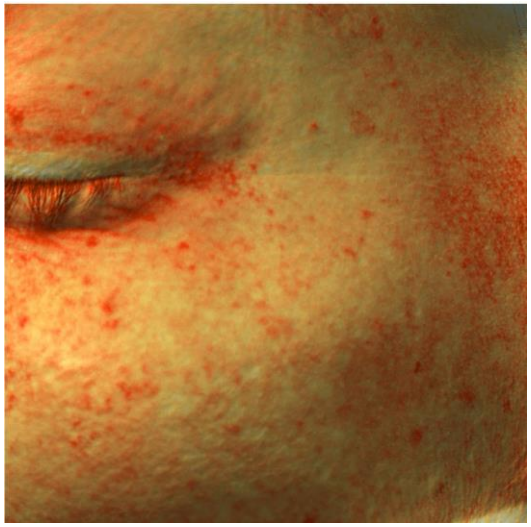
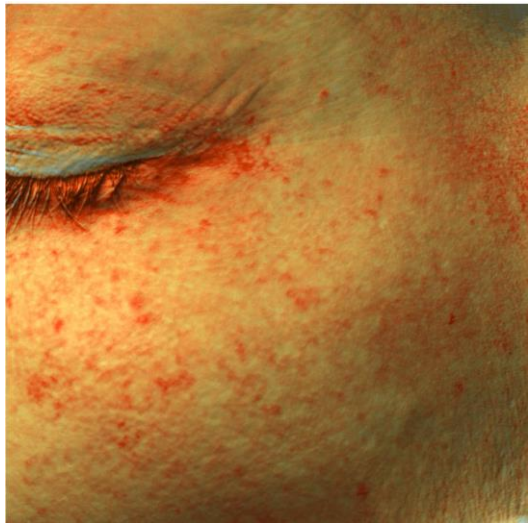
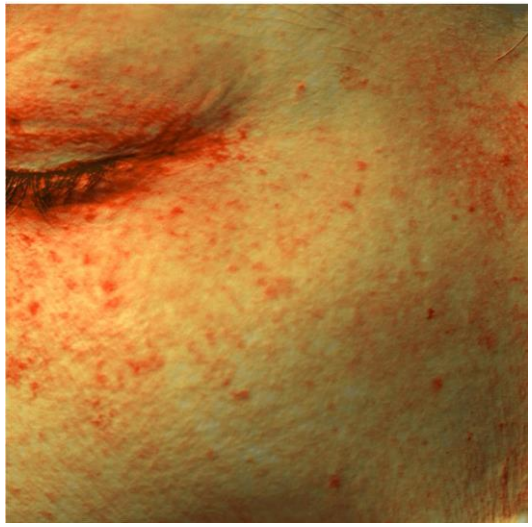
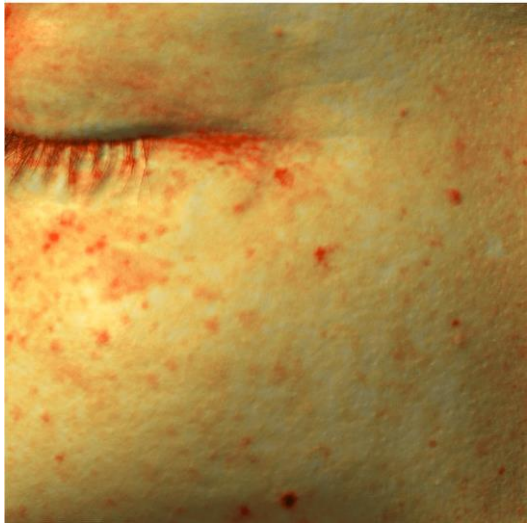
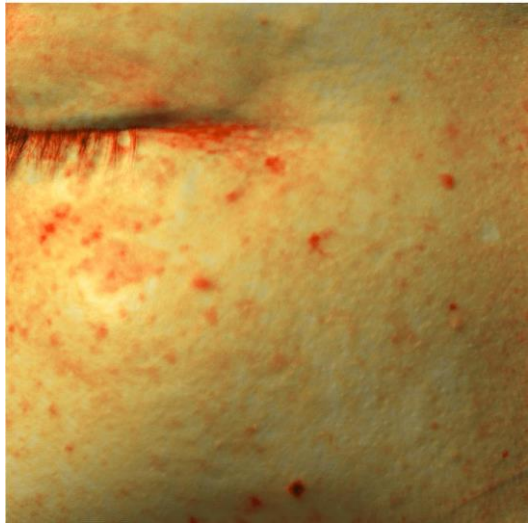
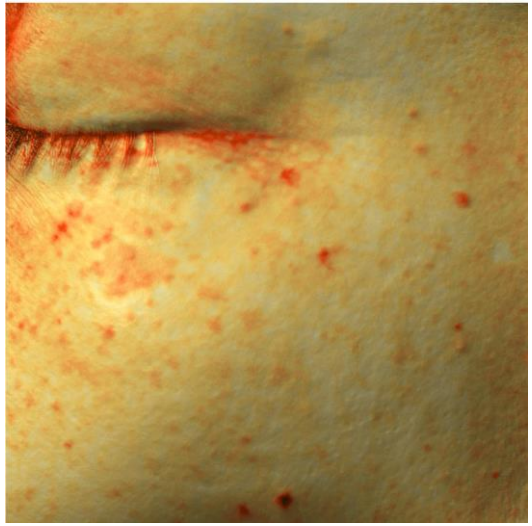
Sub. No.	Before	After 1 week use	After 4 weeks use
15			
16			

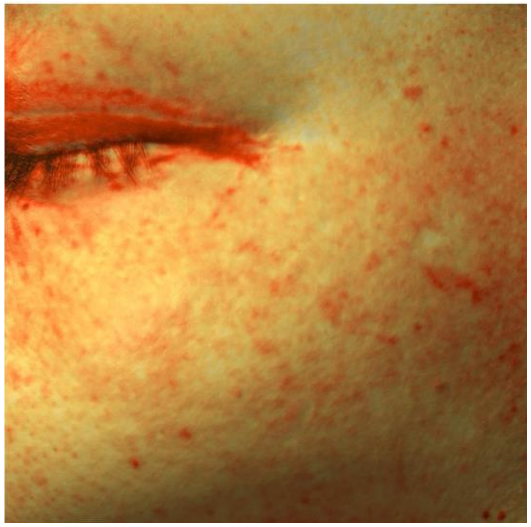
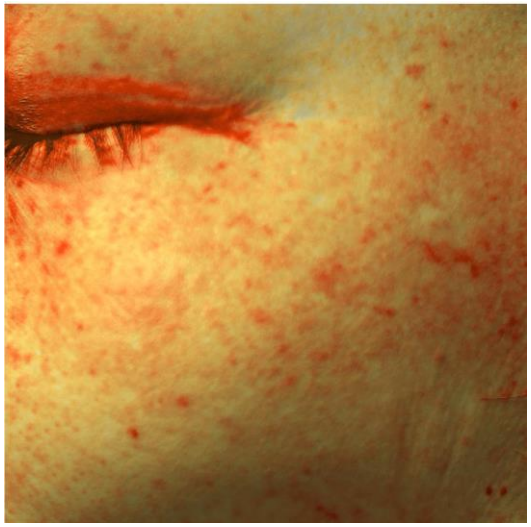
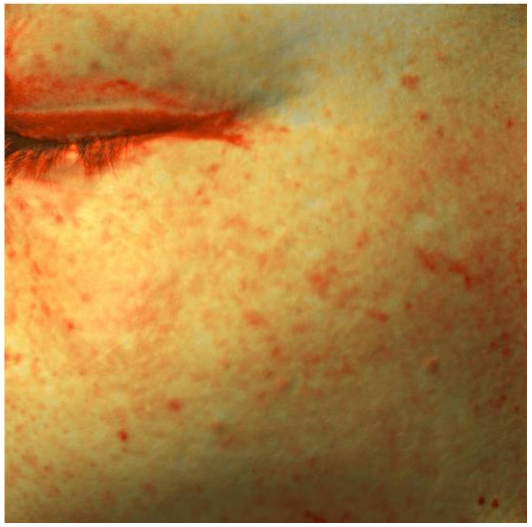
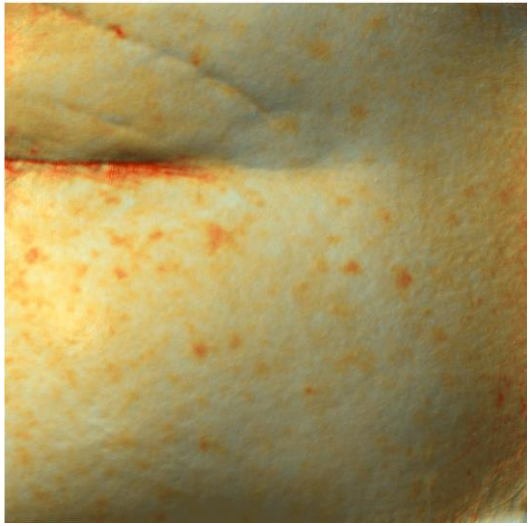
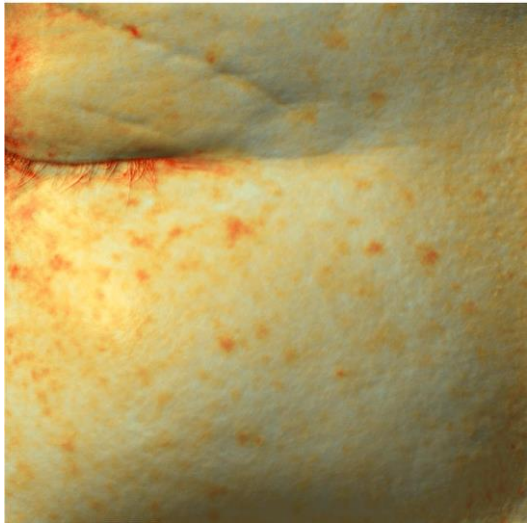
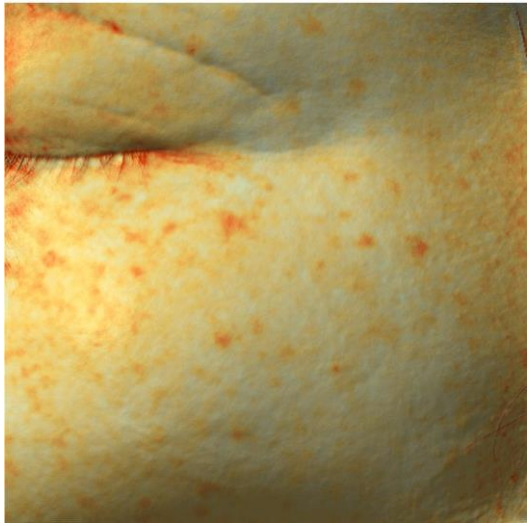
Sub. No.	Before	After 1 week use	After 4 weeks use
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18			

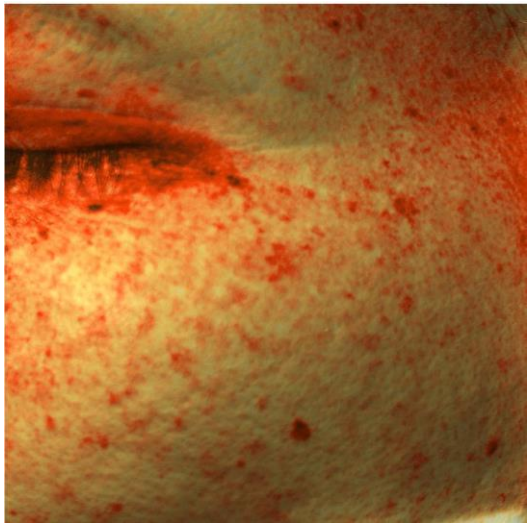
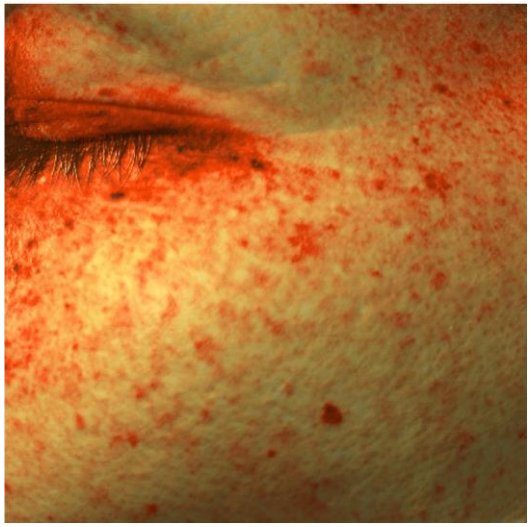
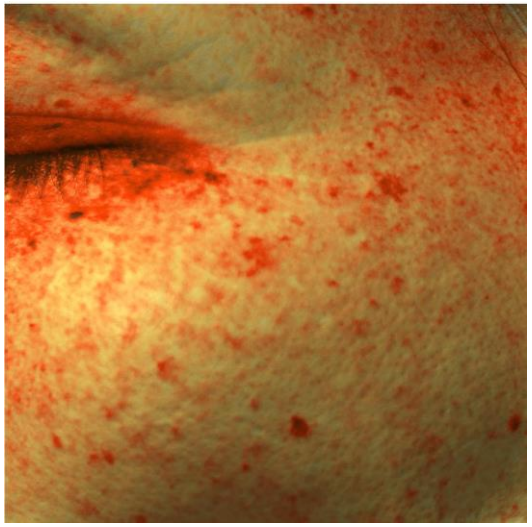
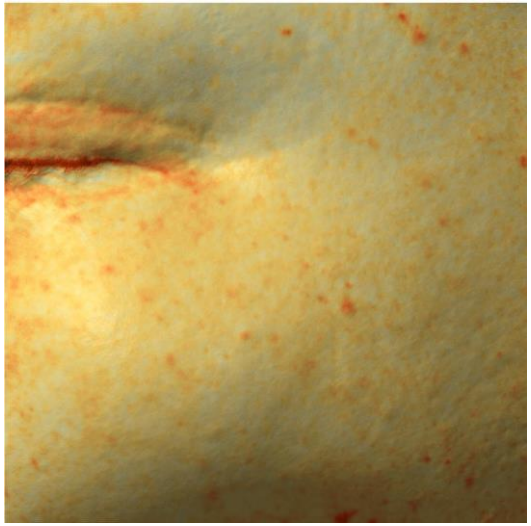
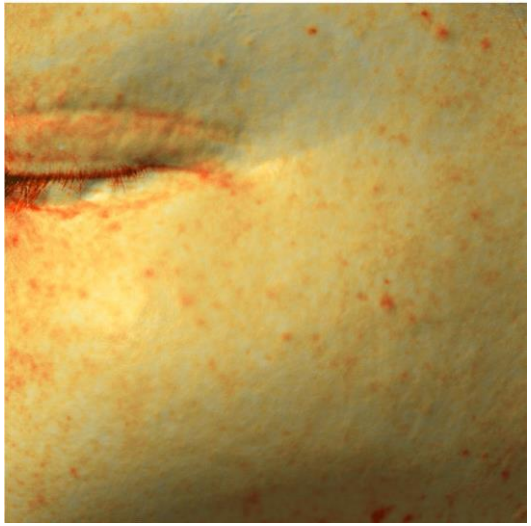
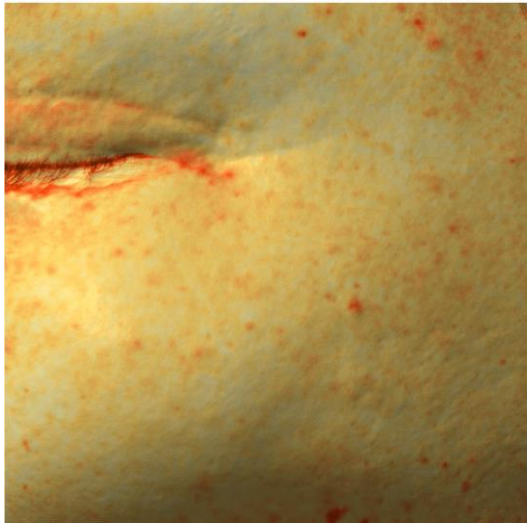
Sub. No.	Before	After 1 week use	After 4 weeks use
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20			

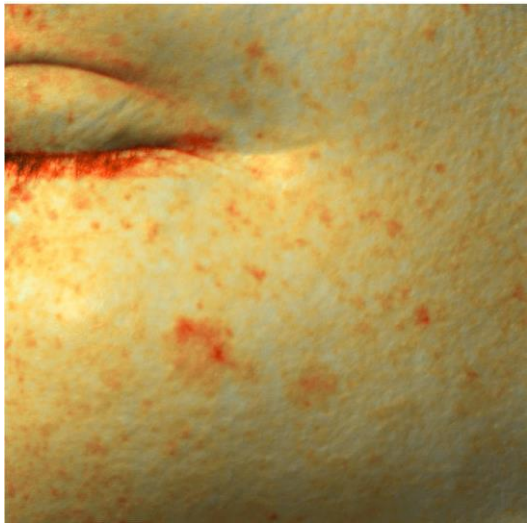
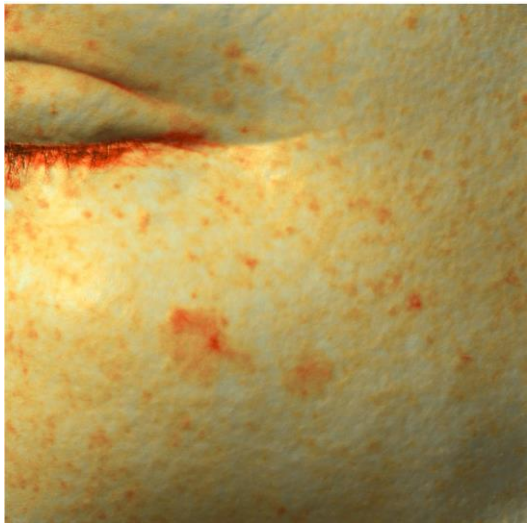
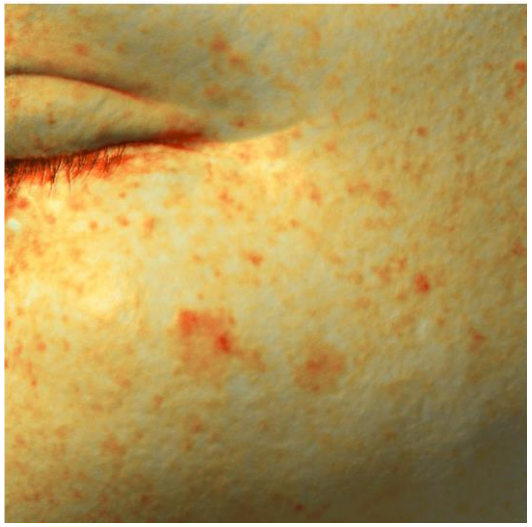
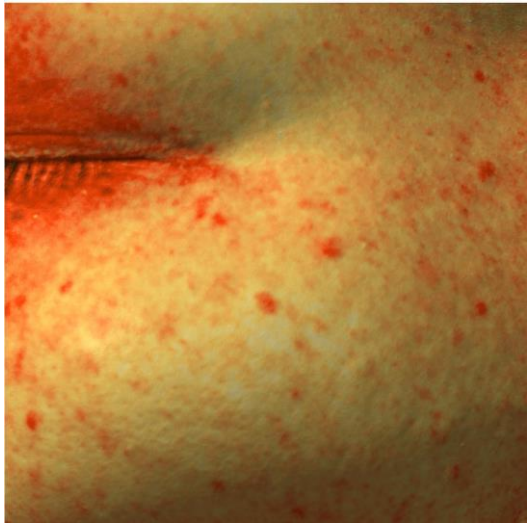
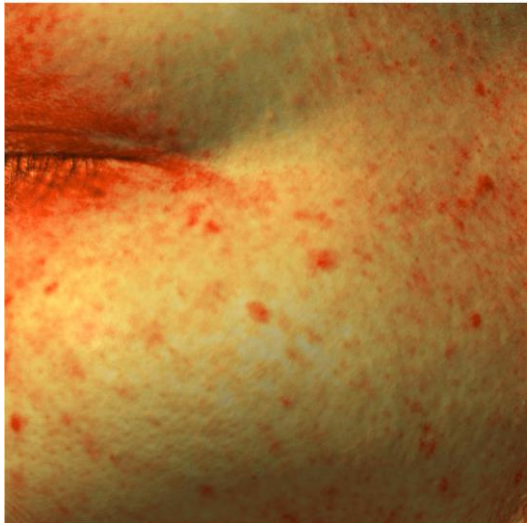
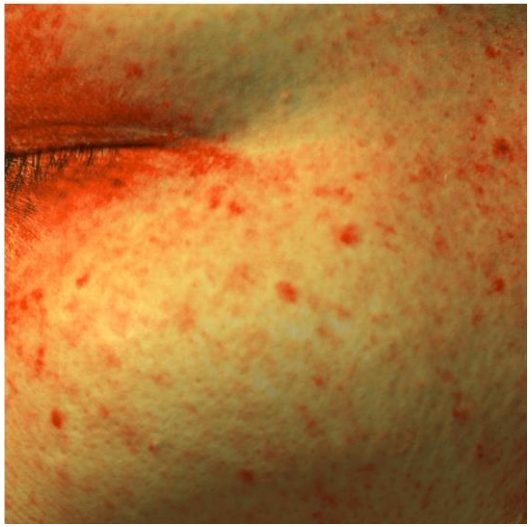
Sub. No.	Before	After 1 week use	After 4 weeks use
21			
22			

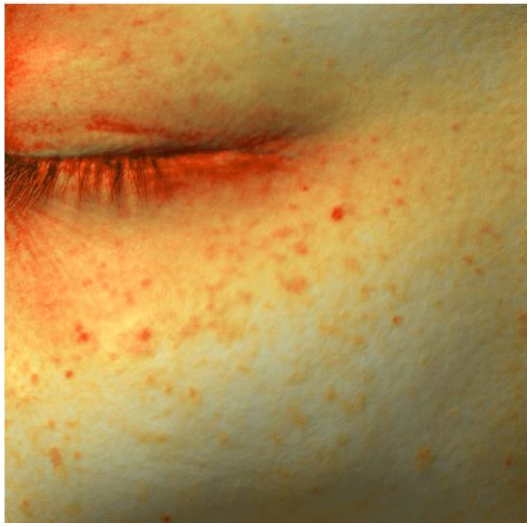
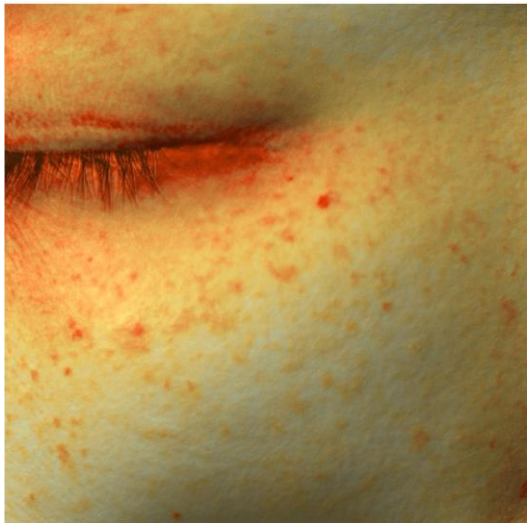
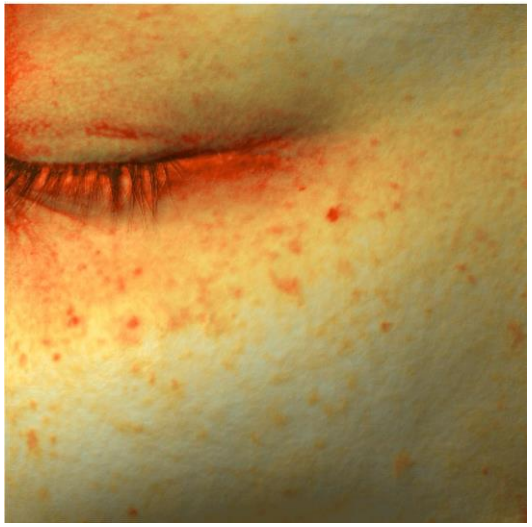
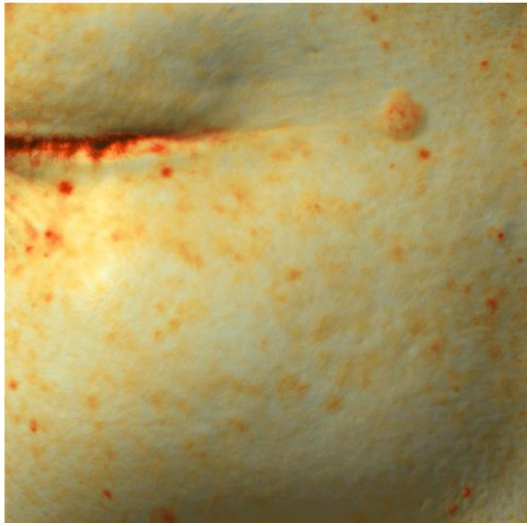
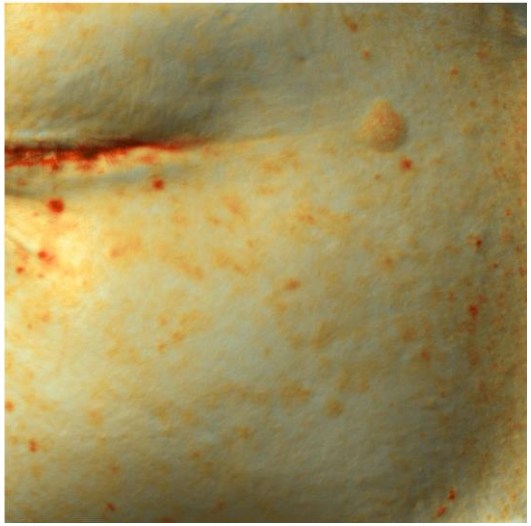
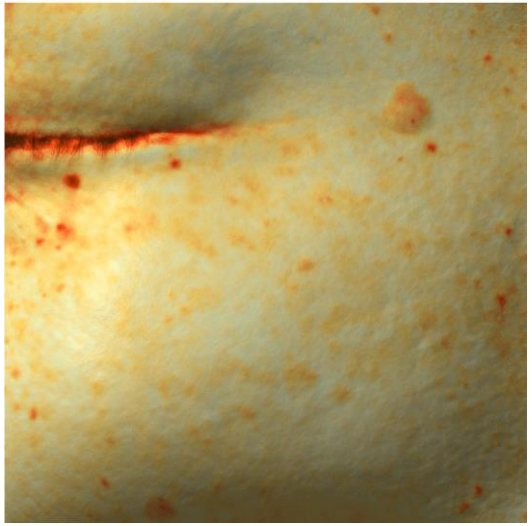
III-V. Images of melanin (concentration and evenness) of pigmentation such as melasma

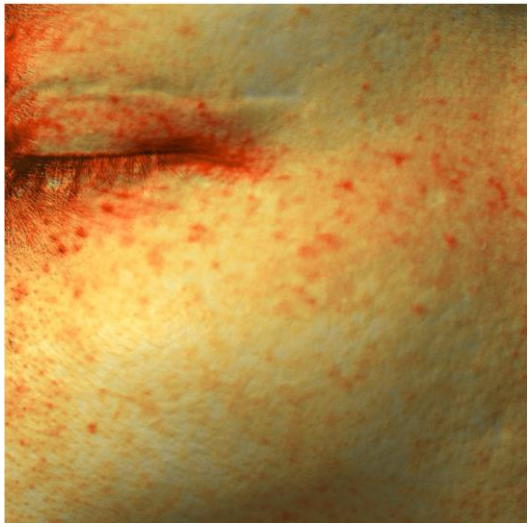
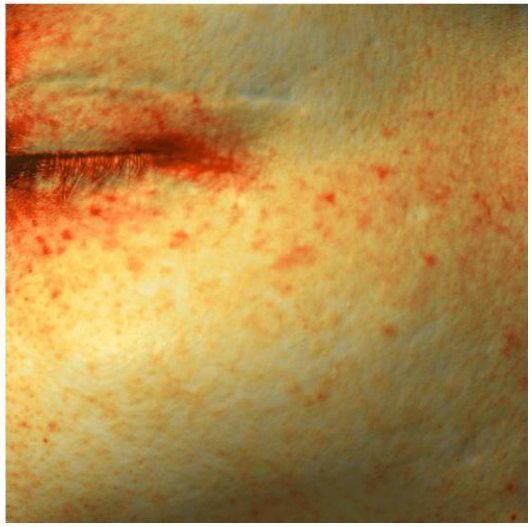
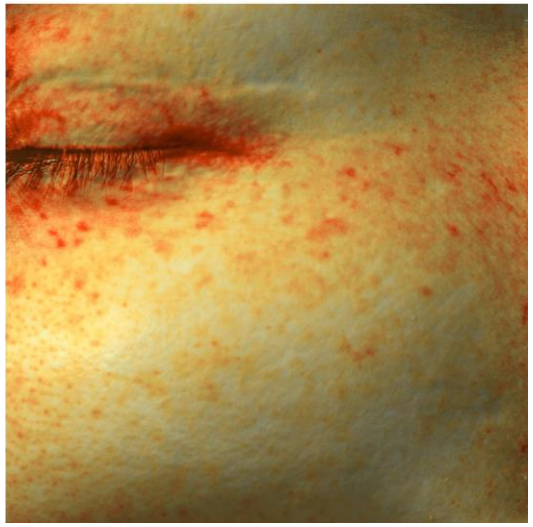
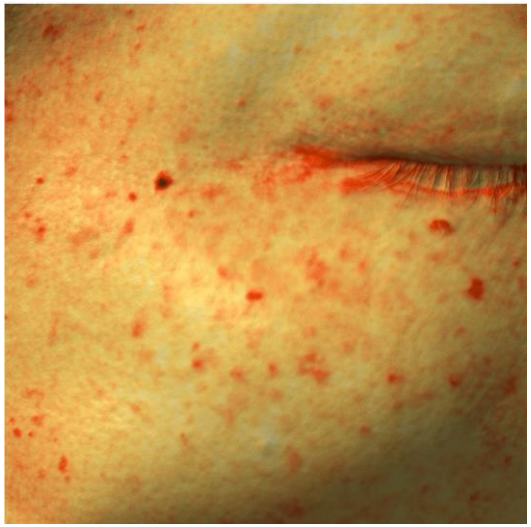
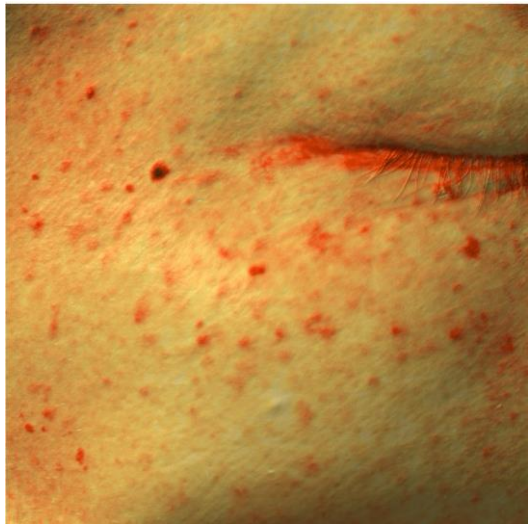
Sub. No.	Before	After 1 week use	After 4 weeks use
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02			

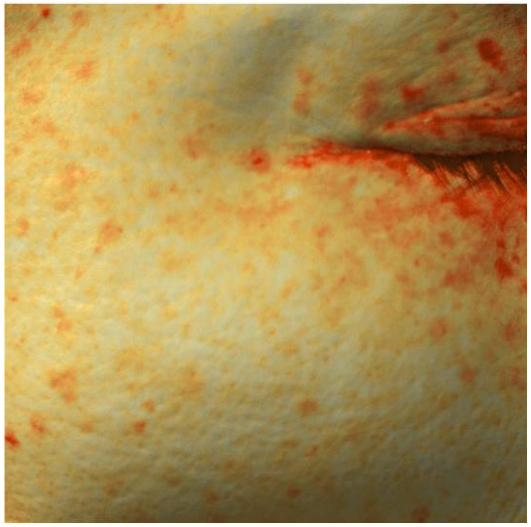
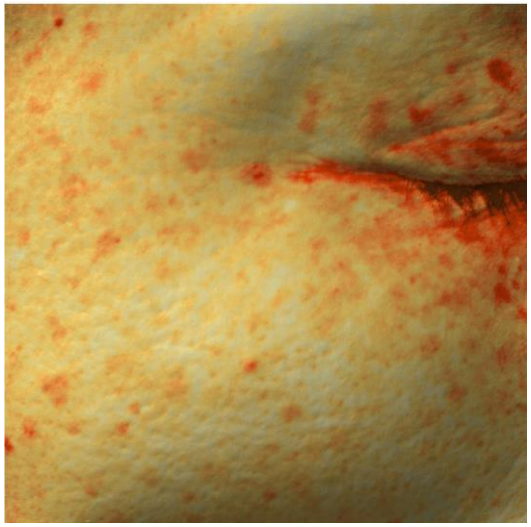
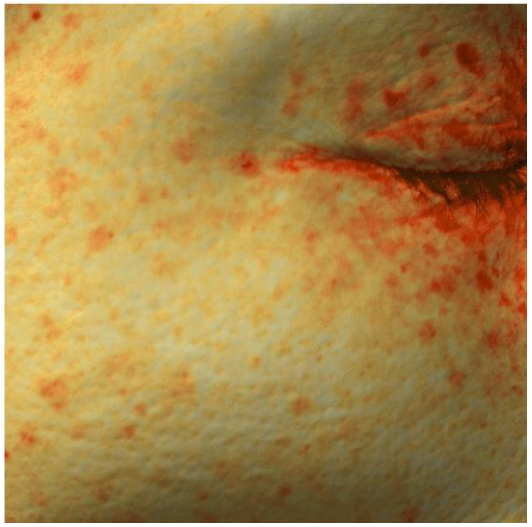
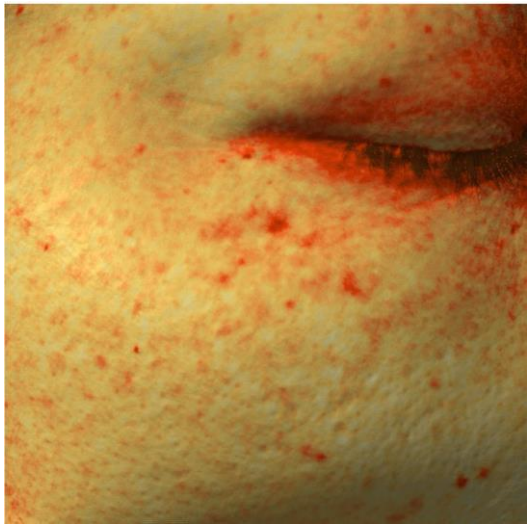
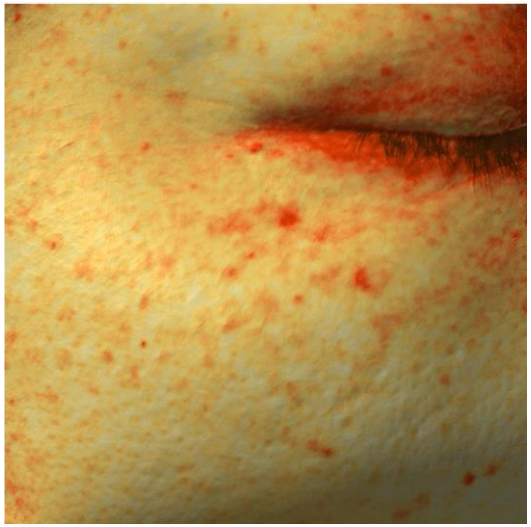
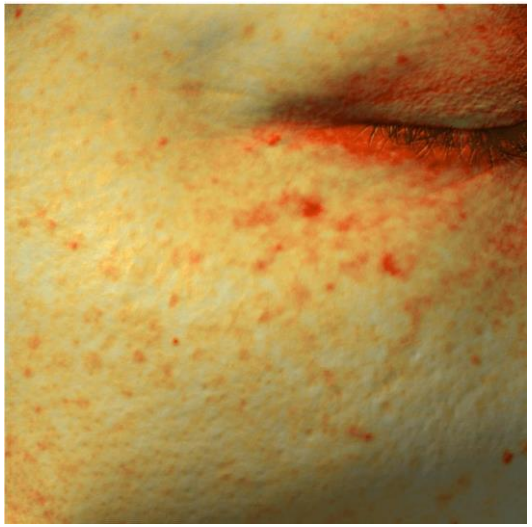
Sub. No.	Before	After 1 week use	After 4 weeks use
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04			

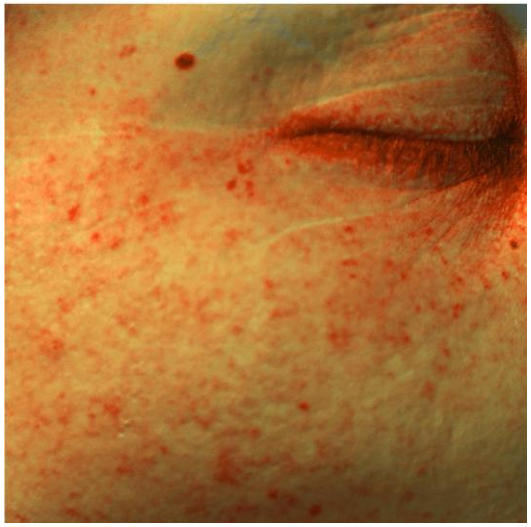
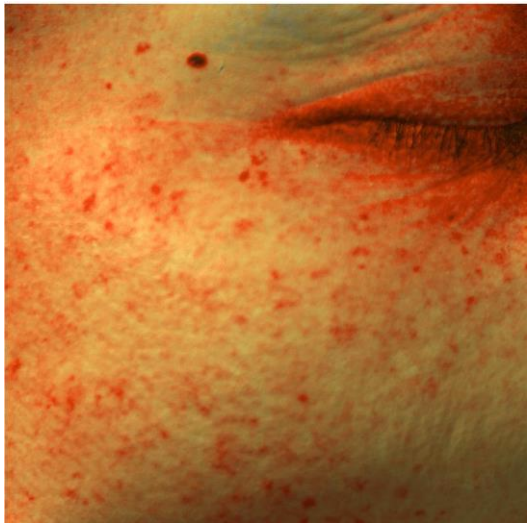
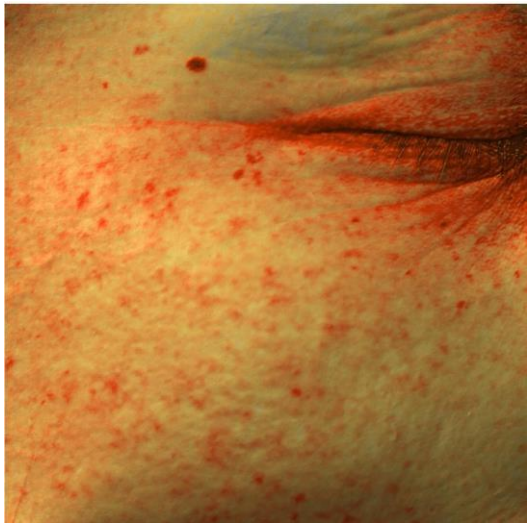
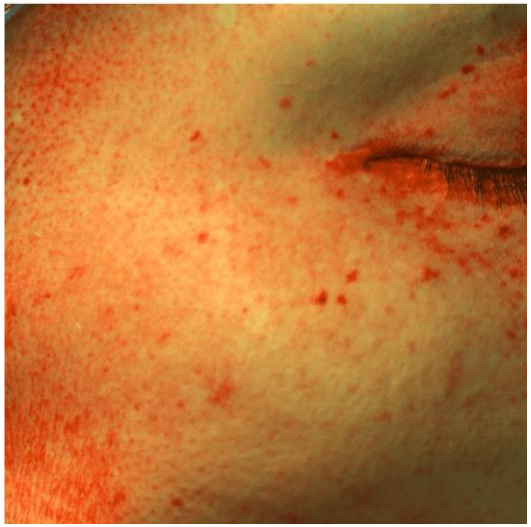
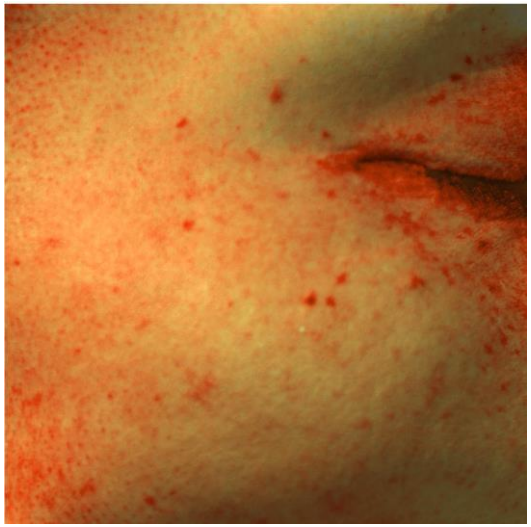
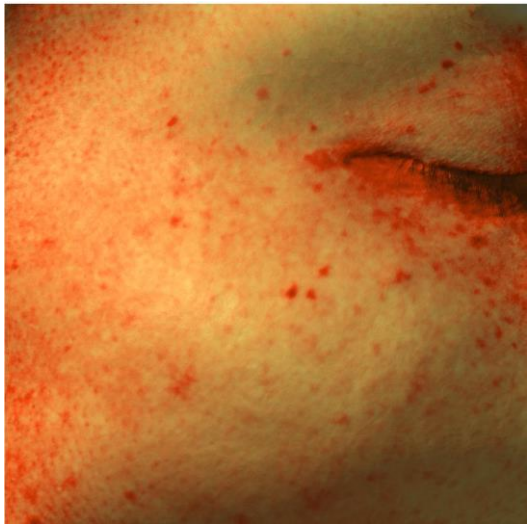
Sub. No.	Before	After 1 week use	After 4 weeks use
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06			

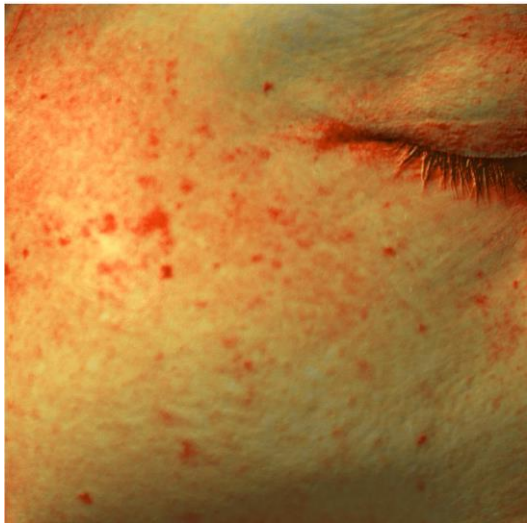
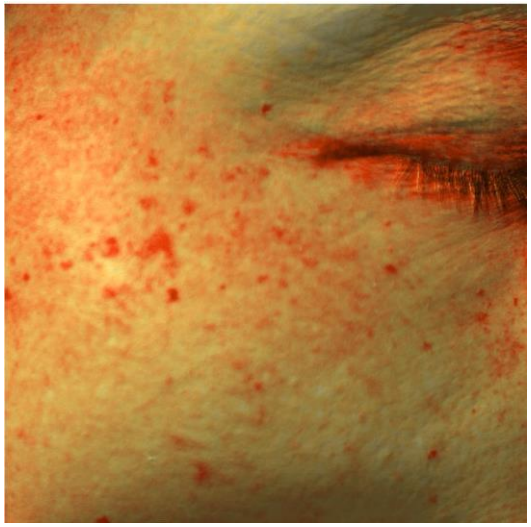
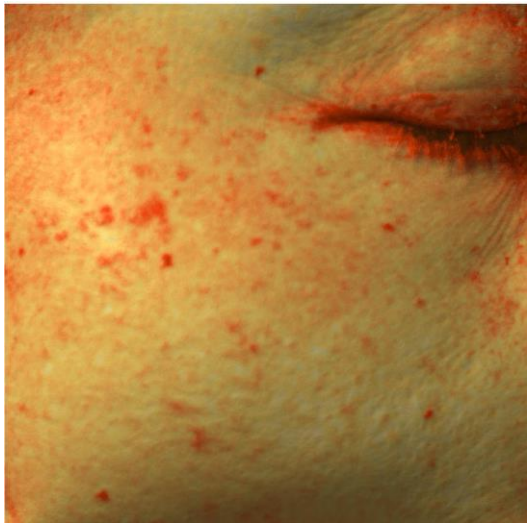
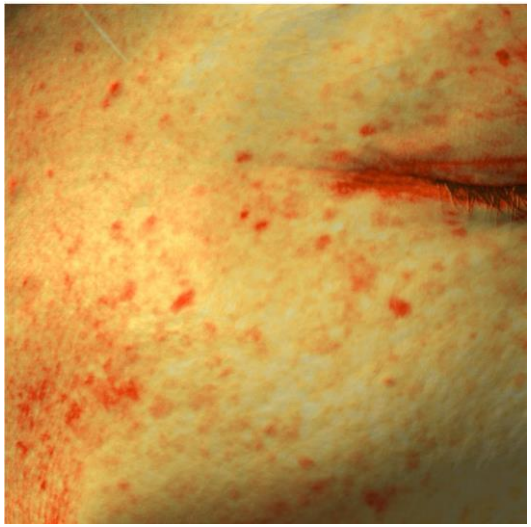
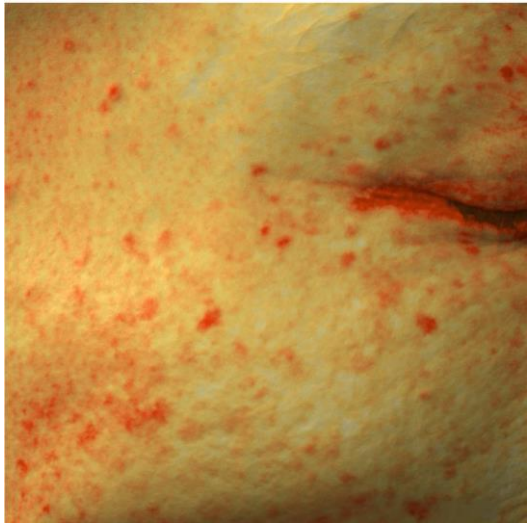
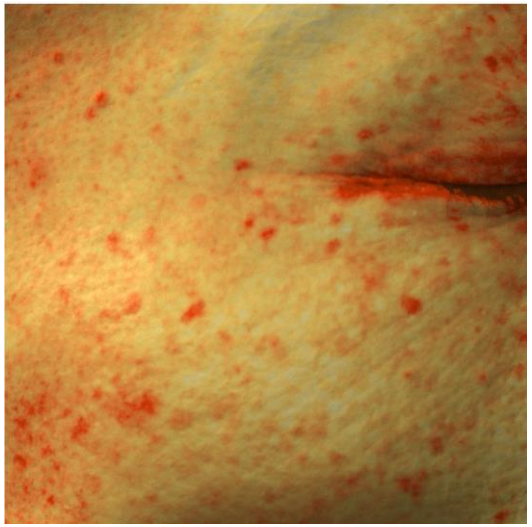
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07			
08			

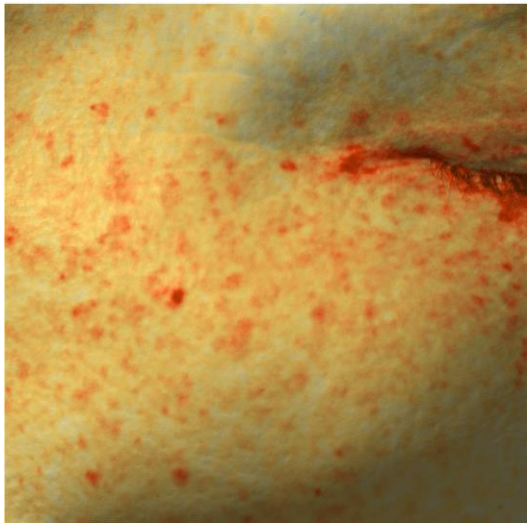
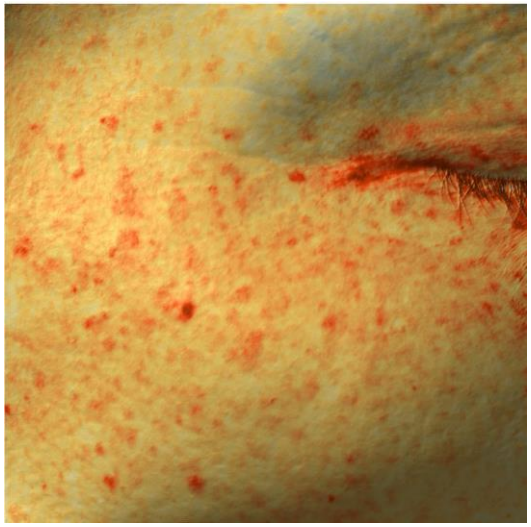
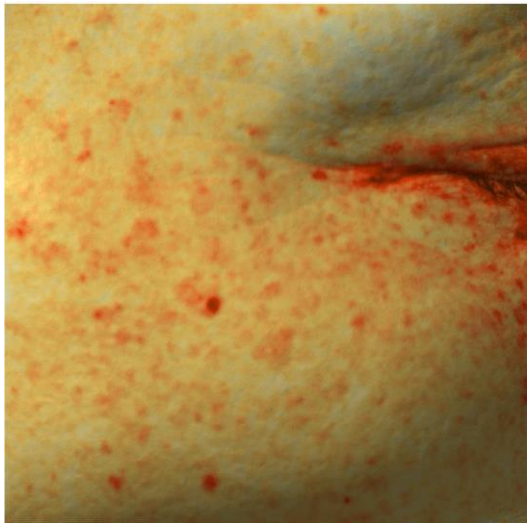
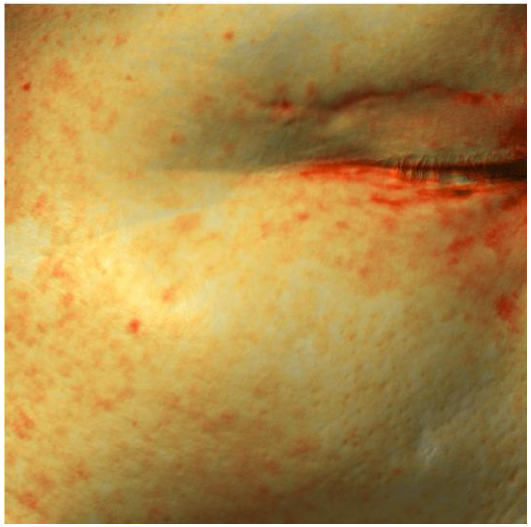
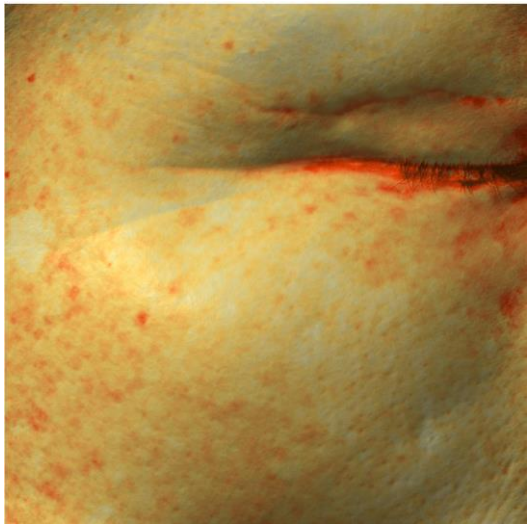
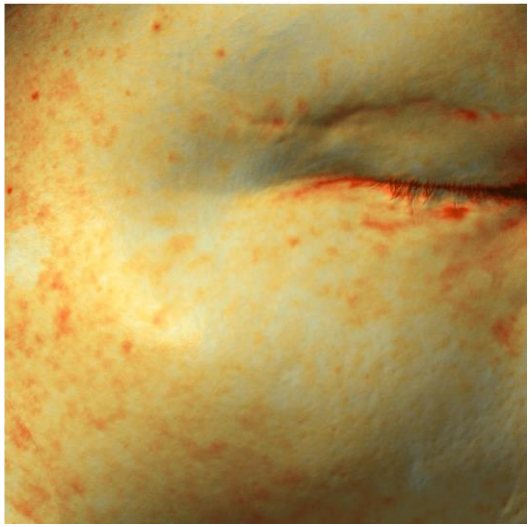
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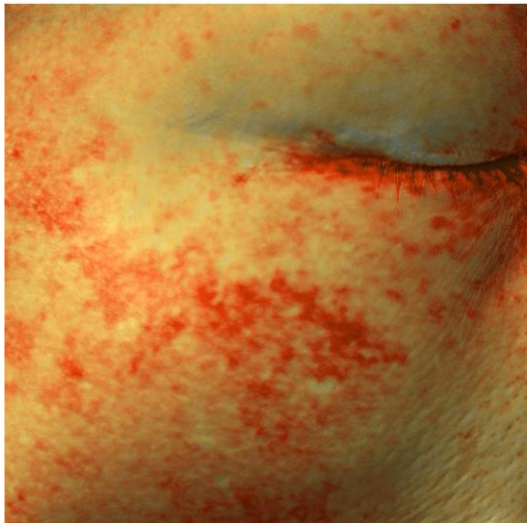
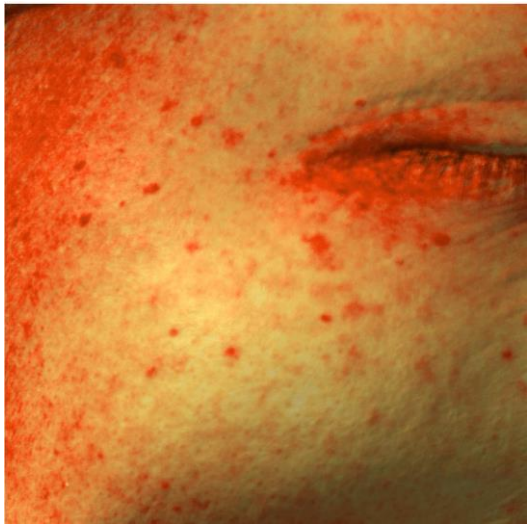
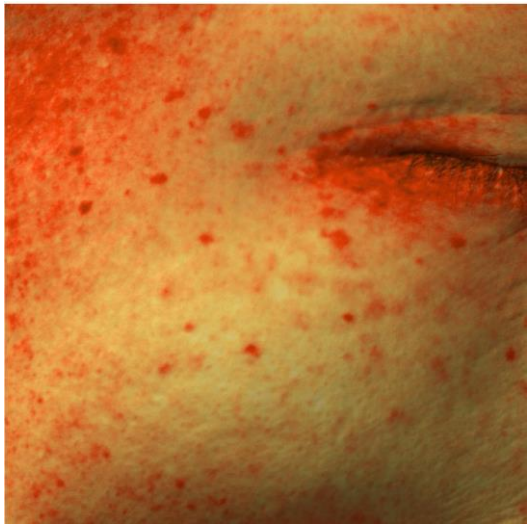
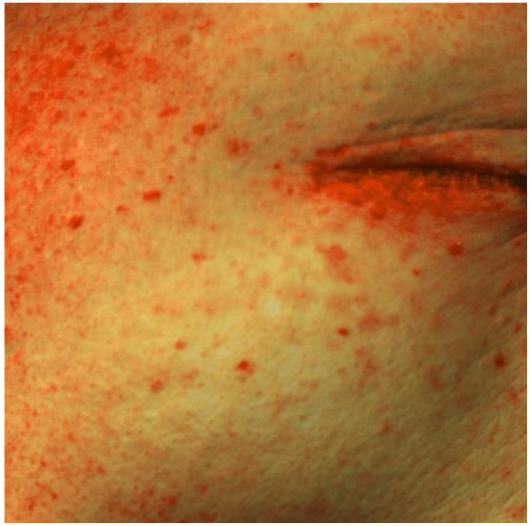
Sub. No.	Before	After 1 week use	After 4 weeks use
11			
12			

Sub. No.	Before	After 1 week use	After 4 weeks use
13			
14			

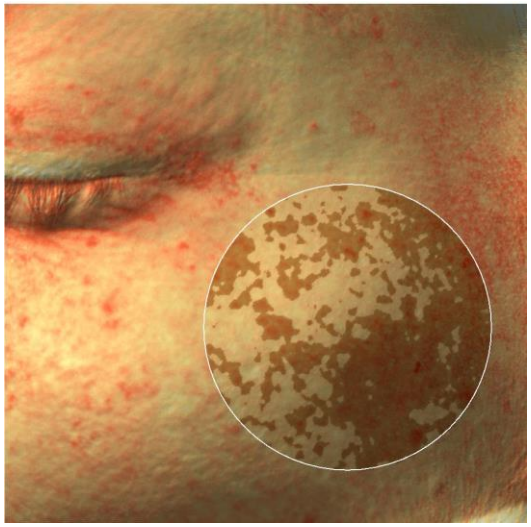
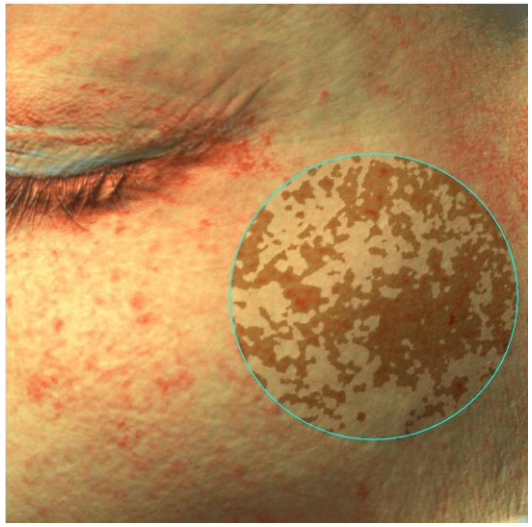
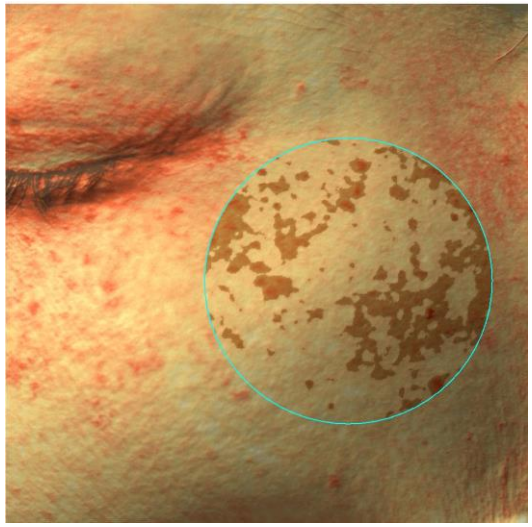
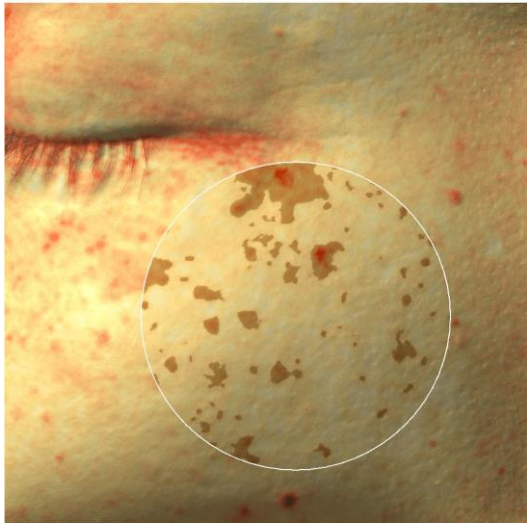
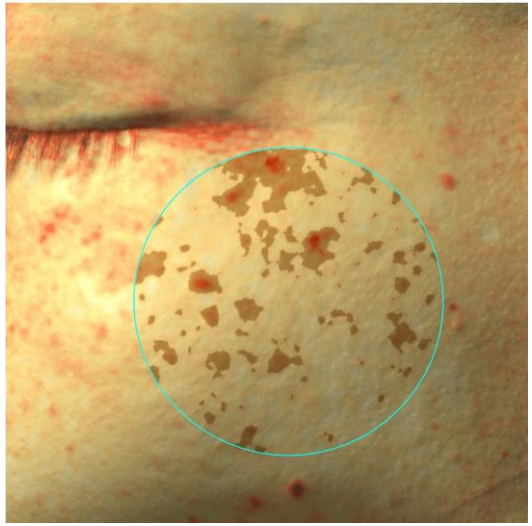
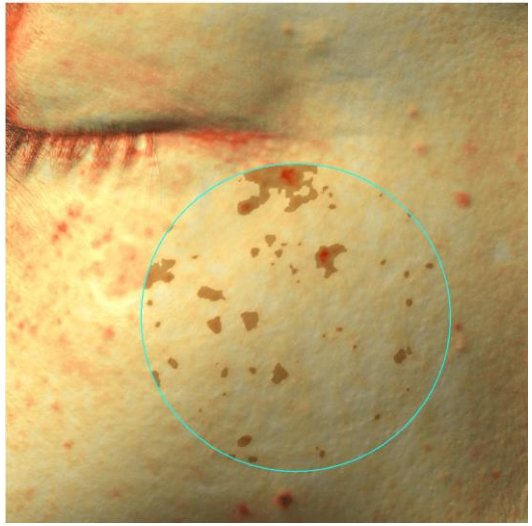
Sub. No.	Before	After 1 week use	After 4 weeks use
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16			

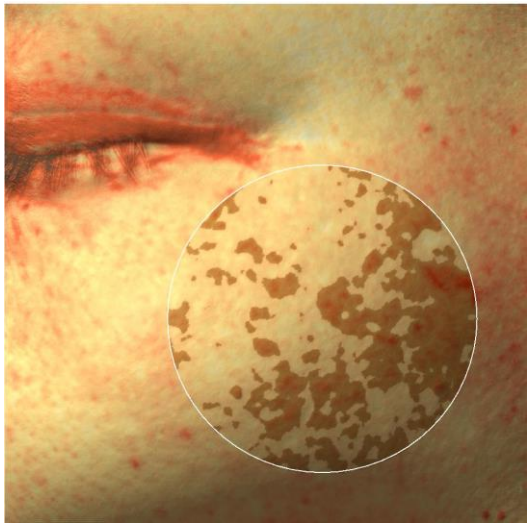
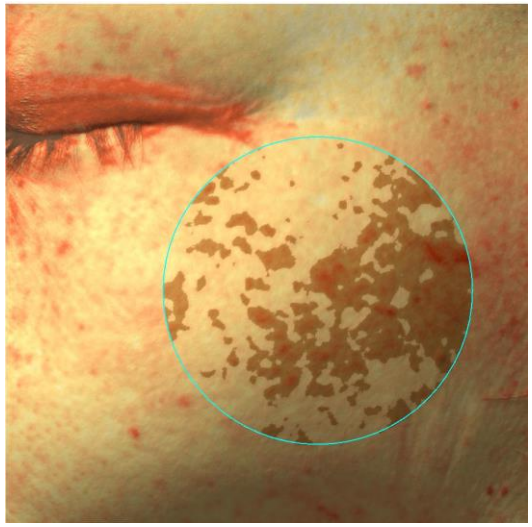
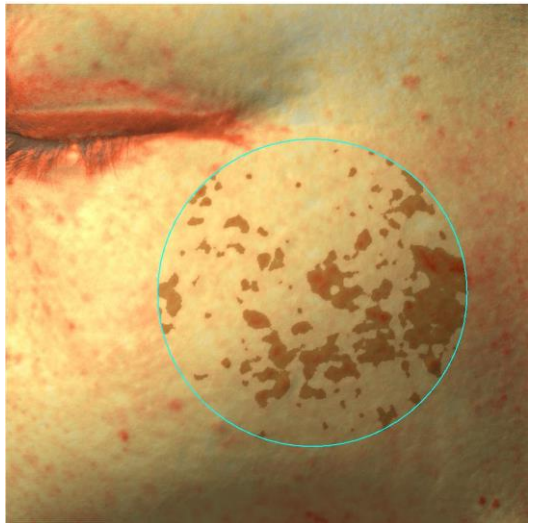
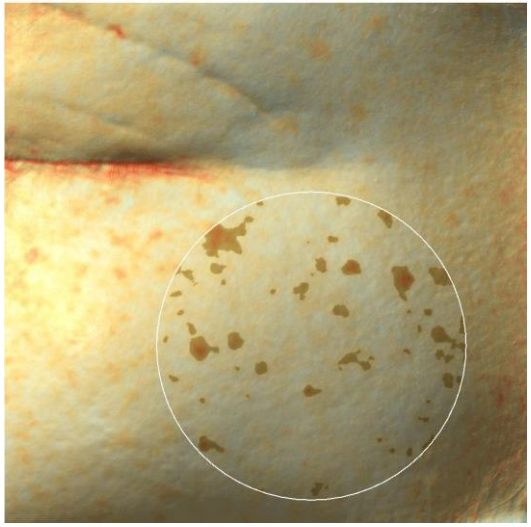
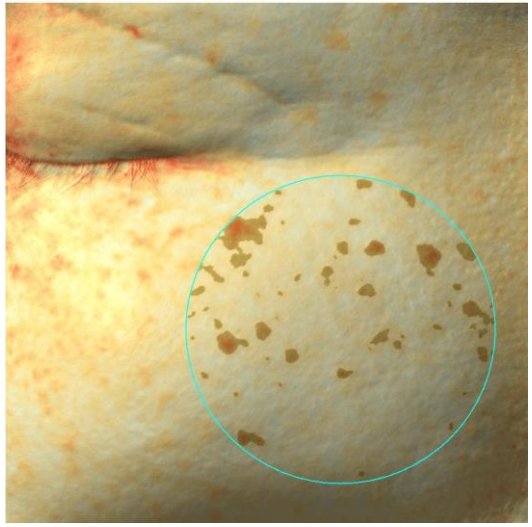
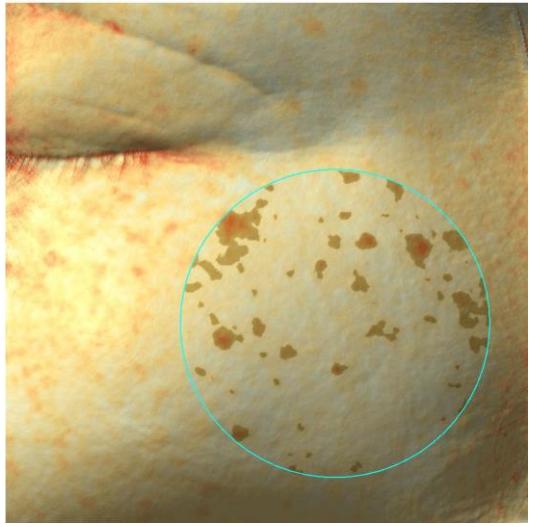
Sub. No.	Before	After 1 week use	After 4 weeks use
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18			

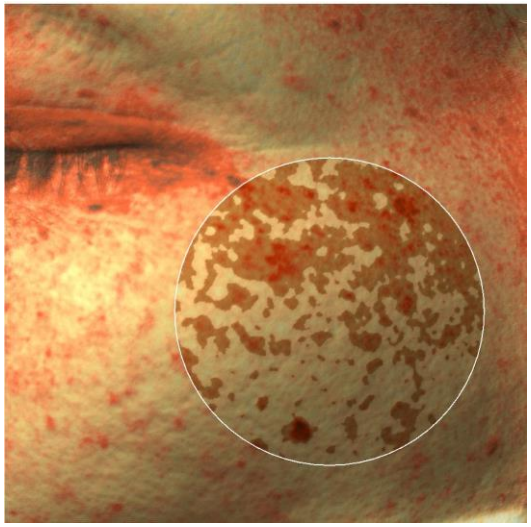
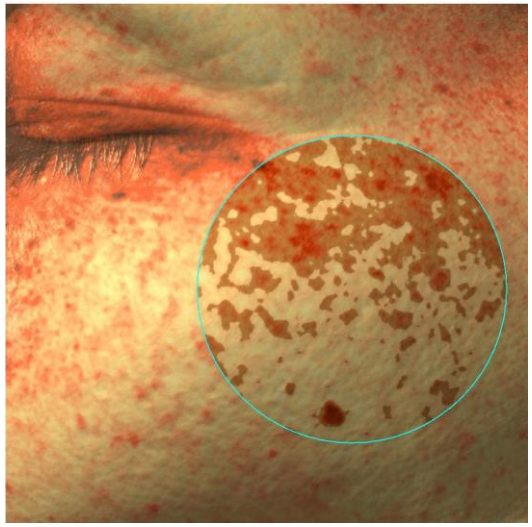
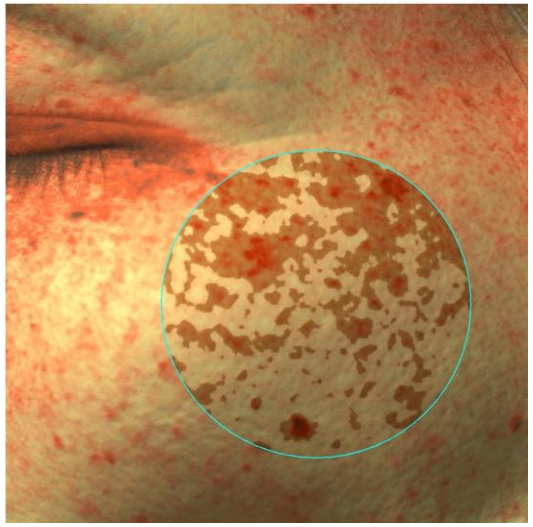
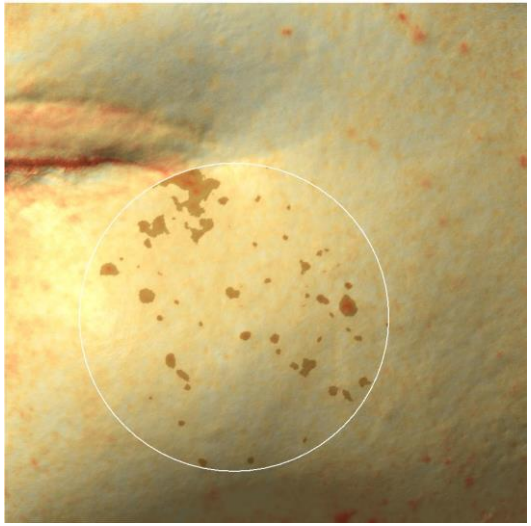
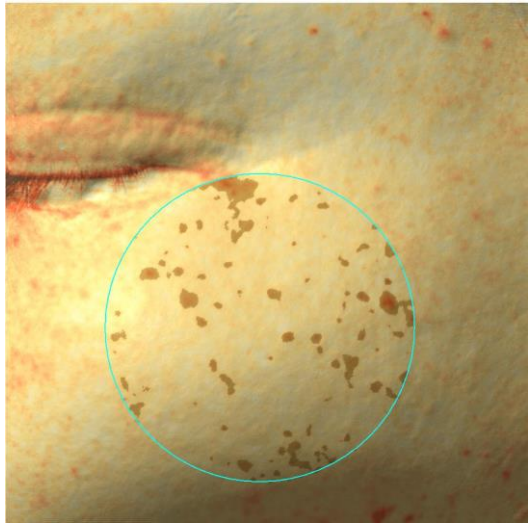
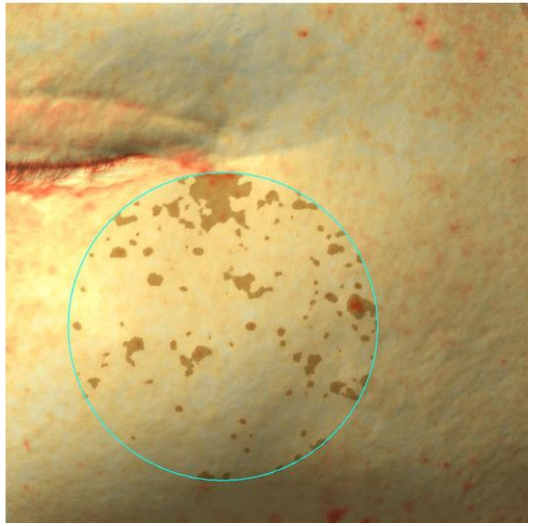
Sub. No.	Before	After 1 week use	After 4 weeks use
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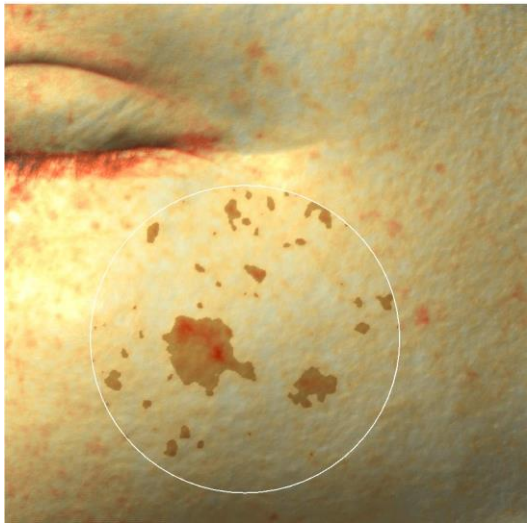
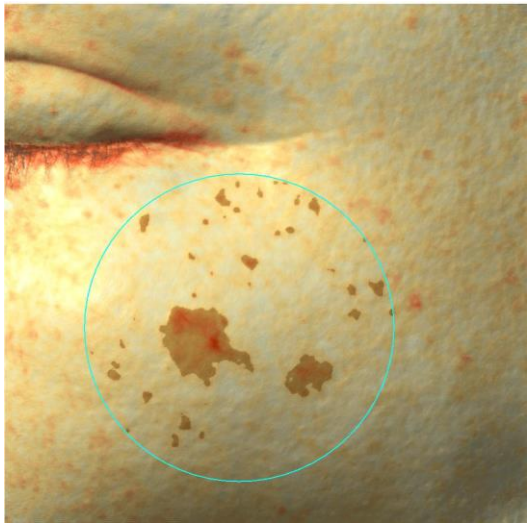
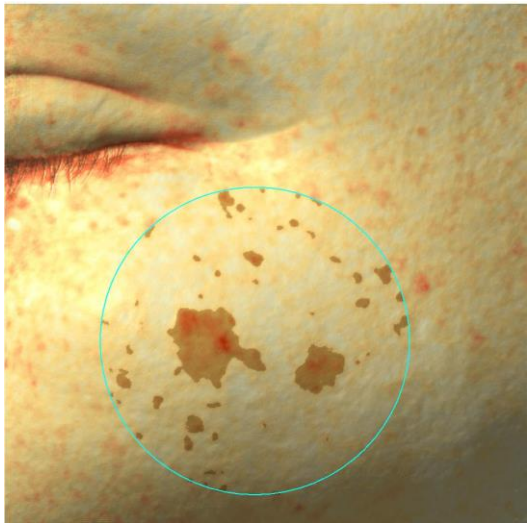
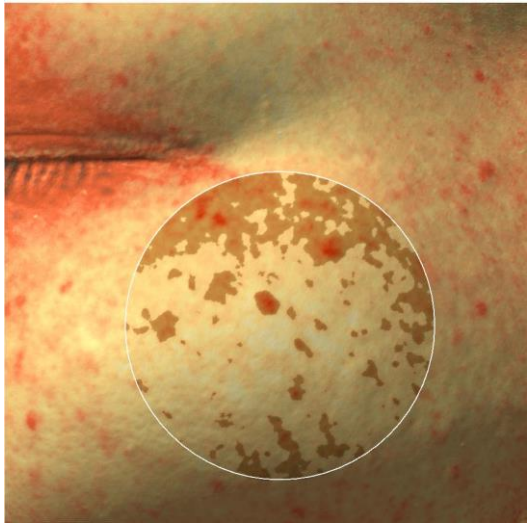
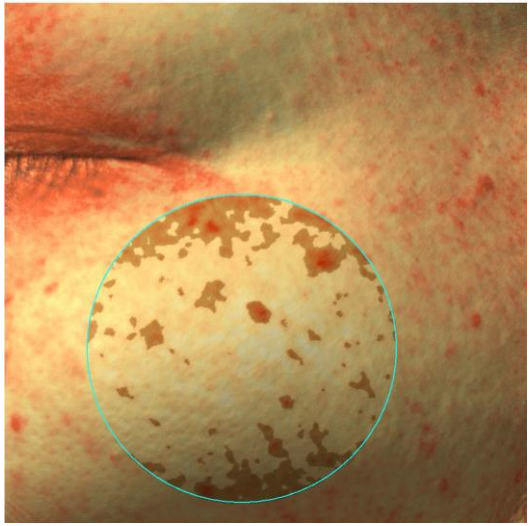
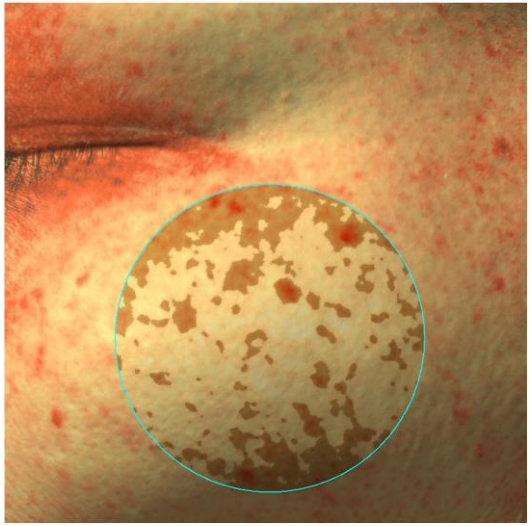
Sub. No.	Before	After 1 week use	After 4 weeks use
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22			

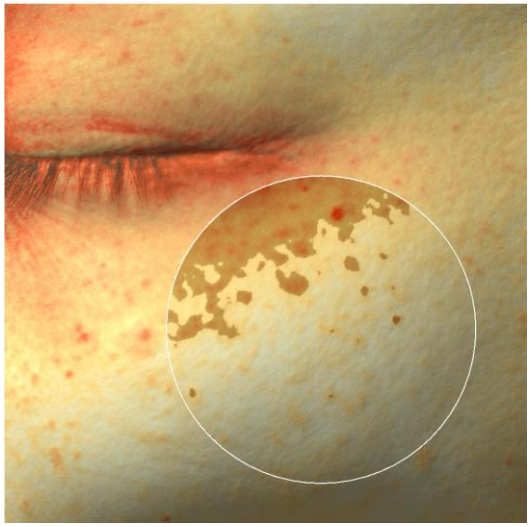
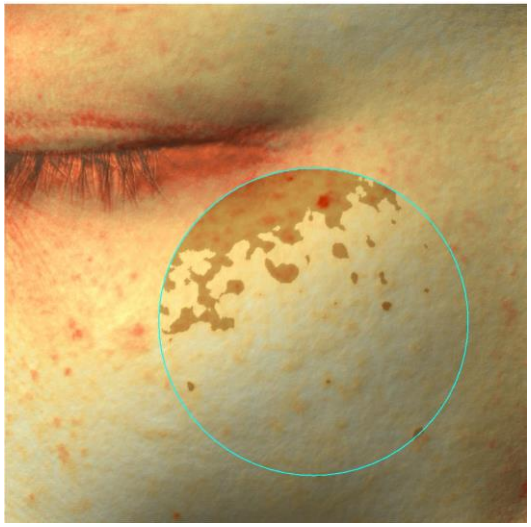
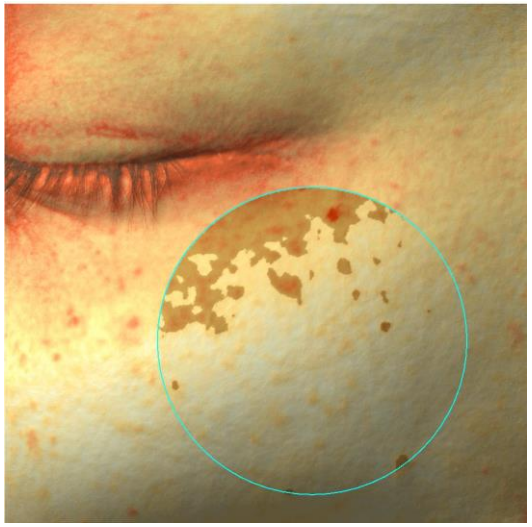
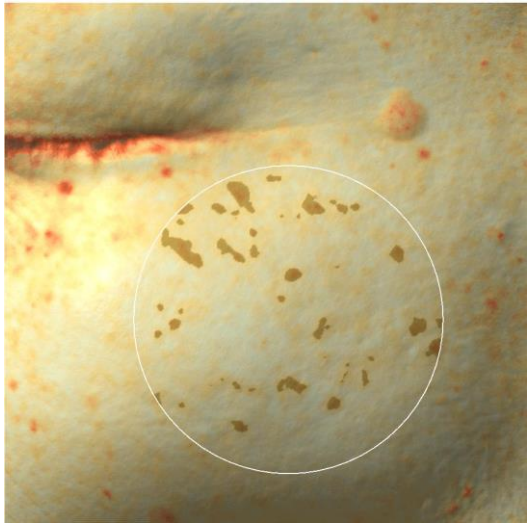
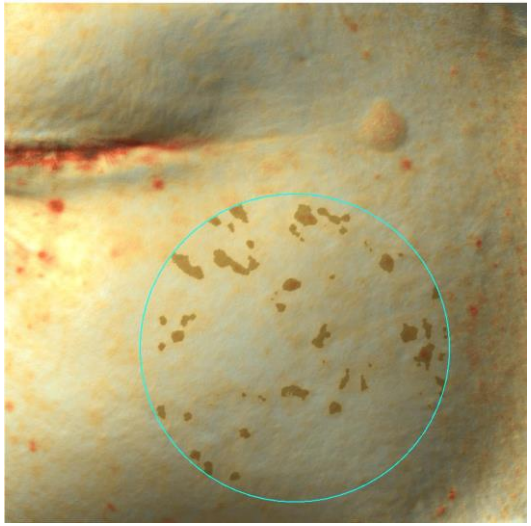
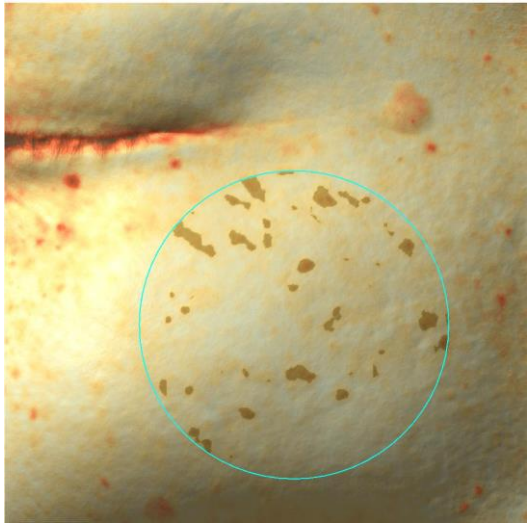
III-VI. Images of melanin (area) of pigmentation such as melasma

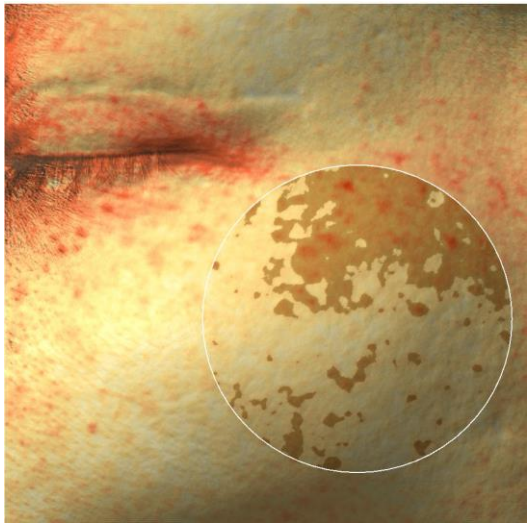
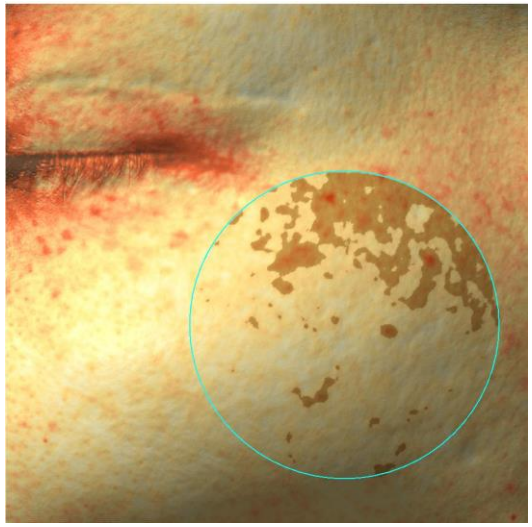
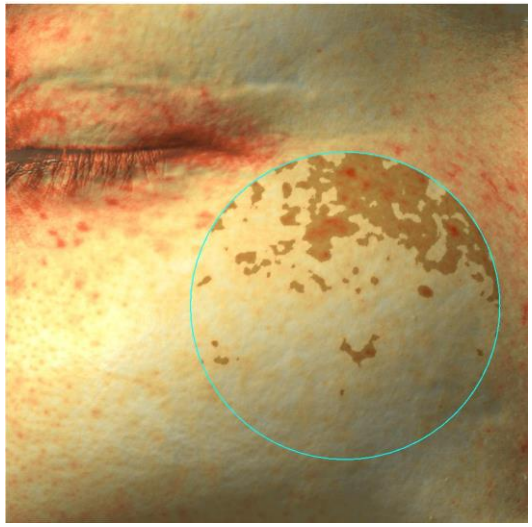
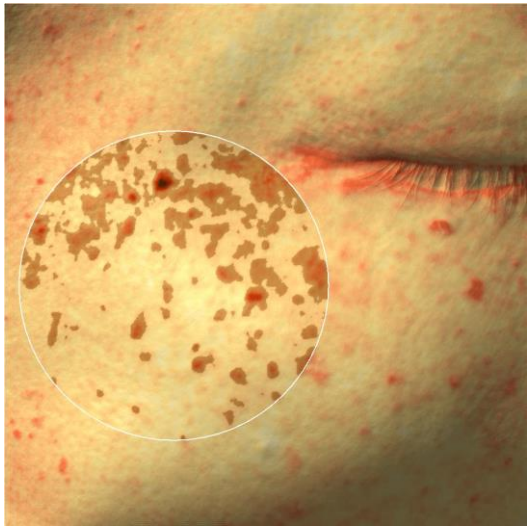
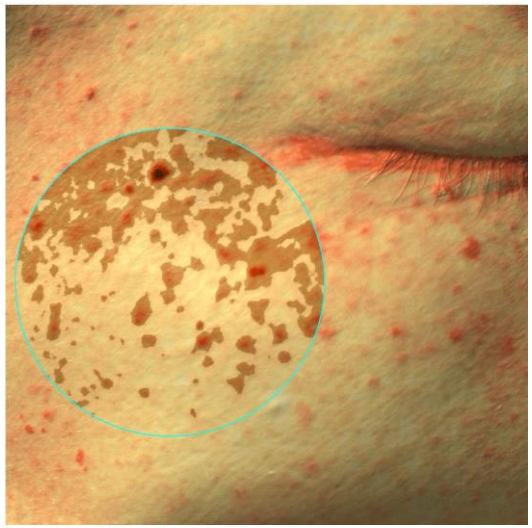
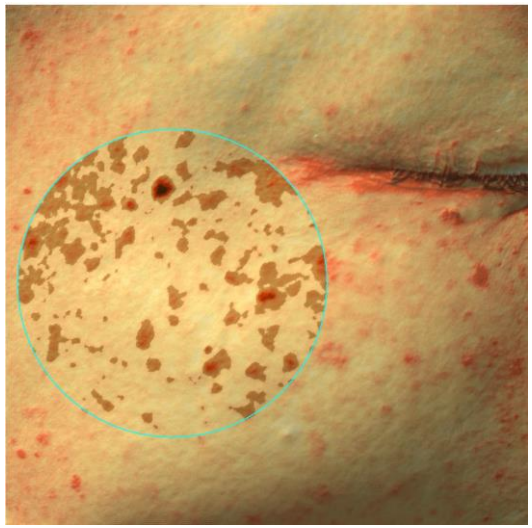
Sub. No.	Before	After 1 week use	After 4 weeks use
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02			

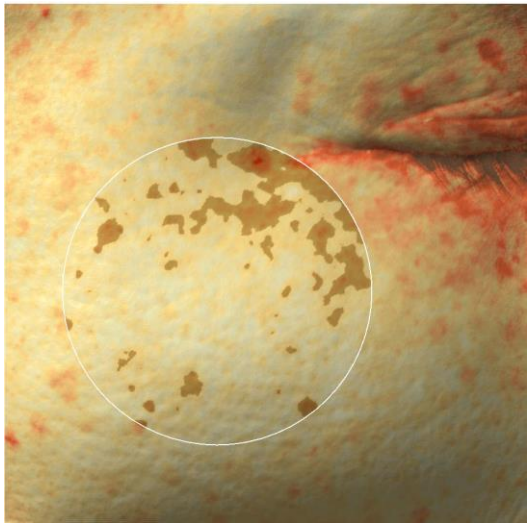
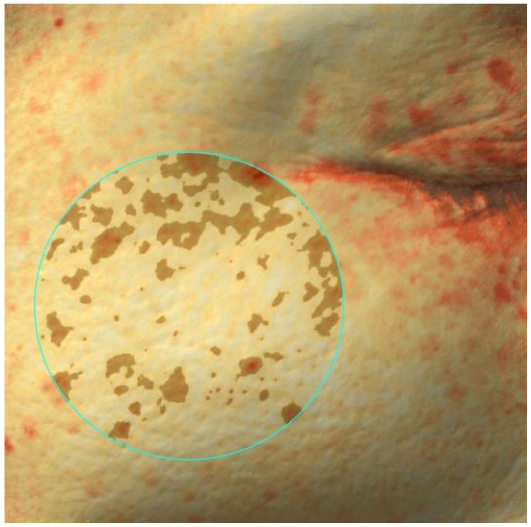
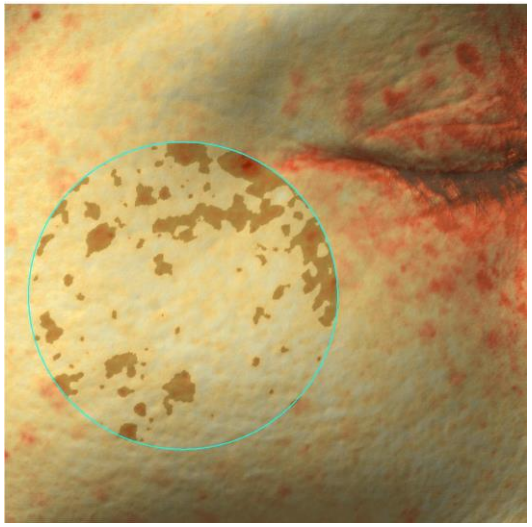
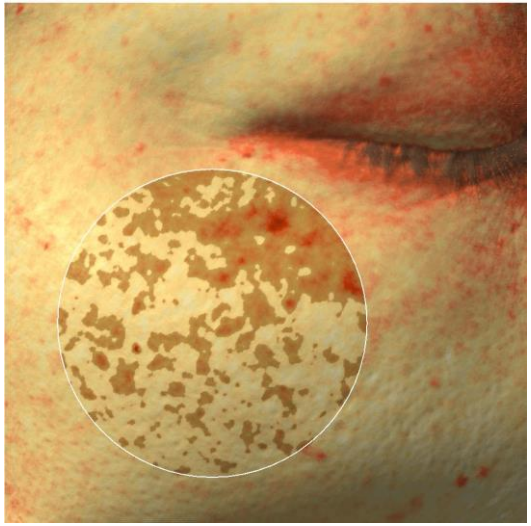
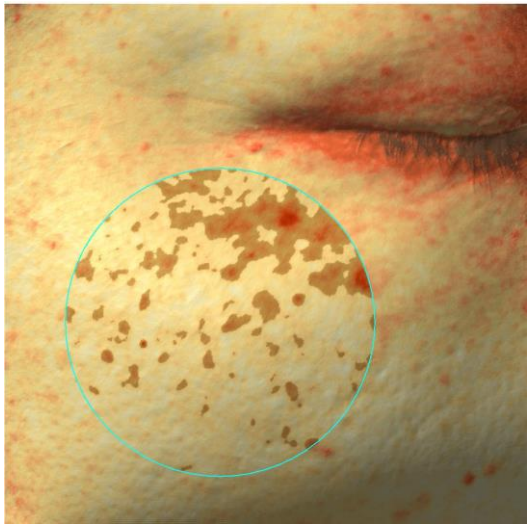
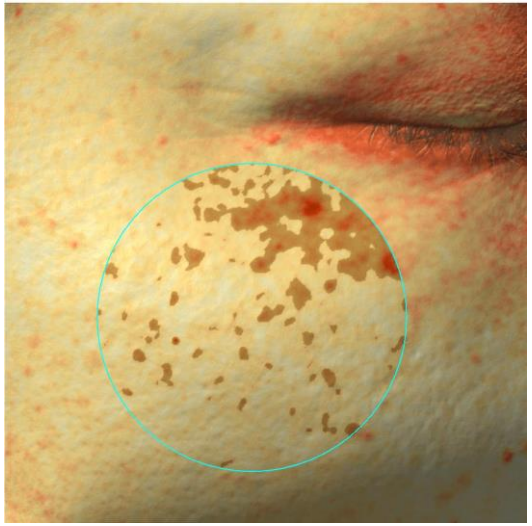
Sub. No.	Before	After 1 week use	After 4 weeks use
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04			

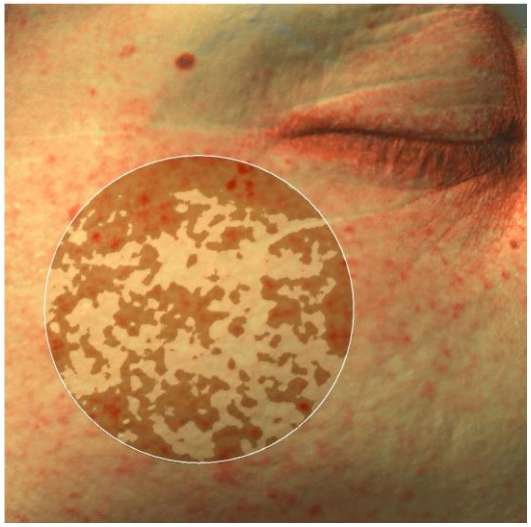
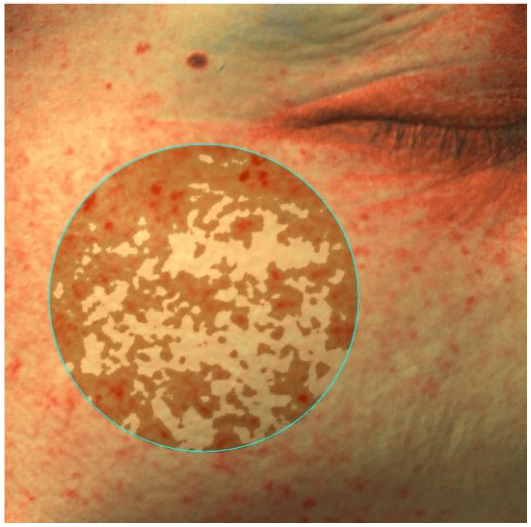
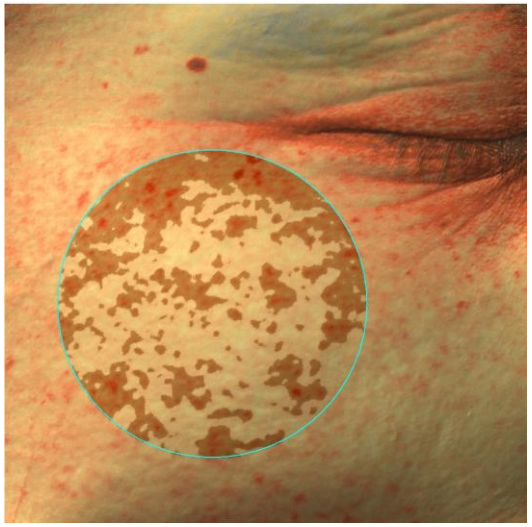
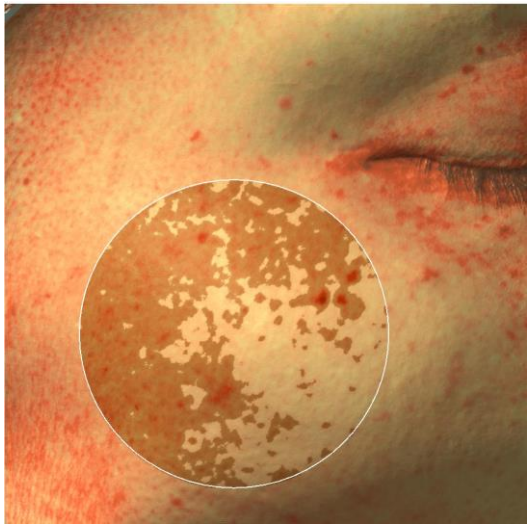
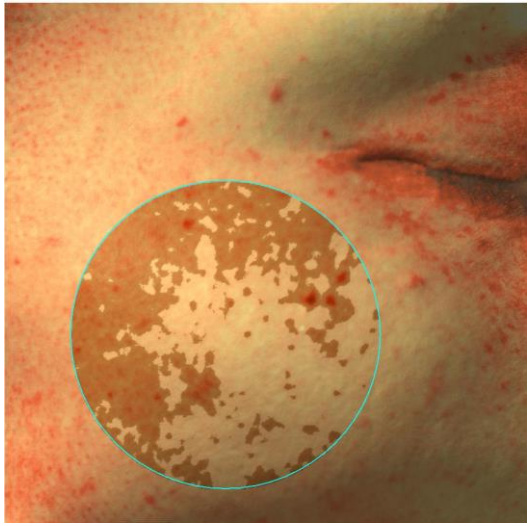
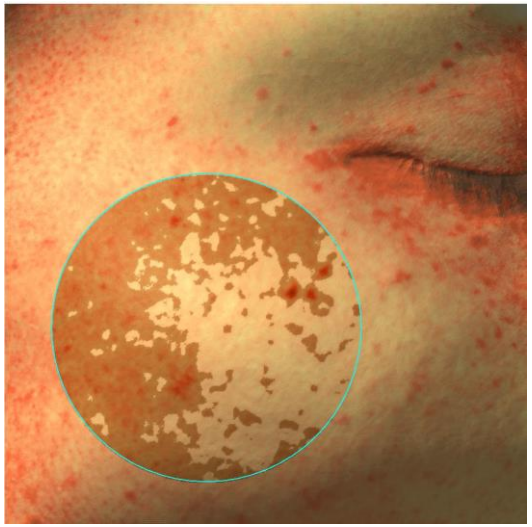
Sub. No.	Before	After 1 week use	After 4 weeks use
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06			

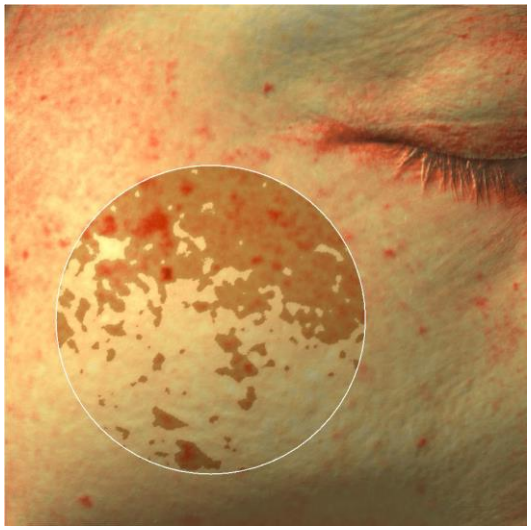
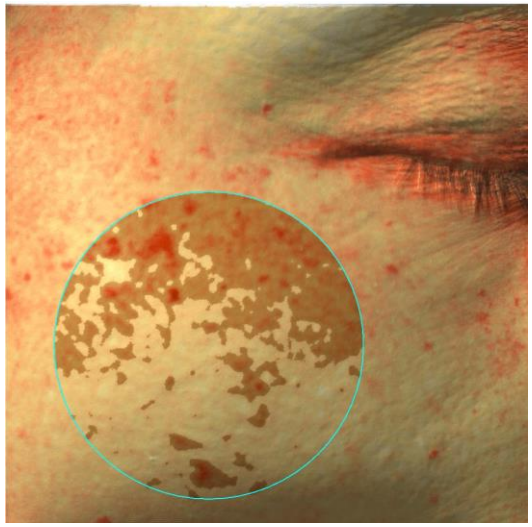
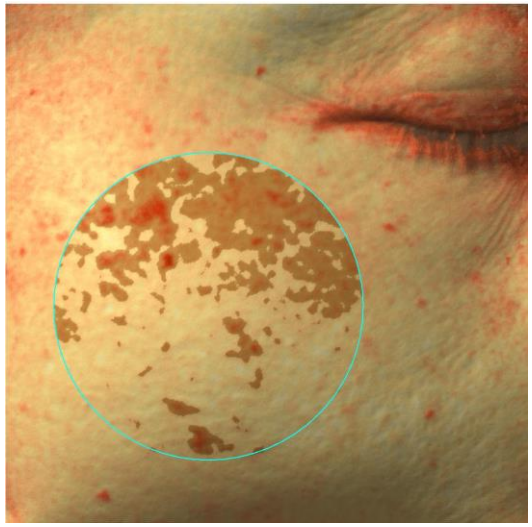
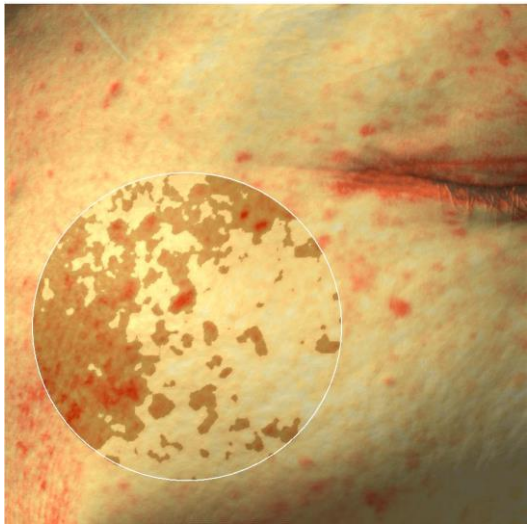
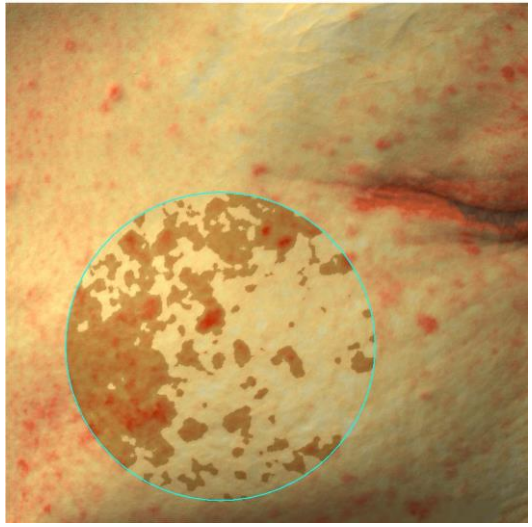
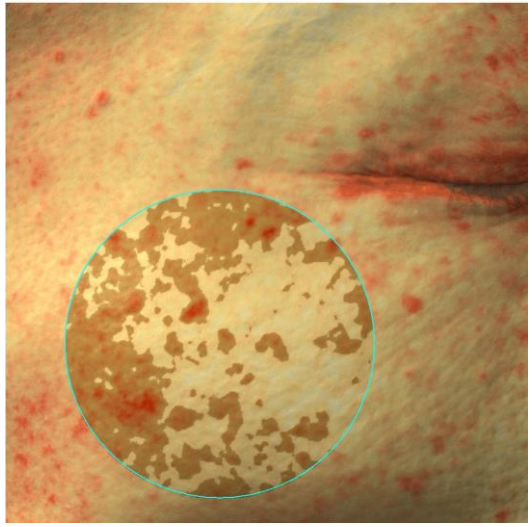
Sub. No.	Before	After 1 week use	After 4 weeks use
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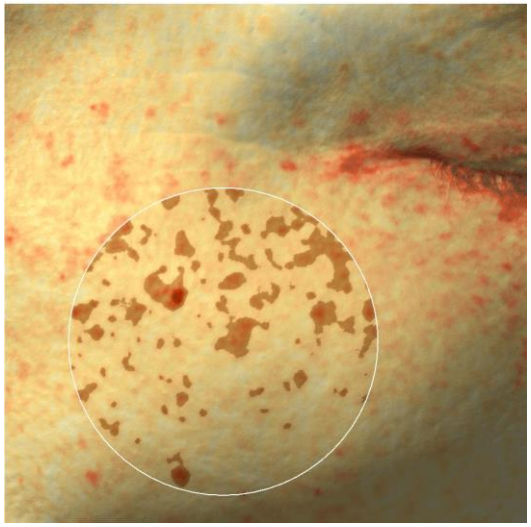
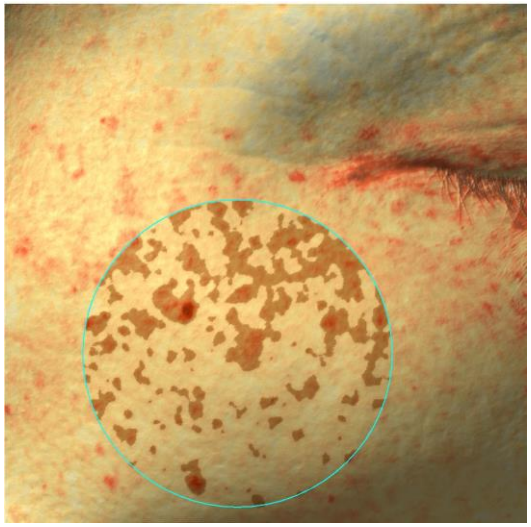
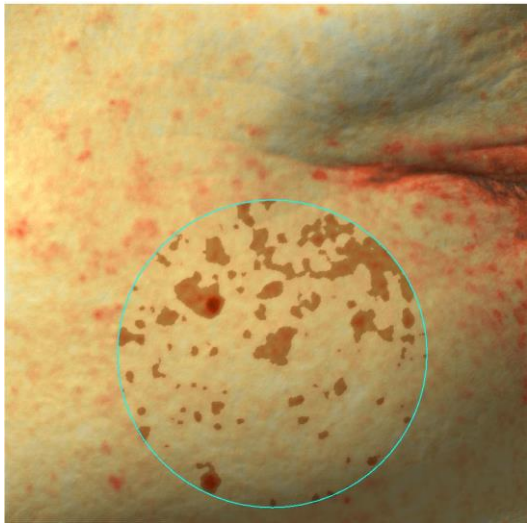
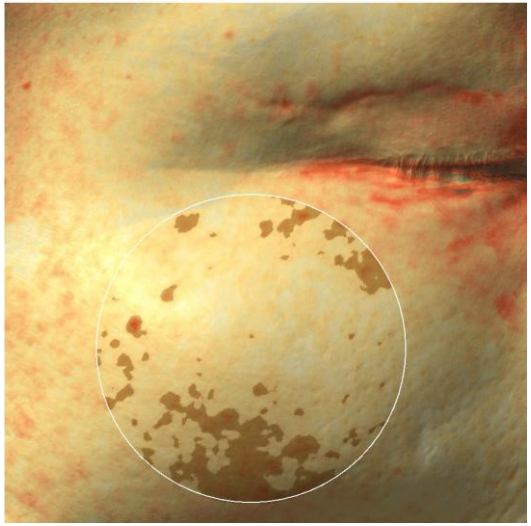
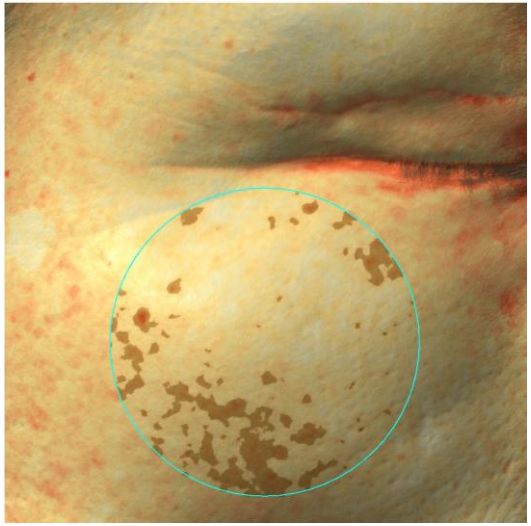
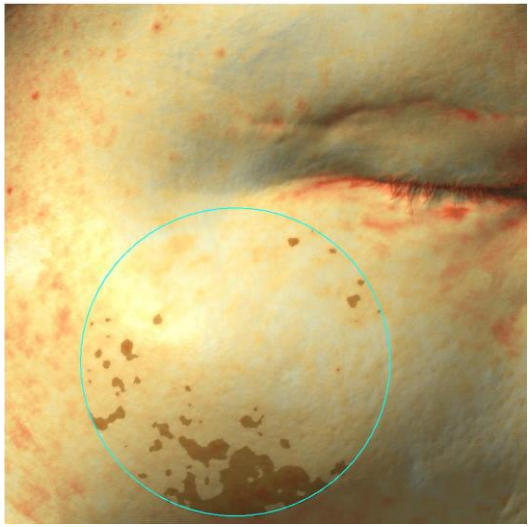
Sub. No.	Before	After 1 week use	After 4 weeks use
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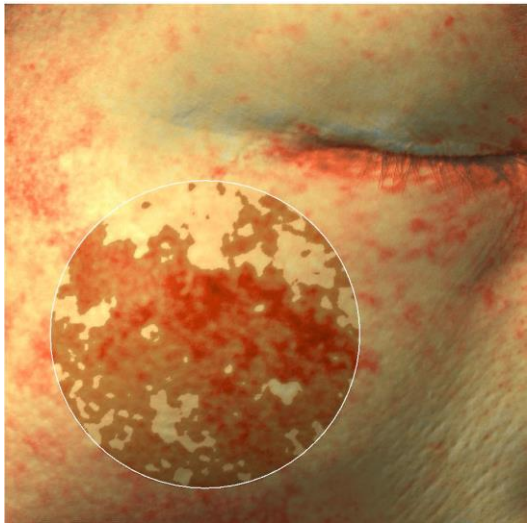
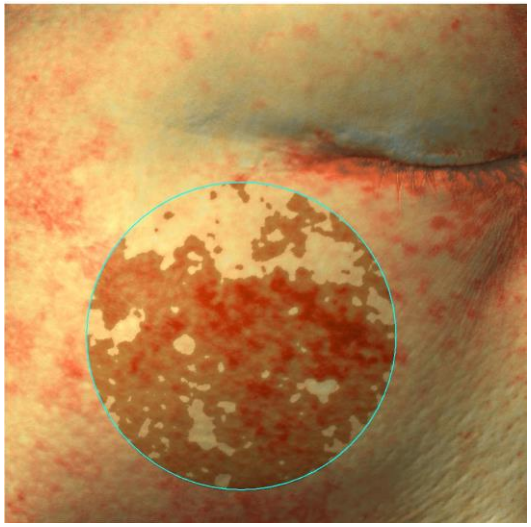
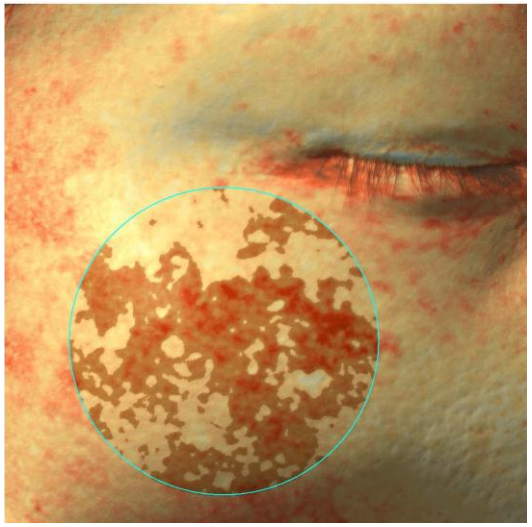
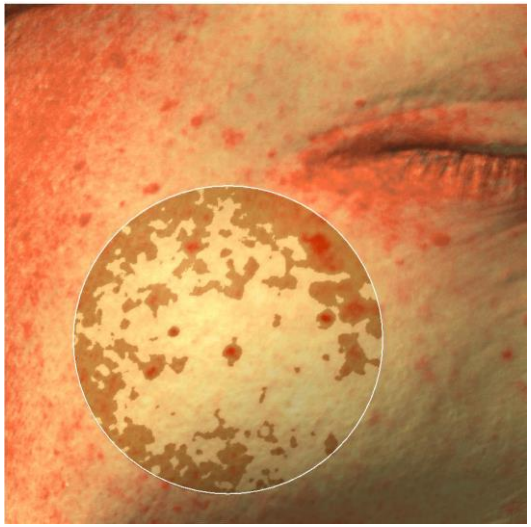
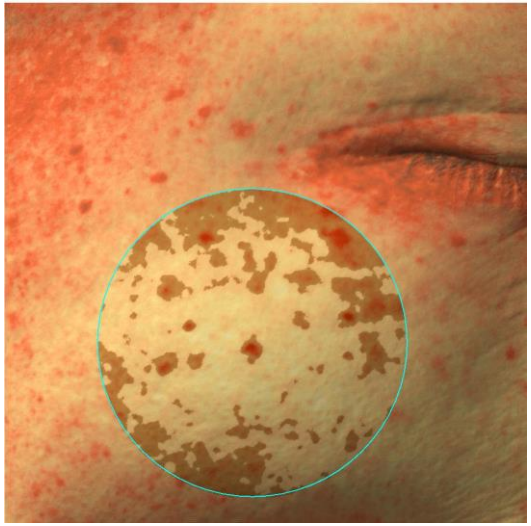
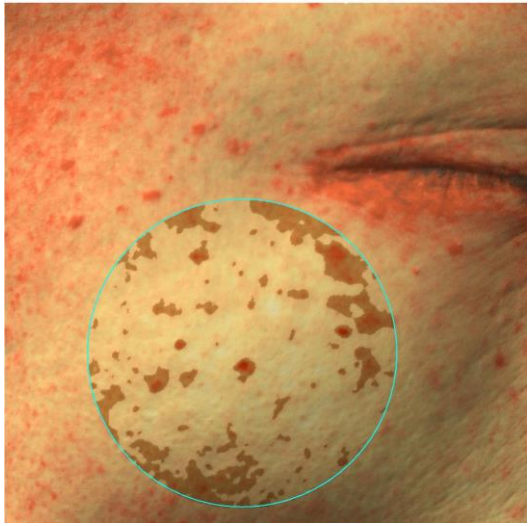
Sub. No.	Before	After 1 week use	After 4 weeks use
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12			

Sub. No.	Before	After 1 week use	After 4 weeks use
13			
14			

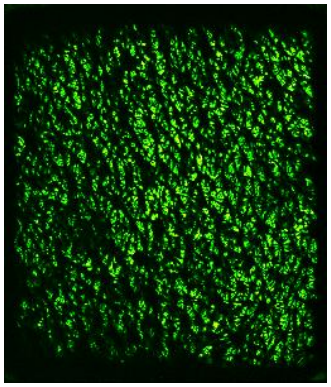
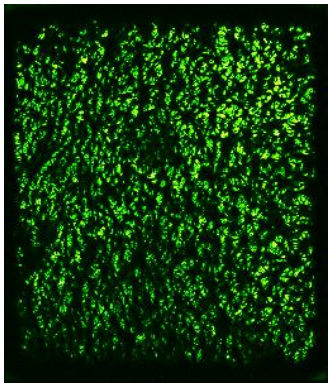
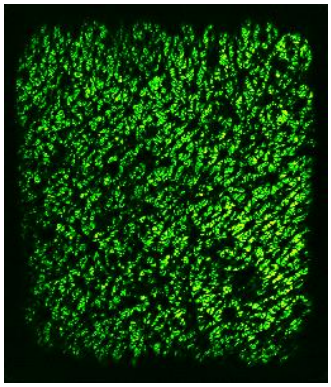
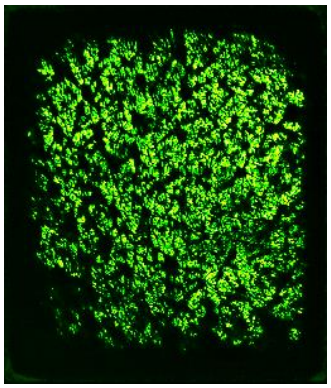
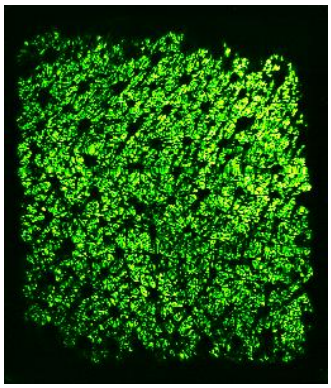
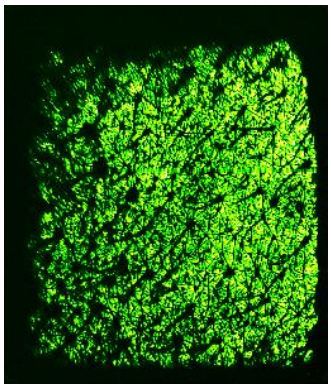
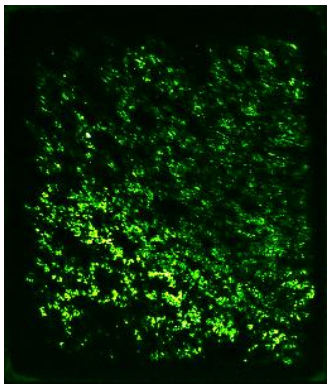
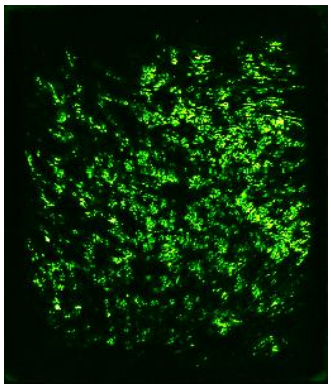
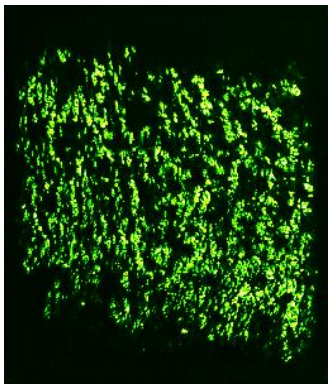
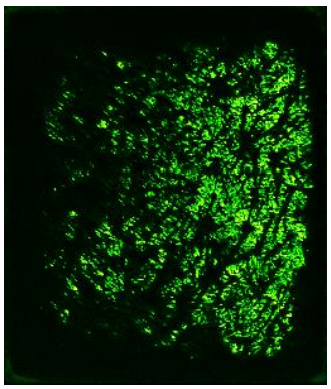
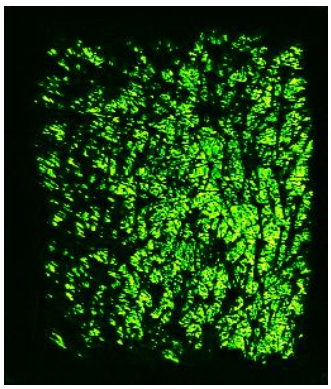
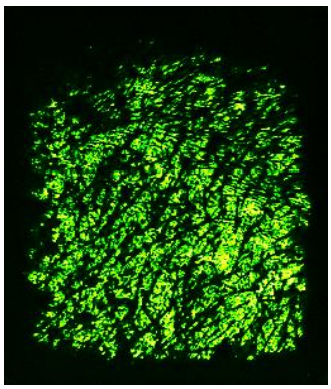
Sub. No.	Before	After 1 week use	After 4 weeks use
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16			

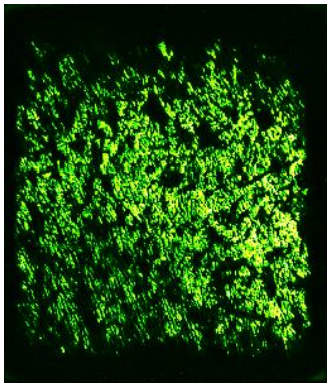
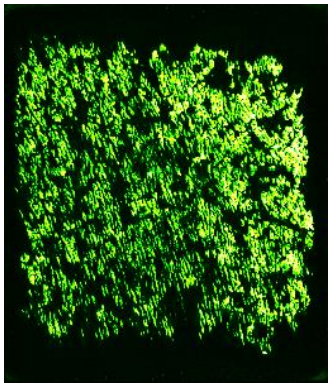
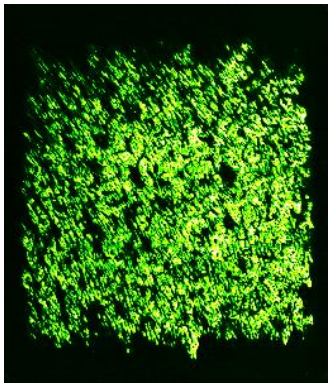
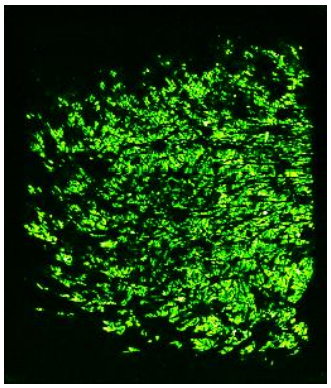
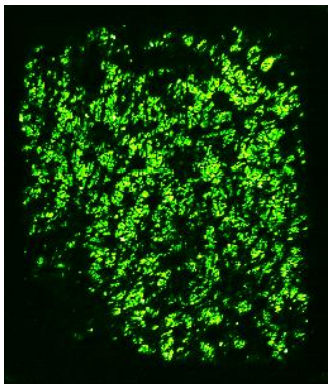
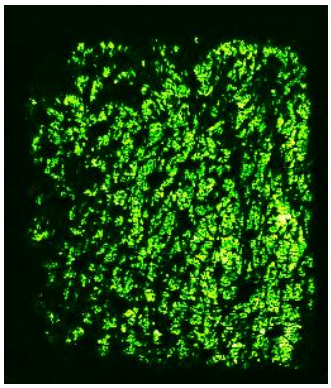
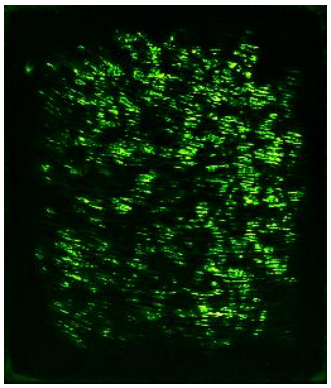
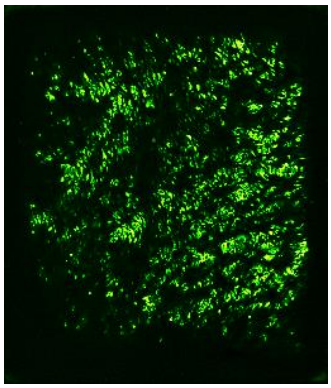
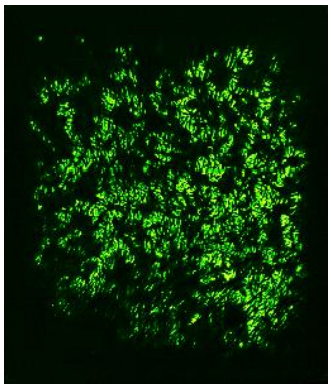
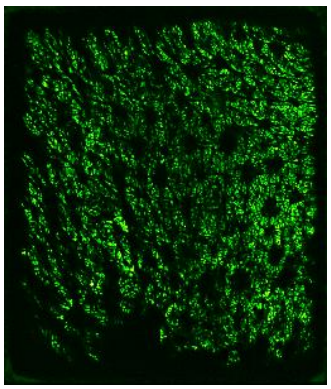
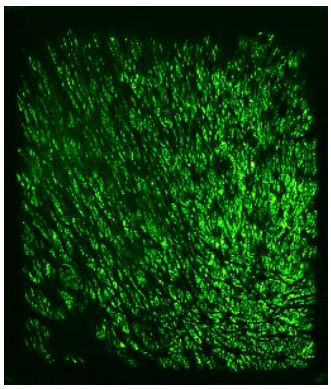
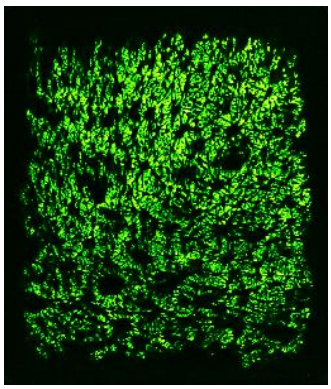
Sub. No.	Before	After 1 week use	After 4 weeks use
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18			

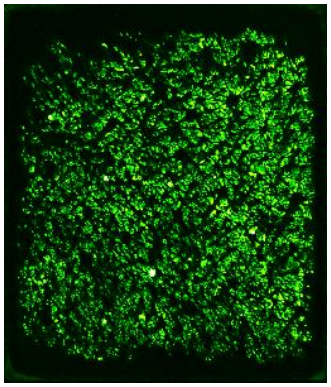
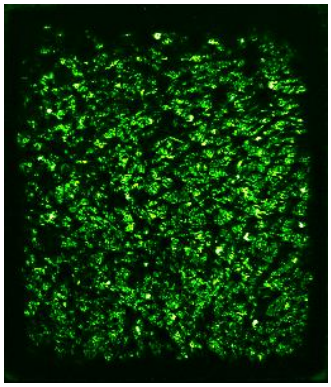
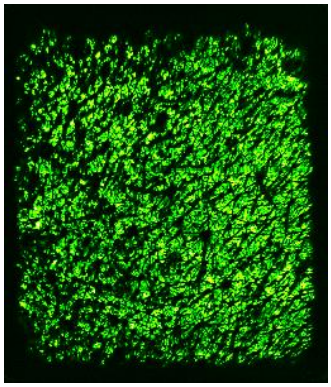
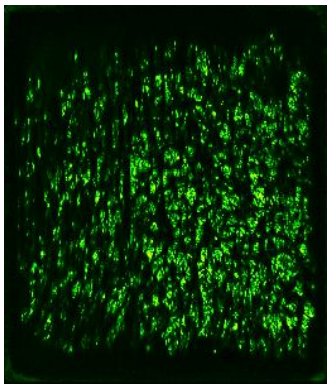
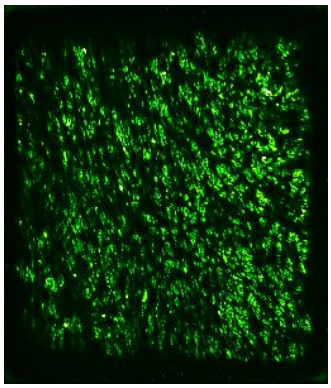
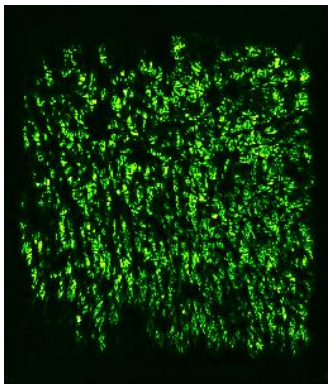
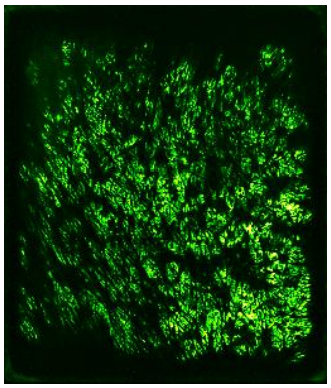
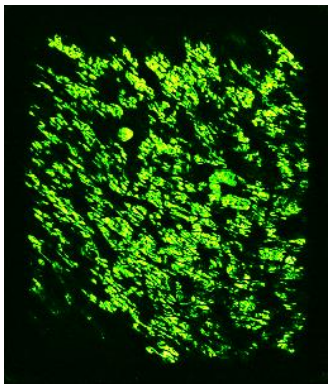
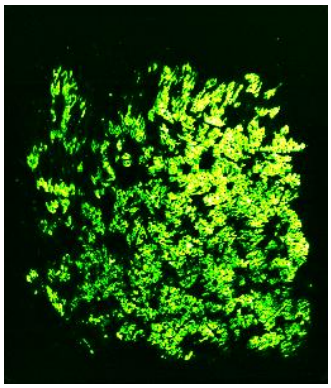
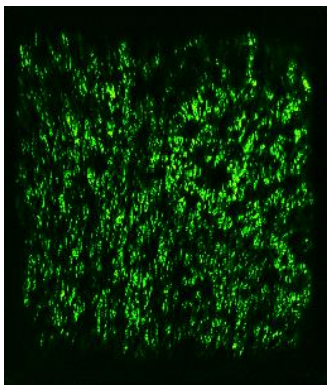
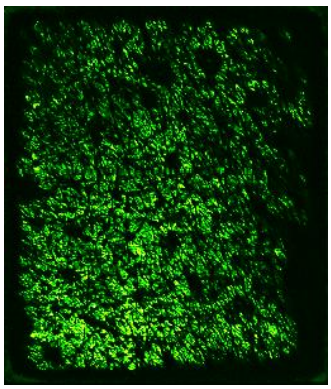
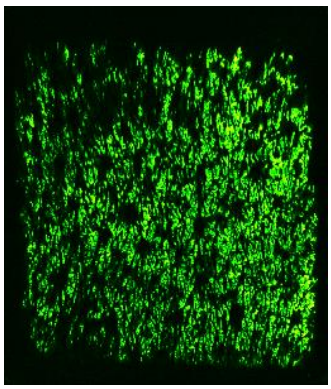
Sub. No.	Before	After 1 week use	After 4 weeks use
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20			

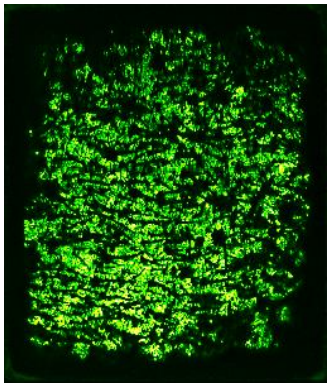
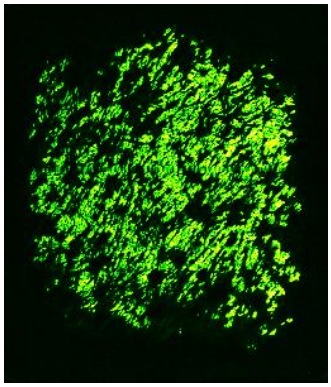
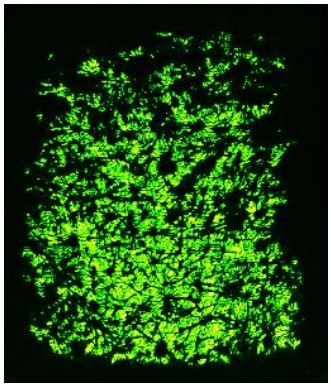
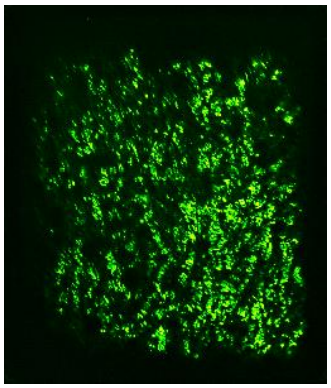
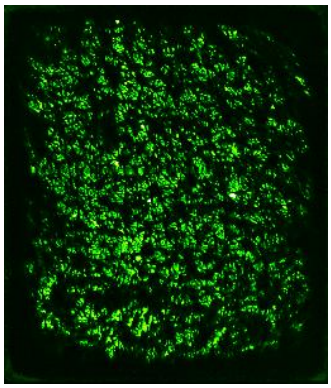
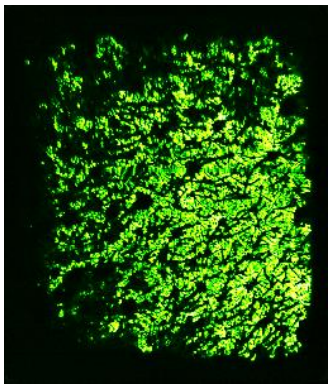
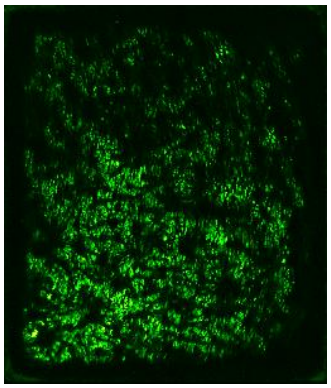
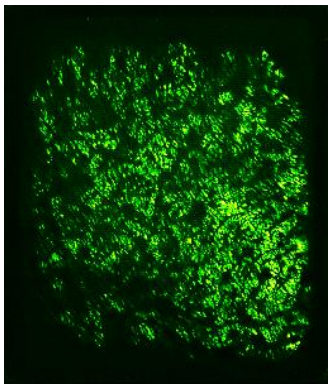
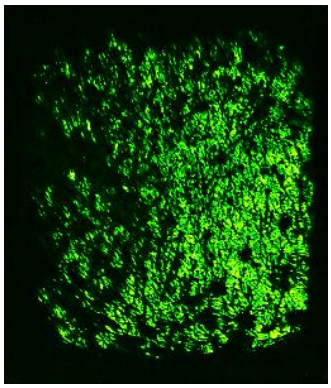
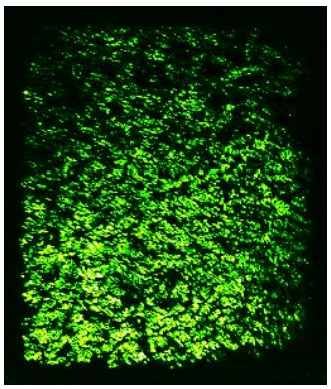
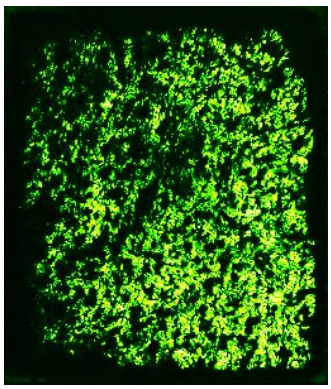
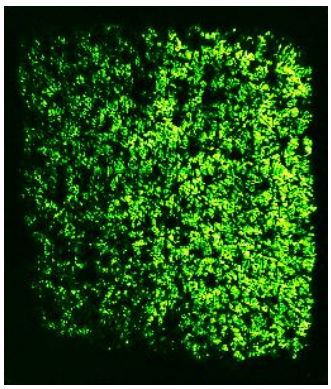
Sub. No.	Before	After 1 week use	After 4 weeks use
21			
22			

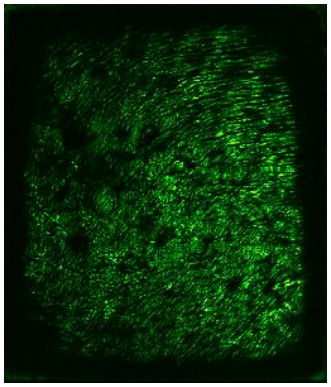
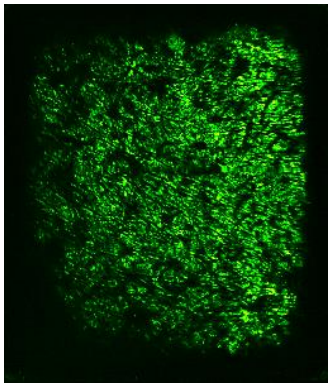
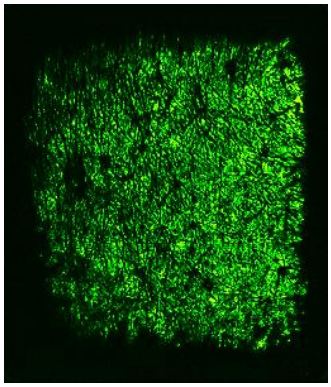
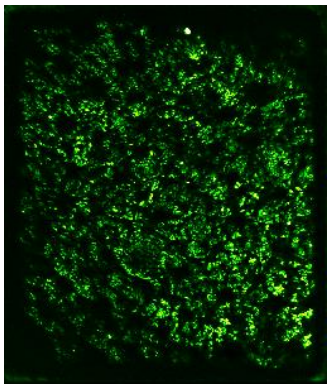
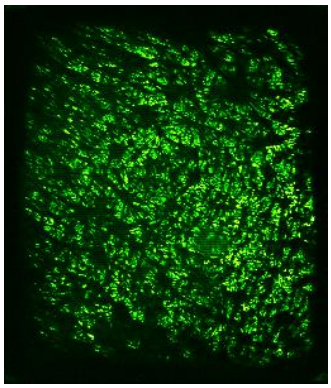
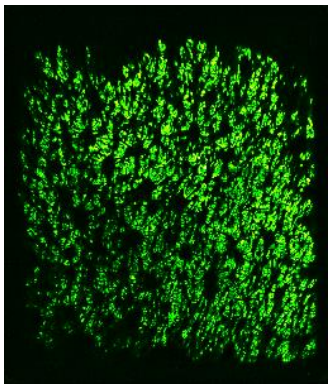
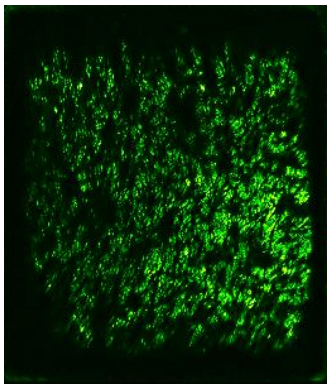
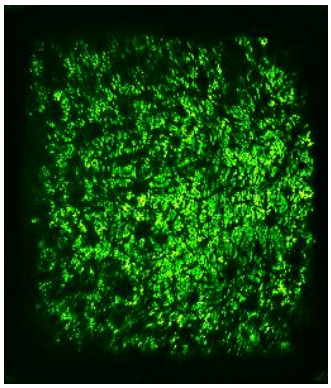
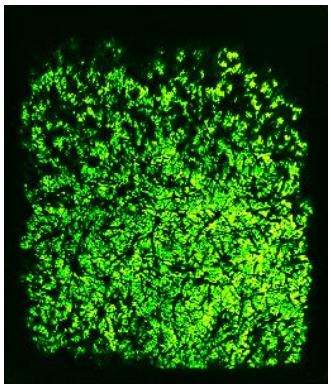
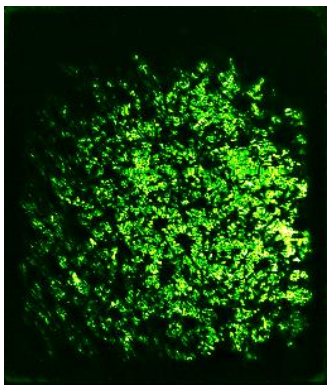
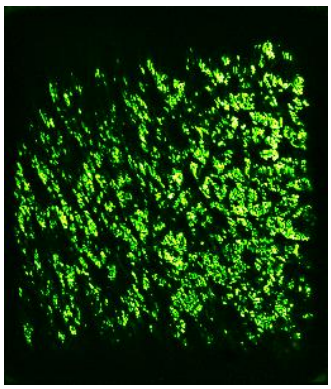
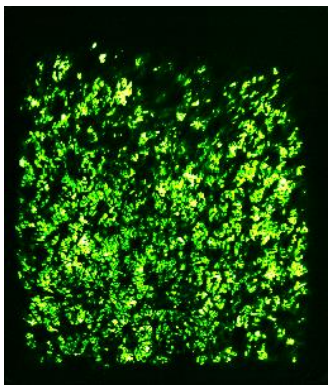
III-VII. Images of hydration (outer moisture)

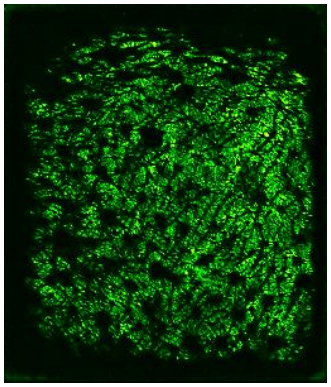
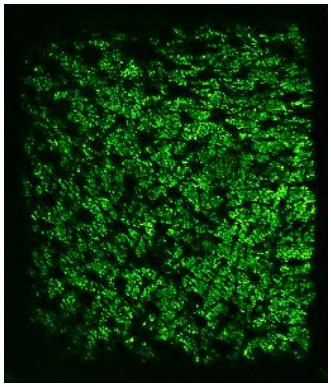
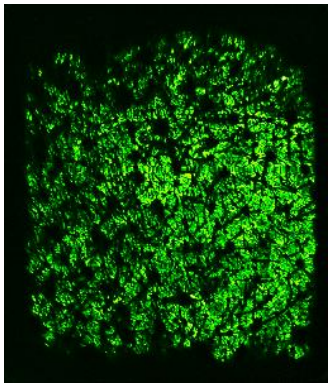
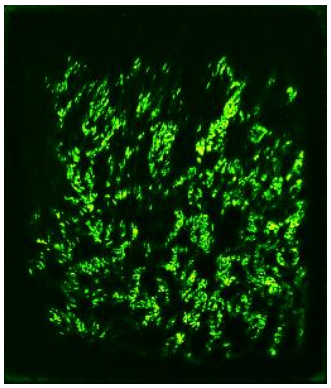
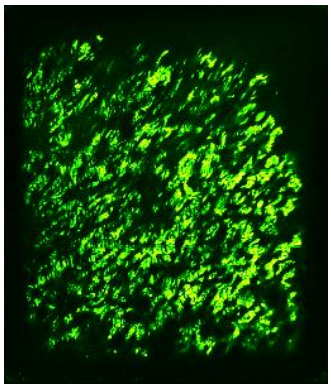
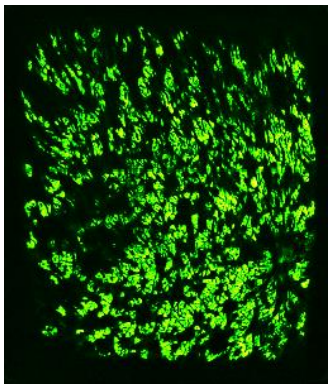
Sub. No.	Before	After 1 week use	After 4 weeks use
01			
02			
03			
04			

Sub. No.	Before	After 1 week use	After 4 weeks use
05			
06			
07			
08			

Sub. No.	Before	After 1 week use	After 4 weeks use
09			
10			
11			
12			

Sub. No.	Before	After 1 week use	After 4 weeks use
13			
14			
15			
16			

Sub. No.	Before	After 1 week use	After 4 weeks use
17			
18			
19			
20			

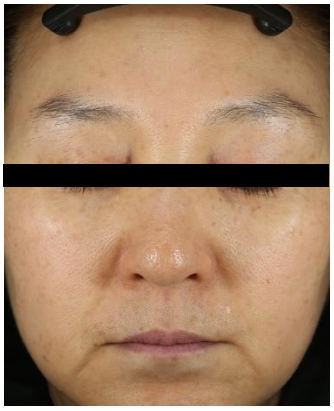
Sub. No.	Before	After 1 week use	After 4 weeks use
21			
22			

III-VIII. Images of skin gloss

Sub. No.	Before	After 1 week use	After 4 weeks use
01			
02			
03			
04			

Sub. No.	Before	After 1 week use	After 4 weeks use
05			
06			
07			
08			

Sub. No.	Before	After 1 week use	After 4 weeks use
09			
10			
11			
12			

Sub. No.	Before	After 1 week use	After 4 weeks use
13			
14			
15			
16			

Sub. No.	Before	After 1 week use	After 4 weeks use
17			
18			
19			
20			

Sub. No.	Before	After 1 week use	After 4 weeks use
21			
22			

III-IX. Images of skin transparency

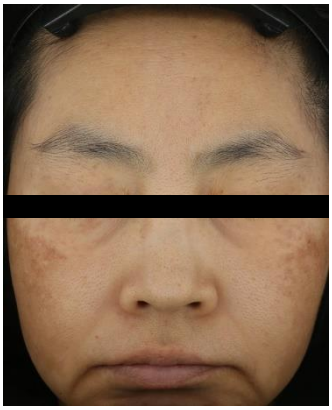
Sub. No.	Before	After 1 week use	After 4 weeks use
01			
02			
03			
04			

Sub. No.	Before	After 1 week use	After 4 weeks use
05			
06			
07			
08			

Sub. No.	Before	After 1 week use	After 4 weeks use
09			
10			
11			
12			

Sub. No.	Before	After 1 week use	After 4 weeks use
13			
14			
15			
16			

Sub. No.	Before	After 1 week use	After 4 weeks use
17			
18			
19			
20			

Sub. No.	Before	After 1 week use	After 4 weeks use
21			
22			

Appendix IV. Facilities and faculty involved in the study

■ Information of institution

Name	COREDERM Inc. Skin Research Center		
Address	4F, Kukje Bld, 56, Jungdae-ro, Songpa-gu, Seoul, Republic of Korea.		
The heads of center	Joonhwan Cho / Scientific Director		
	Boncheol Leo Goo / Medical Director, Dermatologist		
Tel	+82-2-6925-3707	Fax	+82-70-8275-3707
Email address	src@corederm.co.kr	Home page	www.corederm.co.kr

■ Clinical study items

Functional Cosmetics Test	Safety Test
➢ Human Skin Wrinkle Improvement Test ➢ Human Skin Lightening Effect Test ➢ UVA Protection Factor Test ➢ Sun Protection Factor(SPF) Test ➢ Anti-Hairloss Test ➢ Relieving Acne-like Skin Test ➢ Improving Itching through Restoring Skin Barrier	➢ Human Skin Primary Irritation Test ➢ Cumulative irritation test ➢ Human Skin Repeat Insult Patch Test(RIPT) ➢ Human Skin Sting Potential Test ➢ Human Skin In-Use Test ➢ Human Sensitive Skin Suitability Test ➢ Human Acne-Prone Skin Suitability Test

Efficacy Test	
➢ Human Skin Lightening Test ➢ Human Skin Wrinkle Test ➢ Human Skin Hydration Test ➢ Human Skin Firming & Sagging Test ➢ Human Skin Texture Test ➢ Human Skin Scale Test ➢ Human Skin Pore Test ➢ Human Skin Transparency & Gloss Test ➢ Human Skin Temperature Test ➢ Human Skin Sebum Control Test	➢ Make-up Effect Test ➢ Human Skin Cellulite Test ➢ Human Skin Swelling Relieving Test ➢ Human Hair Dandruff & Itching Test ➢ Human Skin Barrier Improvement Test ➢ Human Skin Dark Circle Test ➢ Human Skin Cleansing Test ➢ Human Skin Blood Flow Test ➢ Etc. (customized human test : body, make-up, hair and skin care products)

■ Facilities

- Ballistometer
- Mexameter MX18
- Spectrophotometer CM2600-d
- Corneometer CM825
- DUB SkinScanner
- VISIA CR 2.2
- PRIMOS lite
- Folliscope PS
- Image Analyzer System
- pH meters
- Inbody 270
- moor FLPI-2™
- Electronic scale
- Micro-gloss 60°
- Hair photo table
- MoistureMap MM 100
- Janus Pro
- Constant temperature&humidity equipment
- MoistureMeter D
- Anti-pollution Chamber
- Antera 3D CS
- FLIR T620
- Dry Sauna
- Cutometer dual MPA 580
- Cooling Fan
- Derma-Lamp
- Ammonia gas detector SKT-9300
- Epsilon-E100
- MARK-Vu
- Visiometer SV700
- D-Squame D100
- D-Squame scan 850A
- Dermalab skin hydration pintype
- Sebumeter MPA580
- Micropipette & Pistone pipette tip
- Moire / F-ray
- Tewameter TM300
- Face photo table
- Nikon D7200, D7500
- Stereo Microscope SZMN645
- Cellulite photo frame
- Magnifier SK103L
- SOPTOP MDX320
- Universal Testing Machine
- Multi Display Devices 4
- Bath Circulator
- Translucency Meter TLS850
- Radioscan™
- Oral Chroma™
- VECTRA H2
- Infrared light Irradiator
- ASW 300
- P.T.C Heater
- Voltex Mixer
- Treadmill
- SkinFibroMeter
- TMS
- SkinColorCatch

■ Medical Director

1. Boncheol Leo Goo / M.D.

Education:	1999	Medical Doctor, College of Medicine, Yonsei University
	2011	Master of Medical Science, College of Medicine, Yonsei University
Career:	2008 ~ 2010	Fellow/Researcher Seoul National University Hospital / Derpartment of Dermatology, College of Medicine, Seoul National University
	2013 ~ 2015	Director / Clinique L Dermatology
	2011 ~ 2019	Principal Director of Clinical Research, R&D Center, Lutronic corporation, Goyang, Korea
	2015 ~	Director / Naeum Dermatology and Aesthetic Clinic, Seoul, Korea
	2015 ~	Medical Director, Skin Research Center COREDERM Inc, Seoul, Korea
	2016 ~	Chief Medical Officer, R&D Center, Speclipse, Seoul, Korea
Professional Societites & Consult Board:		▪ Korean Dermatological Association, Association of Korean Dermatologists ▪ Korean Society for Laser Medicine and Surgery (Director) ▪ American Society for Laser Medicine and Surgery (Fellow) ▪ Coexistence Forum for Medical Device, The Ministry of Trade, Industry and Engergy, Korea ▪ Technical Review Board, Korean Evaluation Institute of Industrial Technology, Korea ▪ Korean Health Industry Development Institute Korea Medical Device Industrial Corp.Association

■ Staff

1. Joonhwan Cho / Research Director

Education:	1986.03 ~ 1993.02	Bachelor of Natural Science, Biochemistry, Yonsei University
	1996.09 ~ 1999.02	Master of Medical Science, Dermatology, Ajou Graduate School
Career:	1993.12 ~ 2002.01	Senior Researcher / Aekyung Industry Cosmetic Institute
	2002.01 ~ 2006.02	Clinical Team Leader / I.E.C. Korea
	2006.02 ~ 2014.03	New Drug Developmental Team Leader / GNT Pharma
	2014.04 ~ 2016.03	Research & Sales Director / P&K Skin Research Center
	2016.10 ~ 2019.02	Marketing Leader / Sam's CNS Inc.
	2019.02 ~	Research Director / COREDERM Inc., Skin Research Center

2. Yeonwoo shin / Subinvestigator

Education:	2016.02	Bachelor of Chemistry, Soongsil University
Career:	2019.11 ~ 2022.02	Researcher / Global Medical Research Center Co., Ltd. Skin Research Center
	2023.06 ~ 2023.06	Researcher / COREDERM Inc., Skin Research Center
	2023.07 ~	Senior Researcher / COREDERM Inc., Skin Research Center

3. Jihyun Hyun / Subinvestigator

Education:	2021.02	Associate of Science, Food Science & Bio Technology, Shin Ansan University
Career:	2020.09 ~ 2023.06	Researcher / COREDERM Inc., Skin Research Center
	2023.07 ~	Senior Researcher / COREDERM Inc., Skin Research Center

4. Chaeyeon Lee / Subinvestigator

Education:	2024.02	Associate of Science, Food Science & Bio Technology, Shin Ansan University
Career:	2023.06 ~	Researcher / COREDERM Inc., Skin Research Center

5. Ohyeon Kwon / Subinvestigator

Education:	2017.02	Bachelor of Science, Life Science and Biotechnology, Soonchunhyang University
Career:	2017.10 ~ 2020.06	Researcher / KC Skin Research Center
	2020.09 ~ 2022.01	Senior Researcher / COREDERM Inc., Skin Research Center
	2021.05 ~ 2022.01	Research 2 Team Leader / COREDERM Inc., Skin Research Center
	2022.02 ~	Chief Researcher, Research Team Leader / COREDERM Inc., Skin Research Center

■ Quality assurance

1. Eunjoung Kim

Education:	1990.02	Bachelor of Natural Science, Biology, Sogang University
	1992.02	Master of Natural Science, Biology, Sogang Graduate School
	2018.08	Doctor of Natural Science, Biology, Hanyang University Graduate School
Career:	1992.01 ~ 1997.03	Senior Researcher / Amore pacific Co. Ltd. R&D Center
	1998.01 ~ 2000.12	Suwon Women's College Professor
	2001.05 ~ 2006.12	Senior Researcher / Dermapro Co. Ltd. R&D Center
	2004.01 ~ 2006.12	Soekyung University Professor
	2016.02 ~	Research Director / COREDERM Inc., Skin Research Center
	2018.02 ~	CEO / COREDERM Inc., Skin Research Center

■ R&D Papers

Sung Bin Cho, Boncheol Leo Goo, Zhenlong Zheng, Kwang Ho Yoo, Jin-Soo Kang, Heesu Kim. Therapeutic efficacy and safety of a 1927-nm fractionated thulium laser on pattern hair loss: an evaluator-blinded, split-scalp study. 2018.

Boncheol Leo Goo. Laser assisted drug and cosmeceutical delivery system of the skin. 2015.

Boncheol Leo Goo, Jin-Soo Kang, Sung Bin Cho. Treatment of early-stage erythematotelangiec tatic rosacea with a Q-switched 595-nm Nd: YAG laser. Journal of Cosmetic and Laser Therapy, Volume 17, Issue 3, 2015.

Young Koo Kim, Suhyun Cho, Boncheol Leo Goo, Jin-Soo Kang, Sung Bin Cho. Long-pulsed 755-nm alexandrite laser-induced postinflammatory hyperpigmentation treated with 1,064-nm Nd:YAG laser : time course follow-up. 2014.

Boncheol Leo Goo, Jin-Soo Kang, Sung Bin Cho. Therapeutic Efficacy and Safety of Wave length-Converted 660-nm Q-Switched Ruby-Like Versatile YAG Treatment on Various Skin Pigmentation Disorders. Med Laser Epub, 14 pISSN 2287-830,July 2014.

Pok Kee Min, Boncheol Leo Goo. 830 nm light-emitting diode low level light therapy (LED-LLLT) enhances wound healing: a preliminary study. 2013.

Kee-Yang Chung, Boncheol Leo Goo. Evaluation of the Factors Related to the Pain by Fractional Energy Delivery System. 2013.

Jin-Soo Kang, Sung Bin Cho, Boncheol Leo Goo. A Pilot Split-face Comparison of Q-switched (QS) Single Pulse versus QS Quick Pulse-to-pulse 1,064-nm Nd:YAG Laser Treatment in a Patient with Melasma. 2013.

Do-Young Rhee, Hye-Rim Moon, Kee-Chan Moon, Gyeong-Hun Park, Mi-Woo Lee, Sung-Eun Chang, JeeSoo An, Jee-Ho Choi, Boncheol Leo Goo, Chong Hyun Won, Grace Lee, Ji-Hyun Lee. Long-pulsed Alexandrite Laser vs. Intense Pulsed Light for Axillary Hair Removal in Korean Women. 2012.

B Goo, HJ Chung, WJ Chung. Medical and Surgical Dermatology A Critical Guide to the World Literature. Medical and Surgical Dermatology, Volume 9, Issue 1, pp 1-6,February 2008.

Goo B, Kim DH, Lee MG. A Case of Unilateral Linear Syringoma. Korean J Dermatol, 45(1):87-89, Jan 2007.

B Goo, HJ Chung, WG Chung, KY Chung. Intramuscular immunoglobulin for recalcitrant suppurative diseases of the skin: a retrospective review of 63 cases. British Journal of Dermatology, Volume 157, Issue 3, pages 563–568, September 2007.

Boncheol Goo MD1, Sung Bin Cho MD1, Young Hun Cho MD1, Eun Hee Lee BA1, Dongsik Bang MD, PhD1, You Chan Kim MD, PhD2 and Daniel P. Vandersteen MD. Fibrolamellar nerve sheath tumor or sclerotic neurofibroma?. Journal of Cutaneous Pathology, Volume 33, Issue 11, pages 760–761, November 2006.

Goo B, Lee JH, Lee KH. A Case of Pseudoxanthoma-elasticum-like Papillary Dermal Elastoly sis. Korean J Dermatol, 44(10):1228-1230, Oct 2006.

Goo B, Lee KY, Chung KY, Chung WG. A Case of Syringoid Eccrine Carcinoma Successfully Treated with Mohs Micrographic Surgery. Korean J. Dermatol, 44(5):630-632, May 2006.

Boncheol Goo, Jae Yong Jang, Kee Yang Chung. Microcystic Adnexal Carcinoma Treated by Mohs' Micrographic Surgery. Korean J Dermatol, 44(12):1444-1447, Dec 2006.

Boncheol Goo, Sung Bin Cho, Kee Yang Chung. Sequential development of herpes zoster duplex unilateralis during oral famciclovir treatment. The Journal of Dermatology, Volume 32, Issue 11, pages 933–934, November 2005.

Boncheol Goo, Sang Gun Park, Kee Yang Chung. A case of dengue fever. Korean J Dermatol, 43(10):1371-1374, Oct 2005.

Ok-Sub Lee, Eun Joung Kim, Skin Lightening. Cosmetics & Toiletries, 1995.

Eun Joung Kim, Jong Il Kim, Changes in keratin expression of human epidermal raft culture after UV B exposure, 2nd scientific conference of the ASCS, 1995.

Eun Joung Kim, Sung Won Jung, The effectiveness of AHA in the human epidermal raft culture. 2nd scientific conference of the ASCS, 1995.

Eun Joung Kim, Jong Il Kim, A method to evaluate materials protecting from UV damages using human fibroblasts exposed to UV A+B. IFSCC, 1994.