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Evaluation of „iBrea Skin Relief Intense Recovery Cream - Peppermint Oil“ in Affecting the Natural Skin Repair Process after SDS-Induced Skin Irritation

(Cosmetic Study)

Summary

Study Sponsor .....: **IBREA GLOBAL CO., LTD.**
2F, 220, INHYANG-RO, GOCHON-EUP
GIMPO-SI, GYEONGGI-DO
KOREA

Date of Order.....: 21.05.2020

Performance of Test .....: Derma Consult Concept GmbH
and Evaluation by Hermann-Wandersleb-Ring 4
53121 Bonn
Germany

Supervisors of Study .....: Dr. med. H. Prieur, Dermatologist – Allergist
B. Nissen, Manager Derma Consult Concept

Study Code .....: DCC20S017

Test Product.....: The test product, which was coded as follows, was provided by IBREA GLOBAL CA., LTD. in May 2020:

D. iBrea Skin Relief Intense Recovery Cream - Peppermint Oil
(Lot No: MWC 0227-10; Date: 20.04.28)

Subjects .....: Number of individuals.: 20 (+ 1 reserve subject)
Sex (completing).....: 11 female, 9 male
Age range (completing)..: 21-60 years (average: 40,3)

Test Areas.....: Inner sides of forearms

Product Application.....: Duration....: 7 days
Frequency.: twice daily

Test Period.....: September / October 2020

Test Parameters .....: 1. Determination of *skin redness* with Chromameter CR 400 (Minolta, Japan)

2. Determination of Transepidermal Waterloss (TEWL) by means of Tewameter Triple TM 330 T (Courage + Khazaka GmbH, Cologne)

Design of Study.....: **Phase I – Induction of irritation**

Day 0 (start)
- Determination of the parameters in the test areas (afternoon)
- Washing with SDS solution

Days 1 - 6
- Washing with SDS solution (morning & evening)

Day 7 (after SDS)
- Washing with SDS solution (morning)
- Determination of the parameters in the test areas (6 hours after washing)
- First test product application (demonstration of application procedure)

Phase II – Evaluation of regenerative product properties

Days 8 / 9 / 11
- Test product application (morning)
- Determination of the parameters in the test areas (6 hours after test product application in the morning)
- Test product application (evening)

Days 10 / 12/ 13
- Test product application (morning & evening)

Day 14 (end regeneration)
- Final test product application (morning)
- Determination of the parameters in the test areas (6 hours after test product application in the morning)

Evaluation .....: Descriptive statistics: mean, median, minimum, maximum, variance, standard error, standard deviation; Wilcoxon Rank Test

Results .....: The test product was found to have a statistically significant regeneration effect against the damaging properties of the surfactant SDS. It was found enhance recovery from induced barrier damage and skin redness.

Methods

Chromametry

Skin color is measured by Minolta Chromameter CR 400 (Minolta, Japan) using the Commission International de l´eclairage (CIE) L*a*b* color space - a standardized, device independent system to express Colors adjusted to the non-linear Color sensitivity of human eye. In the L*a*b* color space, a color is expressed in a three-dimensional coordinate system with green-red (a* - negative values are green, positive values are red), blue-yellow (b* - negative values are blue, positive values are yellow) and L* axes (lightness). During measurement, the skin surface is illuminated by a Xenon flashlight and remitted light registered and analyzed by a photoreceiver. The Chromameter CR 400 is sensitive and accurate for the characterization of skin color and measures a spot of 8mm diameter. In reddened skin an increase in the a* value can be observed.

Before each measuring series, the instrument was calibrated against a standard white tile. Each value is the average of three recordings. Chromameter used for this study: S/N C8202118.

TEWL

Measurements of TEWL were performed with the Tewameter Triple TM 330 T (Courage & Khazaka, Cologne, Germany). The Tewameter is a device for measurement of water evaporation on skin surfaces based on the diffusion principle discovered by A. Fick in 1885. The TEWL is calculated automatically and expressed digitally in g/m^2h. Measurements were carried out in consideration of the guidelines of the standardisation group of the European Contact Dermatitis Society (Pinnagoda et al. Contact Dermatitis 1990: 22: 164-178). Each value is the average of the recordings of the three sensors. Tewameter used in this study: SN 13.29.5265.

Performance of Test

To respect the SARS-CoV-2 related legal requirements in place at the time of conduct of the study, a contact minimized study protocol was employed.

The subjects were selected from the Derma Consult Concept GmbH database. They were informed about importance and meaning of the study; they could withdraw from the study at any time without giving any reason. Written informed consent was obtained from all the subjects prior to entry into the trial. The following criteria were used for selection of subjects:

for inclusion in study:
- ≥ 18 years of age
- fundamentally clinically healthy
- ability to comply with the requirements of the study

for exclusion from study:
- skin diseases or any other medical condition interfering with the objectives of the study
- planned medical treatment during study period
- pregnancy (women)

A reserve subject, to replace a potential drop-out, started the study together with the 20 original subjects (final readings only taken in case a drop-out needed to be replaced). The subjects were

instructed not to use any topical preparations on the test areas (volar forearms) starting from seven days prior to testing (preconditioning phase) and until the end of the test. For cleansing, water or a mild syndet (Eubos® flüssig – blau; manufacturer: Dr. Hobein, D-53340 Meckenheim-Merl, Germany) was allowed only (whole study inclusive the preconditioning phase).

All visits were scheduled in the afternoon and measurements were conducted after adaptation to the controlled environmental conditions of the test institute (room temperature: 21±2°C, relative humidity: 45±10%). The subjects were expressly advised to avoid bodily exertion and water contact with the test areas during 6 hours before each visit to the test institute.

Phase I - Induction of irritation

The first measurements (skin redness, TEWL) were taken after a 1 week preconditioning phase before any treatment (day 0 - start) and subsequently, to be able to study the regenerative properties of the test product, skin irritation on the inner sides of the forearms was induced in the test areas by 1 week of twice daily washing of the forearms with Sodium Dodecyl Sulfate (SDS, purity: 99%) 5% in distilled water. After the initial washing under guidance by a Derma Consult staff member to demonstrate the correct procedure (application of 5ml SDS solution per forearm by a disposable syringe, 1 minute of massaging the solution into the skin, 5 minutes of waiting, thorough rinsing with luke-warm tap water, drying with soft paper towels), the subjects performed the SDS washing twice daily (morning & evening) at home. Approximately 6 hours after the last SDS washing (in the morning of day 7), skin redness and TEWL were recorded (day 7 - after SDS).

Phase II - Evaluation of regenerative product properties

After the measurements were taken, the subjects applied the test product for the first time (randomized location on the inner sides of the forearms) under guidance by a staff member of Derma Consult (approximately 2 mg/cm²) to demonstrate the correct product application procedure; one additional area was left untreated and served as control.

On the following days, to study the effect of the product treatment on the recovery process of the skin, home application took place (twice daily in the morning & evening) and additional measurements were taken on days 8, 9, 11 and 14 (after 1, 2, 4 and 7 days of treatment respectively) in the afternoon approximately 6 hours after the respective last product use.

Biometry

Measurement data is automatically computerized and after validity check and quality assurance stored centrally in a database. Evaluation is conducted using the software NAG® Statistical Add-Ins for Excel – NAG Ltd., United Kingdom.

Evaluated to determine the efficacy of the test product are the changes to the respective baseline values (‘day 7 (after SDS)’ to ‘day 0 (start)’; days 8, 9, 11 and 14 to ‘day 7 (after SDS)’) in the treated area as compared to the changes in the untreated area by Wilcoxon Rank test.

To assess the overall effect within a test area, the Wilcoxon Rank test with comparison to the initial condition is used (days 7, 8, 9, 11 and 14 to 'day 0 – start') – significant within-area results are not highlighted in the graphs in this report for ease of interpretation.

The 0.05 level was selected as the point of minimal acceptance of statistical significance.

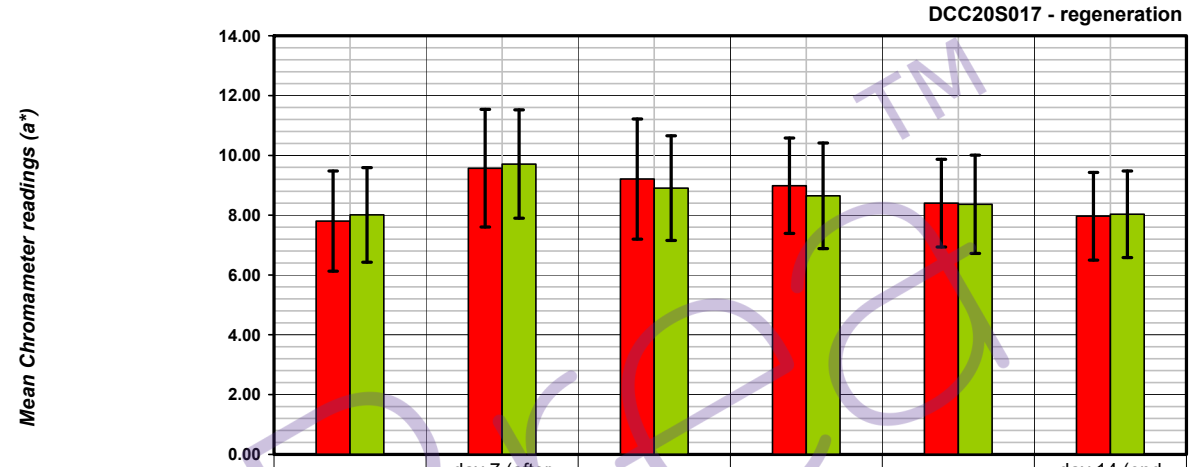
Results

During the phase II (evaluation of regenerative product properties), original subject 5 dropped out of the study due to medical reasons unrelated to the conduct of the study and was replaced by the reserve subject. The data collected from the drop-out was discarded and, as all remaining subjects, including the reserve subject, completed the study as planned, the entire evaluation is based on the complete results from 20 volunteers. The completing subjects of this study, 11 females and 9 males, were between 21 and 60 years of age (average: 40,3).

Chromametry

The solution of 5 % SDS in water induced in most of the subjects after 1 week of washing measurable and overall statistically significant skin reddening in both test areas (see figs. 1 & 2). Some of the volunteers, however, reacted with a whitening response towards the surfactant.

Experimental data of Skin Redness



	day 0 (start)	day 7 (after SDS)	day 8	day 9	day 11	day 14 (end regeneration)
untreated	7.80	9.57	9.21	8.99	8.40	7.96
D: iBrea Skin Relief Intense Recovery Cream - Peppermint Oil (Lot No: MWC 0227-10)	8.01	9.71	8.91	8.65	8.36	8.03

Fig.1: Redness - Regeneration

During the following application phase, skin redness (a*) was found to decrease in both the untreated and product treated test areas.

The decrease in the product treated test area was found to be statistically significant larger on day 9 (after 2 days of regular treatment) as compared to the changes in the untreated control area with "day 7 - after SDS" taken as baseline ($p<0,05$). On days 11 (product treated area) and 14 (untreated area), skin redness was found (in statistical terms, $p<0,05$) to have returned to its original level.

The test product was found to have a small, yet statistically significant, regeneration effect on skin redness induced by the damaging properties of the surfactant SDS as evidenced by the statistically significantly larger decrease in redness on day 9 (i.e. to enhance recovery from induced skin redness).

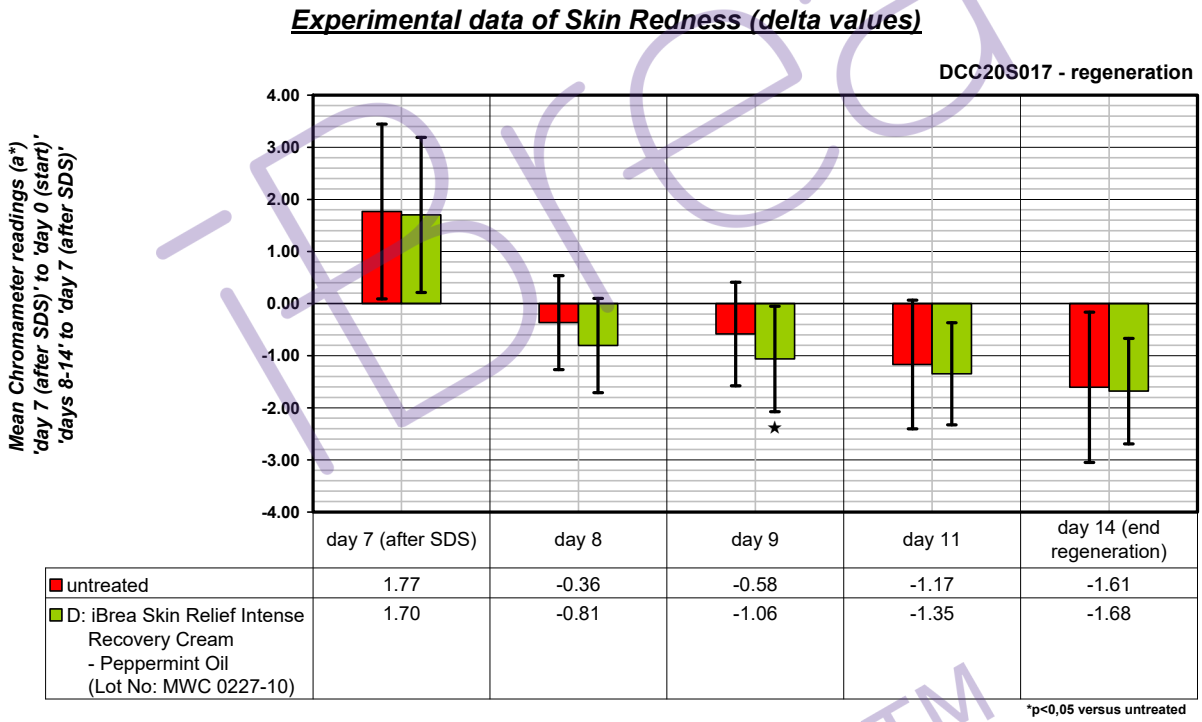


Fig.2: Δ Redness - Regeneration

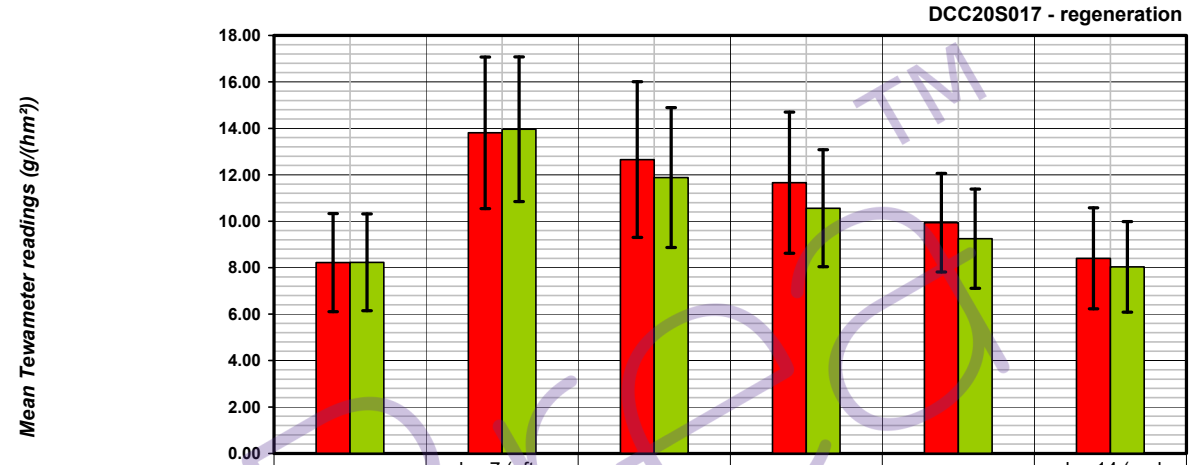
TEWL

The solution of 5 % SDS in water induced in all subjects after 1 week of washing a measurable and overall statistically significant increase in TEWL in both test areas (see figs. 3 & 4).

During the following application phase, TEWL was found to decrease in both the untreated and product treated test areas over time.

The decrease in the product treated test area was found to be statistically significant larger on days 8, 9 and 11 (after 1, 2 and 4 days of regular treatment) as compared to the changes in the untreated control area with "day 7 - after SDS" taken as baseline ($p<0,05$). On day 14, TEWL was found (in statistical terms, $p<0,05$) to have returned to its original level in both areas.

Experimental data of Transepidermal Water Loss

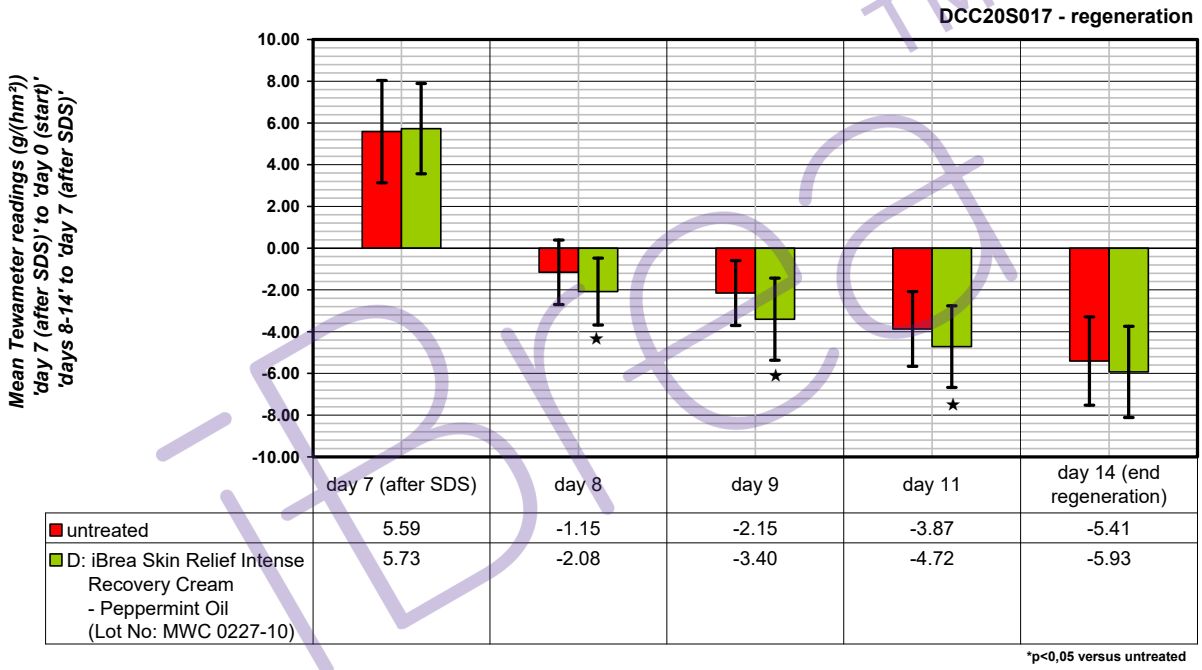


	day 0 (start)	day 7 (after SDS)	day 8	day 9	day 11	day 14 (end regeneration)
untreated	8.22	13.81	12.65	11.66	9.93	8.40
D: iBrea Skin Relief Intense Recovery Cream - Peppermint Oil (Lot No: MWC 0227-10)	8.23	13.96	11.88	10.56	9.25	8.03

Fig.3: TEWL – Regeneration

The test product was found to have a statistically significant regeneration effect against the damaging properties of the surfactant SDS with regards to its effect on the barrier function of the skin as evidenced by the statistically significantly larger decrease in TEWL on days 8, 9 and 11 (i.e. to enhance recovery from induced barrier damage).

Experimental data of Transepidermal Water Loss (delta values)



	day 7 (after SDS)	day 8	day 9	day 11	day 14 (end regeneration)
untreated	5.59	-1.15	-2.15	-3.87	-5.41
D: iBrea Skin Relief Intense Recovery Cream - Peppermint Oil (Lot No: MWC 0227-10)	5.73	-2.08	-3.40	-4.72	-5.93

Fig.4: Δ TEWL – Regeneration

Incompatibility

No incompatibility towards the test product was observed in or reported by any of the volunteers.

Signature:

B. Nissen
Manager Derma Consult Concept

Signature:

Dr. med. H. Prieur
Dermatologist - Allergist

Enclosure: Measuring values, summary statistics, statistics, graphic representations

Experimental data of Skin Redness, DCC20S017 - regeneration

Chromameter readings (a*)

	day 0 (start)		day 7 (after SDS)		day 8		day 9		day 11		day 14 (end regeneration)	
	untr.	D	untr.	D	untr.	D	untr.	D	untr.	D	untr.	D
1	5.68	6.13	9.69	8.14	10.10	7.26	8.88	7.26	8.31	7.47	6.41	6.42
2	9.19	9.36	8.20	9.05	8.68	10.08	8.85	9.57	9.52	8.89	9.32	8.20
3	4.57	4.91	7.41	7.41	5.22	5.22	6.02	5.15	5.34	5.15	4.86	5.23
4	8.90	9.27	8.98	9.74	8.97	9.33	8.72	9.44	8.64	9.36	8.84	9.14
5	9.10	9.26	9.95	11.63	9.56	10.87	9.99	9.34	10.00	8.81	9.40	8.62
6	9.12	7.40	9.97	8.46	8.67	8.60	8.75	8.73	8.77	8.00	8.74	7.47
7	7.50	8.61	10.85	10.67	9.21	9.86	9.86	9.42	8.49	9.43	8.80	8.72
8	10.92	10.06	14.93	14.12	13.41	11.93	12.87	12.03	12.02	11.67	11.50	10.71
9	8.22	8.69	7.66	7.79	8.21	7.86	9.48	8.18	7.84	7.59	8.25	7.93
10	7.82	7.91	10.43	10.31	10.55	9.17	9.80	8.48	8.69	7.98	7.72	8.07
11	6.15	6.58	6.58	7.44	6.25	6.15	6.25	5.92	6.09	5.96	6.07	6.47
12	5.46	5.88	7.27	8.23	6.78	7.75	6.39	7.24	6.45	6.50	5.98	5.62
13	7.06	7.01	8.29	8.35	7.43	7.68	7.55	6.90	7.47	6.90	7.62	6.75
14	5.24	5.52	10.39	11.26	10.92	9.88	9.81	8.71	9.34	8.10	7.19	7.99
15	8.16	7.94	10.81	9.71	9.11	8.79	9.33	8.44	7.55	7.92	7.50	7.99
16	7.68	8.39	8.78	9.48	8.99	8.00	8.78	7.97	8.26	8.15	7.84	8.22
17	8.71	8.90	9.84	11.29	11.02	8.68	9.97	9.02	9.45	9.22	8.22	8.62
18	8.14	8.08	7.83	7.94	7.66	8.20	8.37	8.00	7.89	8.27	7.78	8.06
19	8.40	9.84	11.55	11.34	11.54	11.37	10.74	11.51	8.54	10.96	8.02	9.97
20	10.07	10.44	12.00	11.85	11.84	11.45	9.32	11.65	9.39	10.94	9.25	10.42
Average	7.80	8.01	9.57	9.71	9.21	8.91	8.99	8.65	8.40	8.36	7.96	8.03
S.D.	1.68	1.58	1.97	1.81	2.01	1.75	1.60	1.76	1.47	1.64	1.47	1.45
Median	8.15	8.24	9.77	9.60	9.05	8.74	9.10	8.59	8.51	8.12	7.93	8.06

Experimental data of Skin Redness, DCC20S017 - regeneration

delta Chromameter readings (a*)

	day 7 (after SDS) t1-t0		day 8 t2-t1		day 9 t3-t1		day 11 t4-t1		day 14 (end regeneration) t5-t1	
	untr.	**D**	**untr.**	**D**	**untr.**	**D**	**untr.**	**D**	**untr.**	**D**
1	**4.01**	**2.02**	**0.41**	**-0.89**	**-0.81**	**-0.89**	**-1.38**	**-0.67**	**-3.28**	**-1.73**
2	**-0.99**	**-0.31**	**0.48**	**1.03**	**0.65**	**0.52**	**1.32**	**-0.16**	**1.12**	**-0.85**
3	**2.84**	**2.50**	**-2.19**	**-2.19**	**-1.38**	**-2.26**	**-2.06**	**-2.26**	**-2.55**	**-2.18**
4	**0.08**	**0.47**	**-0.01**	**-0.41**	**-0.26**	**-0.30**	**-0.34**	**-0.38**	**-0.14**	**-0.60**
5	**0.85**	**2.37**	**-0.39**	**-0.77**	**0.04**	**-2.29**	**0.04**	**-2.83**	**-0.56**	**-3.01**
6	**0.85**	**1.06**	**-1.30**	**0.14**	**-1.22**	**0.28**	**-1.20**	**-0.45**	**-1.23**	**-0.99**
7	**3.36**	**2.05**	**-1.64**	**-0.81**	**-0.99**	**-1.25**	**-2.37**	**-1.24**	**-2.06**	**-1.95**
8	**4.01**	**4.06**	**-1.52**	**-2.19**	**-2.06**	**-2.09**	**-2.91**	**-2.45**	**-3.43**	**-3.41**
9	**-0.56**	**-0.90**	**0.55**	**0.07**	**1.82**	**0.39**	**0.18**	**-0.20**	**0.59**	**0.14**
10	**2.61**	**2.40**	**0.12**	**-1.14**	**-0.63**	**-1.83**	**-1.75**	**-2.34**	**-2.71**	**-2.24**
11	**0.43**	**0.86**	**-0.33**	**-1.29**	**-0.33**	**-1.52**	**-0.49**	**-1.48**	**-0.51**	**-0.97**
12	**1.81**	**2.35**	**-0.49**	**-0.48**	**-0.88**	**-0.99**	**-0.82**	**-1.73**	**-1.29**	**-2.61**
13	**1.22**	**1.34**	**-0.85**	**-0.67**	**-0.73**	**-1.45**	**-0.82**	**-1.45**	**-0.67**	**-1.60**
14	**5.15**	**5.74**	**0.53**	**-1.38**	**-0.58**	**-2.55**	**-1.05**	**-3.16**	**-3.20**	**-3.26**
15	**2.65**	**1.78**	**-1.70**	**-0.93**	**-1.48**	**-1.27**	**-3.26**	**-1.79**	**-3.31**	**-1.73**
16	**1.10**	**1.09**	**0.22**	**-1.48**	**0.00**	**-1.51**	**-0.52**	**-1.33**	**-0.94**	**-1.26**
17	**1.13**	**2.39**	**1.18**	**-2.60**	**0.13**	**-2.26**	**-0.39**	**-2.06**	**-1.62**	**-2.67**
18	**-0.31**	**-0.15**	**-0.17**	**0.26**	**0.54**	**0.07**	**0.06**	**0.34**	**-0.05**	**0.12**
19	**3.15**	**1.50**	**-0.01**	**0.02**	**-0.81**	**0.17**	**-3.02**	**-0.38**	**-3.53**	**-1.37**
20	**1.94**	**1.41**	**-0.16**	**-0.40**	**-2.69**	**-0.20**	**-2.61**	**-0.91**	**-2.75**	**-1.43**
Average	**1.77**	**1.70**	**-0.36**	**-0.81**	**-0.58**	**-1.06**	**-1.17**	**-1.35**	**-1.61**	**-1.68**
S.D.	**1.68**	**1.49**	**0.90**	**0.90**	**1.00**	**1.01**	**1.23**	**0.98**	**1.44**	**1.01**
Median	**1.52**	**1.64**	**-0.16**	**-0.79**	**-0.68**	**-1.26**	**-0.94**	**-1.39**	**-1.46**	**-1.66**

Descriptive Statistics of Skin Redness, DCC20S017 - regeneration

day 0 (start)

	untr.	D
Valid cases	20.0	20.0
Mean	7.8	8.0
Std. error of mean	0.4	0.4
Variance	2.8	2.5
Std. Deviation	1.7	1.6
Variation Coefficient	0.2	0.2
Minimum	4.6	4.9
Maximum	10.9	10.4
Median	8.1	8.2

day 7 (after SDS)

	untr.	D
Valid cases	20.0	20.0
Mean	9.6	9.7
Std. error of mean	0.4	0.4
Variance	3.9	3.3
Std. Deviation	2.0	1.8
Variation Coefficient	0.2	0.2
Minimum	6.6	7.4
Maximum	14.9	14.1
Median	9.8	9.6

day 8

	untr.	D
Valid cases	20.0	20.0
Mean	9.2	8.9
Std. error of mean	0.4	0.4
Variance	4.0	3.1
Std. Deviation	2.0	1.8
Variation Coefficient	0.2	0.2
Minimum	5.2	5.2
Maximum	13.4	11.9
Median	9.1	8.7

day 9

	untr.	D
Valid cases	20.0	20.0
Mean	9.0	8.6
Std. error of mean	0.4	0.4
Variance	2.5	3.1
Std. Deviation	1.6	1.8
Variation Coefficient	0.2	0.2
Minimum	6.0	5.2
Maximum	12.9	12.0
Median	9.1	8.6

day 11

	untr.	D
Valid cases	20.0	20.0
Mean	8.4	8.4
Std. error of mean	0.3	0.4
Variance	2.2	2.7
Std. Deviation	1.5	1.6
Variation Coefficient	0.2	0.2
Minimum	5.3	5.2
Maximum	12.0	11.7
Median	8.5	8.1

day 14 (end regeneration)

	untr.	D
Valid cases	20.0	20.0
Mean	8.0	8.0
Std. error of mean	0.3	0.3
Variance	2.2	2.1
Std. Deviation	1.5	1.4
Variation Coefficient	0.2	0.2
Minimum	4.9	5.2
Maximum	11.5	10.7
Median	7.9	8.1

Wilcoxon Rank Test of Skin Redness, DCC20S017 - regeneration

day 0 (start) - day 7 (after SDS)

	untr.	D
Rank sum (positive)	13	8
Z-value	-3.4159	-3.6026
Significance	0.0002	0.0000
non-zero observations	20	20

day 0 (start) - day 8

	untr.	D
Rank sum (positive)	21	23
Z-value	-3.1173	-3.0426
Significance	0.0009	0.0012
non-zero observations	20	20

day 0 (start) - day 9

	untr.	D
Rank sum (positive)	18	35
Z-value	-3.2293	-2.5946
Significance	0.0005	0.0073
non-zero observations	20	20

day 0 (start) - day 11

	untr.	D
Rank sum (positive)	42	61
Z-value	-2.3333	-1.6240
Significance	0.0172	0.1054
non-zero observations	20	20

day 0 (start) - day 14 (end regeneration)

	untr.	D
Rank sum (positive)	85	115
Z-value	-0.7280	0.3547
Significance	0.4749	0.7214
non-zero observations	20	20

Wilcoxon Rank Test of Skin Redness, DCC20S017 - regeneration

day 0 (start) - comparison of absolute values

	untr. - D
Rank sum (positive)	47
Z-value	-2.1466
Significance	0.0296
non-zero observations	20

day 7 (after SDS) - comparison of changes from initial condition

	untr. - D
Rank sum (positive)	104
Z-value	-0.0187
Significance	0.9854
non-zero observations	20

day 8 - comparison of changes from t1

	untr. - D
Rank sum (positive)	141
Z-value	1.3253
Significance	0.1893
non-zero observations	20

day 9 - comparison of changes from t1

	untr. - D
Rank sum (positive)	158
Z-value	1.9600
Significance	0.0484
non-zero observations	20

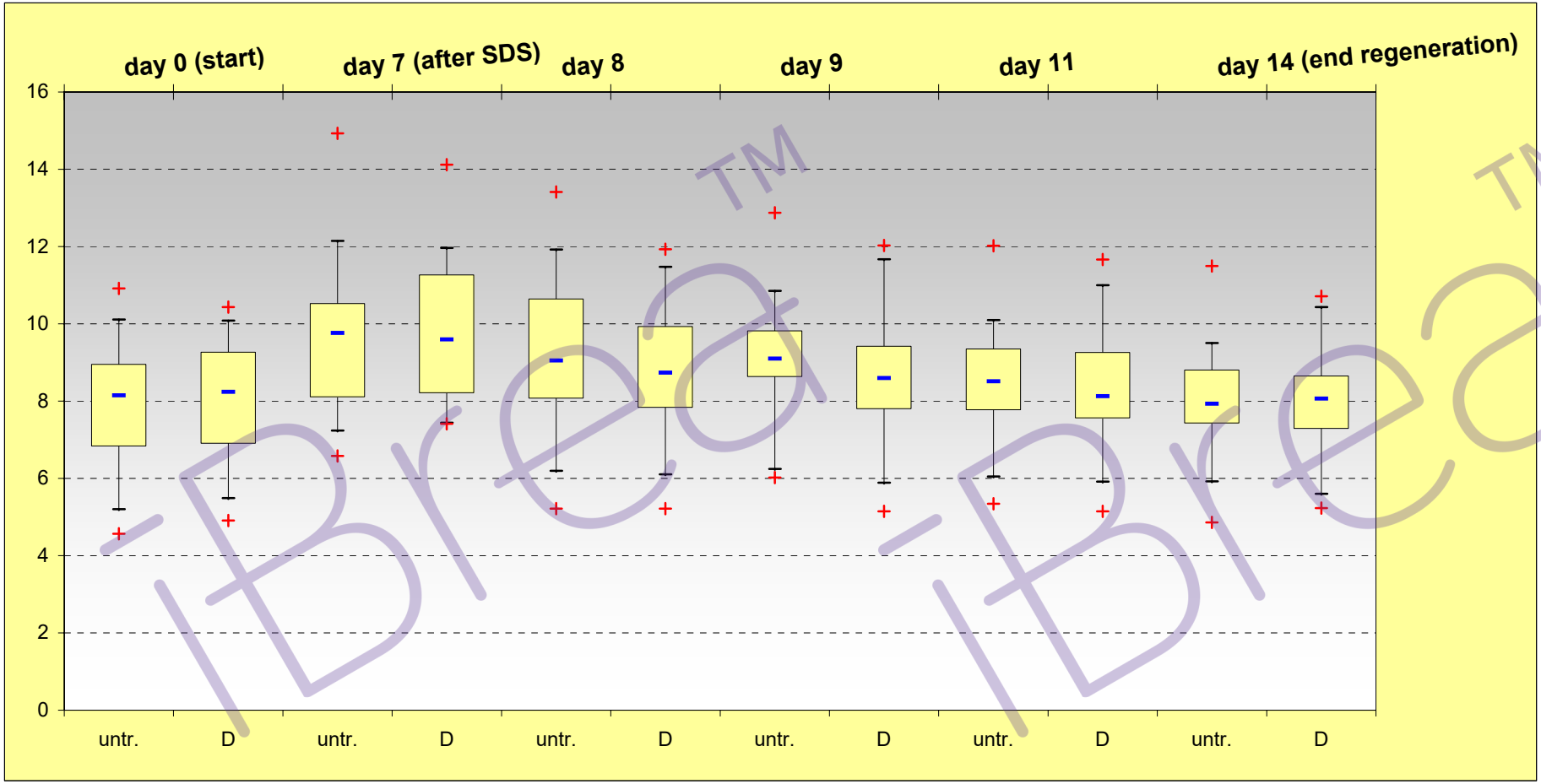
day 11 - comparison of changes from t1

	untr. - D
Rank sum (positive)	122
Z-value	0.6160
Significance	0.5459
non-zero observations	20

day 14 (end regeneration) - comparison of changes from t1

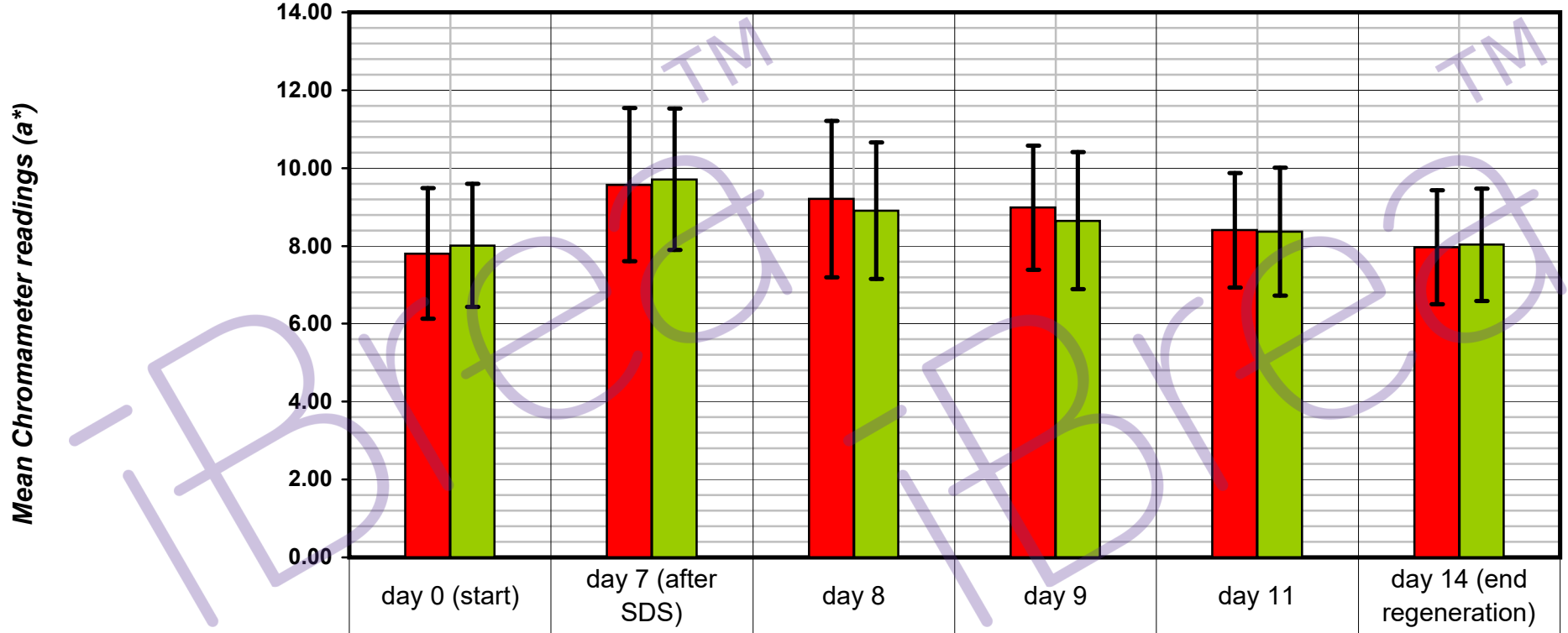
	untr. - D
Rank sum (positive)	112
Z-value	0.2427
Significance	0.8124
non-zero observations	20

Box & Whisker Plot of Skin Redness, DCC20S017 - regeneration



Experimental data of Skin Redness

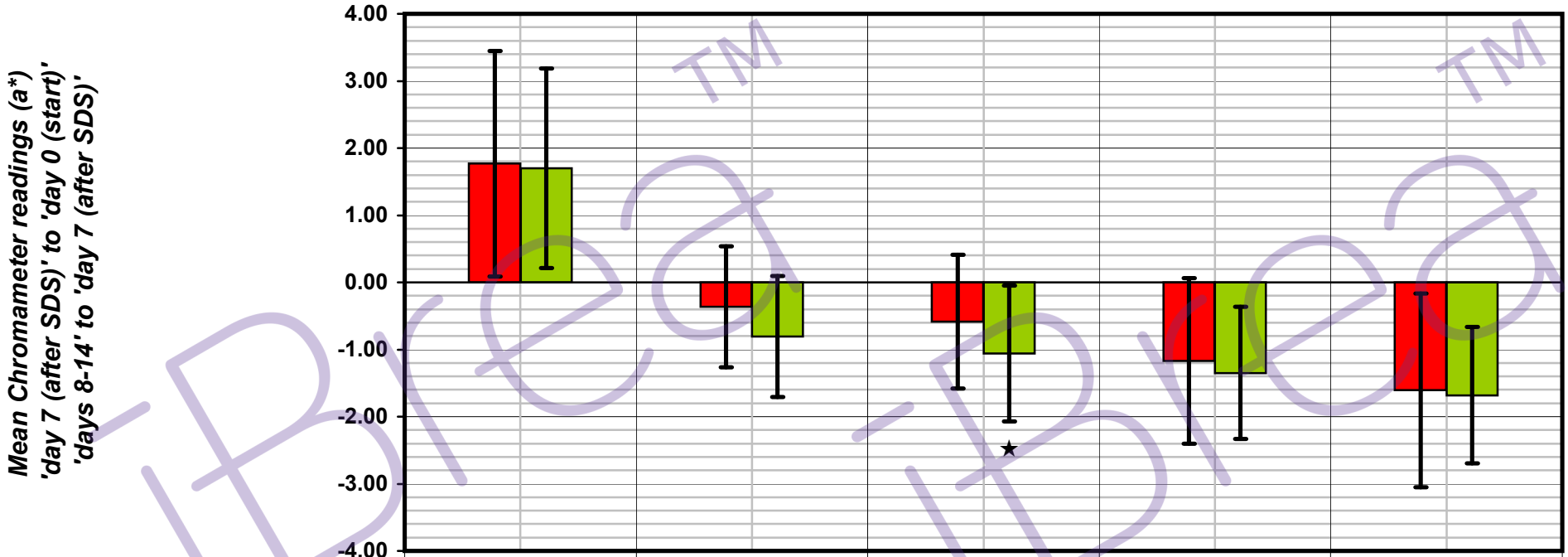
DCC20S017 - regeneration



	day 0 (start)	day 7 (after SDS)	day 8	day 9	day 11	day 14 (end regeneration)
untreated	7.80	9.57	9.21	8.99	8.40	7.96
D: iBrea Skin Relief Intense Recovery Cream - Peppermint Oil (Lot No: MWC 0227-10)	8.01	9.71	8.91	8.65	8.36	8.03

Experimental data of Skin Redness (delta values)

DCC20S017 - regeneration



	day 7 (after SDS)	day 8	day 9	day 11	day 14 (end regeneration)
untreated	1.77	-0.36	-0.58	-1.17	-1.61
D: iBrea Skin Relief Intense Recovery Cream - Peppermint Oil (Lot No: MWC 0227-10)	1.70	-0.81	-1.06	-1.35	-1.68

***p<0,05 versus untreated**

Experimental data of Transepidermal Water Loss, DCC20S017 - regeneration

Tewameter readings (g/(hm²))

	day 0 (start)		day 7 (after SDS)		day 8		day 9		day 11		day 14 (end regeneration)	
	untr.	D	untr.	D	untr.	D	untr.	D	untr.	D	untr.	D
1	8.52	8.37	20.16	18.74	18.99	15.09	17.17	13.68	12.76	10.50	10.61	8.94
2	12.24	12.99	15.55	17.57	14.01	15.88	13.33	11.32	12.98	10.35	13.69	11.18
3	9.21	9.73	12.88	11.81	13.32	12.00	12.56	12.06	10.97	9.99	9.28	10.06
4	6.73	5.91	14.21	11.34	11.70	9.01	9.16	8.28	7.56	7.41	7.17	5.56
5	7.44	7.10	12.34	11.92	9.83	10.27	8.98	9.00	7.46	8.36	7.35	7.46
6	6.33	6.92	11.14	12.88	9.08	9.55	8.45	9.14	7.83	6.51	6.56	6.62
7	12.66	9.76	16.15	14.12	12.72	11.42	12.51	9.82	12.12	9.35	11.31	8.97
8	9.01	9.30	14.78	17.72	15.05	15.32	13.01	15.30	10.94	13.49	9.26	9.68
9	5.98	6.25	10.85	11.13	10.85	11.95	9.71	10.51	8.78	7.21	6.13	7.29
10	7.20	7.82	10.41	12.25	8.72	10.32	7.82	11.34	8.29	10.39	6.83	7.10
11	6.36	7.33	8.59	9.36	9.28	9.33	9.43	7.72	7.83	7.66	6.38	7.97
12	6.57	6.64	11.34	12.57	10.36	10.26	9.22	9.81	8.22	7.85	6.48	6.19
13	8.37	8.26	14.69	15.09	14.74	16.58	14.42	13.30	9.81	12.29	8.78	8.04
14	10.01	11.11	17.28	19.03	16.04	16.33	15.00	14.86	12.78	12.55	10.14	12.00
15	10.65	11.17	18.71	17.27	15.90	15.28	14.75	12.21	12.09	10.31	10.52	9.51
16	6.15	5.67	7.58	7.94	6.35	5.29	6.25	5.57	5.97	5.17	5.66	5.13
17	5.85	5.17	12.53	12.79	9.58	9.26	9.10	7.35	9.09	6.83	6.07	5.16
18	7.66	6.75	14.92	14.33	16.43	11.80	15.25	10.21	11.43	9.54	7.75	6.41
19	6.61	8.29	15.46	14.76	16.90	10.35	14.35	10.64	10.30	9.54	7.65	7.55
20	10.78	10.08	16.56	16.64	13.24	12.33	12.71	9.06	11.48	9.65	10.41	9.83
Average	8.22	8.23	13.81	13.96	12.65	11.88	11.66	10.56	9.93	9.25	8.40	8.03
S.D.	2.11	2.09	3.27	3.12	3.35	3.01	3.04	2.52	2.12	2.14	2.18	1.95
Median	7.55	8.04	14.45	13.50	12.98	11.61	12.54	10.36	10.05	9.54	7.70	7.76

Experimental data of Transepidermal Water Loss, DCC20S017 - regeneration

delta Tewameter readings (g/(hm²))

	day 7 (after SDS) t1-t0		day 8 t2-t1		day 9 t3-t1		day 11 t4-t1		day 14 (end regeneration) t5-t1	
	untr.	D	untr.	D	untr.	D	untr.	D	untr.	D
1	11.64	10.37	-1.17	-3.65	-2.99	-5.07	-7.40	-8.24	-9.55	-9.80
2	3.31	4.59	-1.54	-1.69	-2.22	-6.25	-2.57	-7.22	-1.86	-6.40
3	3.67	2.08	0.44	0.19	-0.32	0.25	-1.91	-1.82	-3.60	-1.75
4	7.48	5.42	-2.50	-2.33	-5.05	-3.06	-6.65	-3.93	-7.04	-5.77
5	4.89	4.82	-2.51	-1.64	-3.35	-2.92	-4.87	-3.56	-4.99	-4.45
6	4.82	5.96	-2.06	-3.34	-2.70	-3.75	-3.31	-6.37	-4.59	-6.26
7	3.49	4.36	-3.43	-2.70	-3.64	-4.30	-4.03	-4.77	-4.84	-5.15
8	5.77	8.42	0.27	-2.40	-1.77	-2.42	-3.84	-4.23	-5.52	-8.04
9	4.87	4.88	0.00	0.82	-1.14	-0.62	-2.06	-3.92	-4.72	-3.84
10	3.21	4.43	-1.69	-1.93	-2.59	-0.91	-2.13	-1.86	-3.58	-5.14
11	2.22	2.03	0.69	-0.02	0.84	-1.64	-0.75	-1.70	-2.21	-1.38
12	4.78	5.94	-0.99	-2.32	-2.12	-2.76	-3.13	-4.72	-4.87	-6.39
13	6.32	6.83	0.05	1.49	-0.27	-1.78	-4.88	-2.79	-5.91	-7.04
14	7.27	7.92	-1.24	-2.70	-2.28	-4.17	-4.50	-6.48	-7.14	-7.03
15	8.07	6.11	-2.81	-2.00	-3.96	-5.06	-6.62	-6.97	-8.19	-7.76
16	1.43	2.26	-1.23	-2.64	-1.33	-2.37	-1.61	-2.76	-1.92	-2.80
17	6.67	7.62	-2.95	-3.53	-3.42	-5.44	-3.44	-5.96	-6.45	-7.63
18	7.26	7.58	1.51	-2.53	0.33	-4.12	-3.49	-4.79	-7.17	-7.92
19	8.85	6.46	1.44	-4.40	-1.11	-4.12	-5.16	-5.21	-7.81	-7.21
20	5.78	6.56	-3.33	-4.31	-3.85	-7.58	-5.08	-6.99	-6.15	-6.81
Average	5.59	5.73	-1.15	-2.08	-2.15	-3.40	-3.87	-4.72	-5.41	-5.93
S.D.	2.45	2.16	1.55	1.60	1.56	1.97	1.79	1.95	2.11	2.19
Median	5.33	5.95	-1.23	-2.36	-2.25	-3.40	-3.67	-4.75	-5.26	-6.39

Descriptive Statistics of Transepidermal Water Loss, DCC20S017 - regeneration

day 0 (start)

	untr.	D
Valid cases	20.0	20.0
Mean	8.2	8.2
Std. error of mean	0.5	0.5
Variance	4.5	4.3
Std. Deviation	2.1	2.1
Variation Coefficient	0.3	0.3
Minimum	5.9	5.2
Maximum	12.7	13.0
Median	7.6	8.0

day 7 (after SDS)

	untr.	D
Valid cases	20.0	20.0
Mean	13.8	14.0
Std. error of mean	0.7	0.7
Variance	10.7	9.7
Std. Deviation	3.3	3.1
Variation Coefficient	0.2	0.2
Minimum	7.6	7.9
Maximum	20.2	19.0
Median	14.4	13.5

day 8

	untr.	D
Valid cases	20.0	20.0
Mean	12.7	11.9
Std. error of mean	0.7	0.7
Variance	11.2	9.1
Std. Deviation	3.4	3.0
Variation Coefficient	0.3	0.3
Minimum	6.4	5.3
Maximum	19.0	16.6
Median	13.0	11.6

day 9

	untr.	D
Valid cases	20.0	20.0
Mean	11.7	10.6
Std. error of mean	0.7	0.6
Variance	9.2	6.4
Std. Deviation	3.0	2.5
Variation Coefficient	0.3	0.2
Minimum	6.3	5.6
Maximum	17.2	15.3
Median	12.5	10.4

day 11

	untr.	D
Valid cases	20.0	20.0
Mean	9.9	9.2
Std. error of mean	0.5	0.5
Variance	4.5	4.6
Std. Deviation	2.1	2.1
Variation Coefficient	0.2	0.2
Minimum	6.0	5.2
Maximum	13.0	13.5
Median	10.1	9.5

day 14 (end regeneration)

	untr.	D
Valid cases	20.0	20.0
Mean	8.4	8.0
Std. error of mean	0.5	0.4
Variance	4.7	3.8
Std. Deviation	2.2	2.0
Variation Coefficient	0.3	0.2
Minimum	5.7	5.1
Maximum	13.7	12.0
Median	7.7	7.8

Wilcoxon Rank Test of Transepidermal Water Loss, DCC20S017 - regeneration

day 0 (start) - comparison of absolute values

	untr. - D
Rank sum (positive)	94
Z-value	-0.3920
Significance	0.6942
non-zero observations	20

day 7 (after SDS) - comparison of changes from initial condition

	untr. - D
Rank sum (positive)	89
Z-value	-0.5787
Significance	0.5706
non-zero observations	20

day 8 - comparison of changes from t1

	untr. - D
Rank sum (positive)	159
Z-value	1.9973
Significance	0.0441
non-zero observations	20

day 9 - comparison of changes from t1

	untr. - D
Rank sum (positive)	180
Z-value	2.7813
Significance	0.0037
non-zero observations	20

day 11 - comparison of changes from t1

	untr. - D
Rank sum (positive)	160
Z-value	2.0346
Significance	0.0400
non-zero observations	20

day 14 (end regeneration) - comparison of changes from t1

	untr. - D
Rank sum (positive)	143
Z-value	1.4000
Significance	0.1650
non-zero observations	20

Wilcoxon Rank Test of Transepidermal Water Loss, DCC20S017 - regeneration

day 0 (start) - day 7 (after SDS)

	untr.	D
Rank sum (positive)	0	0
Z-value	-3.9013	-3.9013
Significance	0.0000	0.0000
non-zero observations	20	20

day 0 (start) - day 8

	untr.	D
Rank sum (positive)	0	1
Z-value	-3.9013	-3.8639
Significance	0.0000	0.0000
non-zero observations	20	20

day 0 (start) - day 9

	untr.	D
Rank sum (positive)	2	12
Z-value	-3.8266	-3.4533
Significance	0.0000	0.0001
non-zero observations	20	20

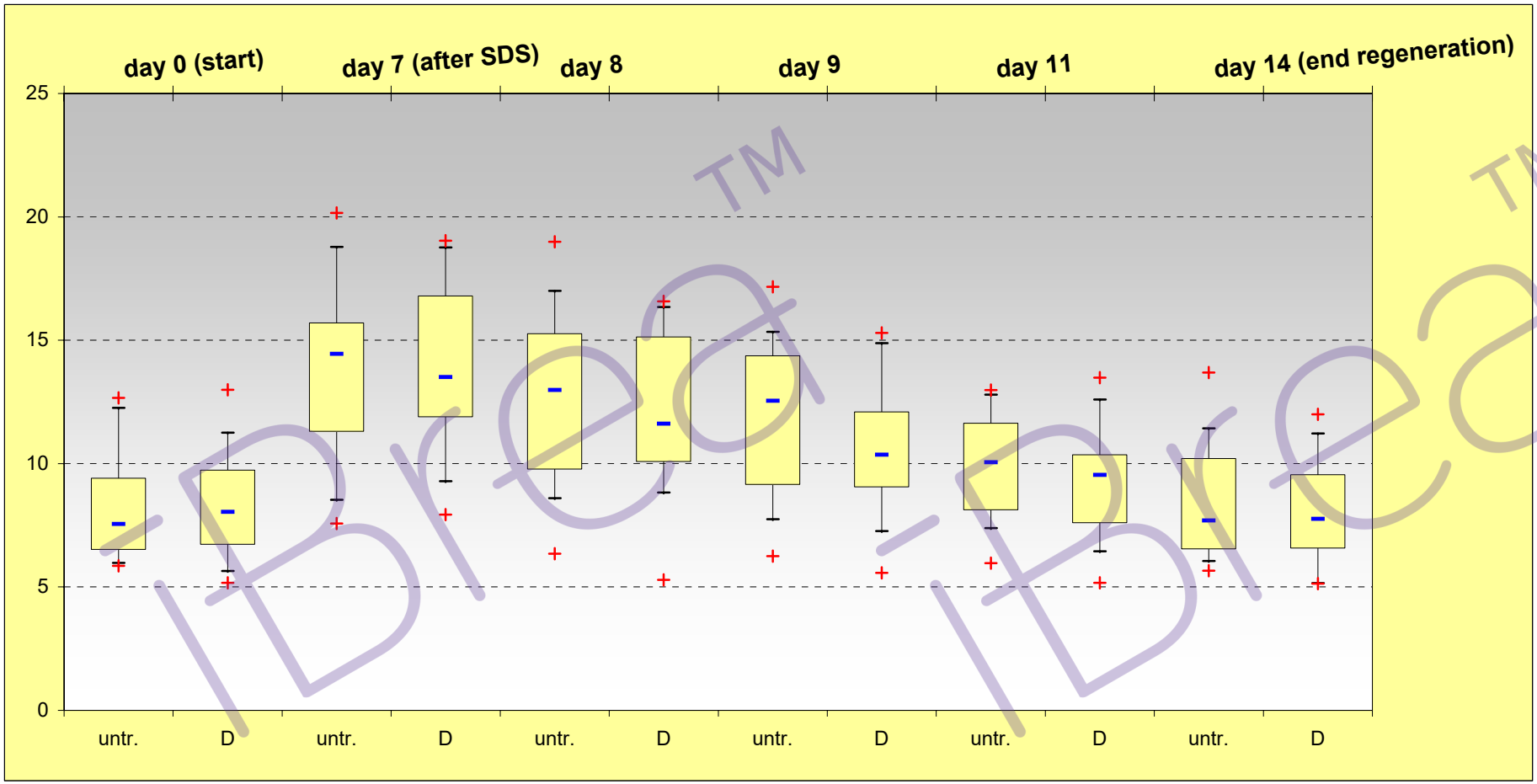
day 0 (start) - day 11

	untr.	D
Rank sum (positive)	5	42
Z-value	-3.7146	-2.3333
Significance	0.0000	0.0172
non-zero observations	20	20

day 0 (start) - day 14 (end regeneration)

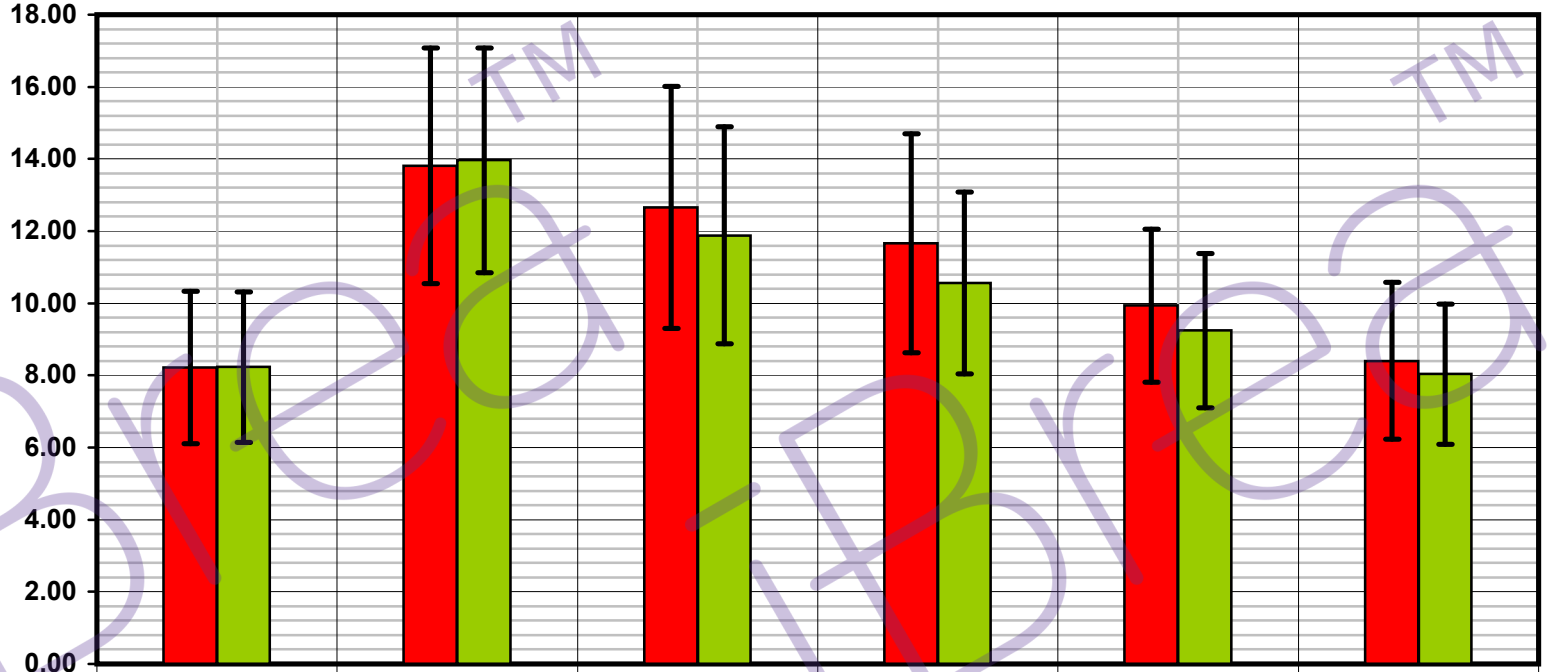
	untr.	D
Rank sum (positive)	73	128
Z-value	-1.1760	0.8400
Significance	0.2455	0.4091
non-zero observations	20	20

Box & Whisker Plot of Transepidermal Water Loss, DCC20S017 - regeneration



Experimental data of Transepidermal Water Loss

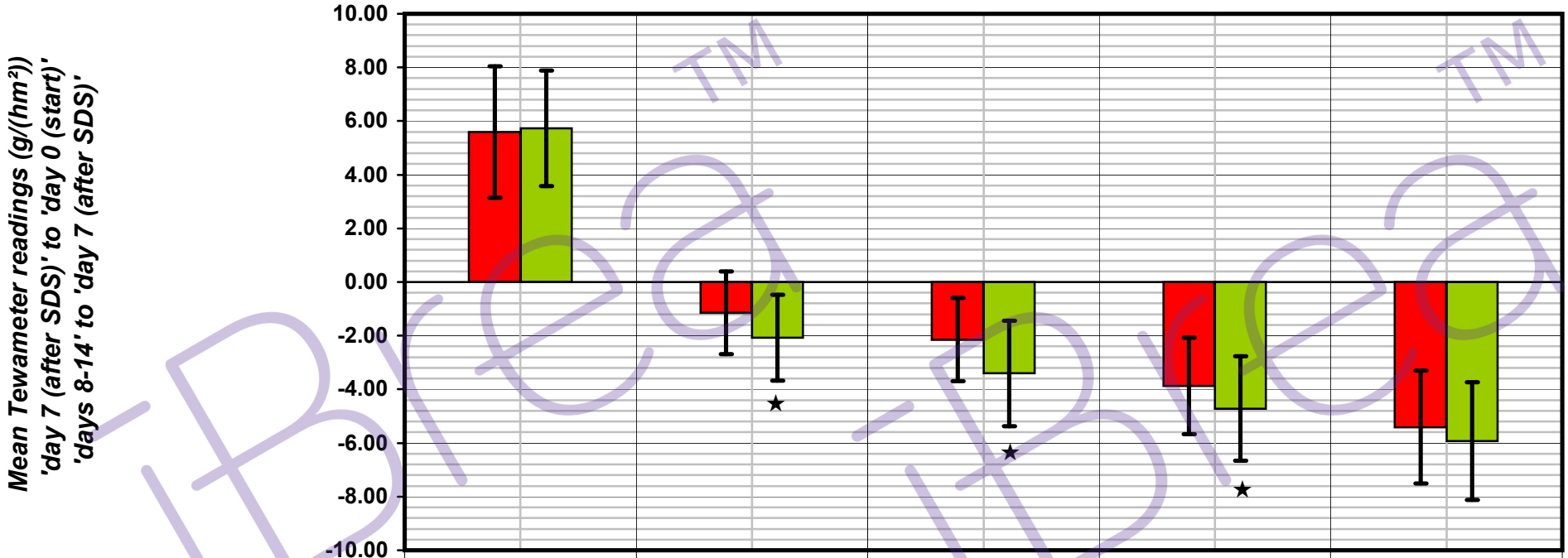
DCC20S017 - regeneration



	day 0 (start)	day 7 (after SDS)	day 8	day 9	day 11	day 14 (end regeneration)
untreated	8.22	13.81	12.65	11.66	9.93	8.40
D: iBrea Skin Relief Intense Recovery Cream - Peppermint Oil (Lot No: MWC 0227-10)	8.23	13.96	11.88	10.56	9.25	8.03

Experimental data of Transepidermal Water Loss (delta values)

DCC20S017 - regeneration



	day 7 (after SDS)	day 8	day 9	day 11	day 14 (end regeneration)
untreated	5.59	-1.15	-2.15	-3.87	-5.41
D: iBrea Skin Relief Intense Recovery Cream - Peppermint Oil (Lot No: MWC 0227-10)	5.73	-2.08	-3.40	-4.72	-5.93

***p<0,05 versus untreated**