

***In vivo* evaluation of emotional status by direct skin measurement, as part as the study of an active formula vs placebo**

Ferreira Yolène¹, Perrin Armelle¹, Le Mestr Audrey¹, Romain Nicolas², Bouthors Tristan², Botto Jean-Marie¹, Imbert Isabelle^{1*};

¹Ashland, Global Skin Research Center, Sophia Antipolis, France – ²Iconik, La Ciotat, France

* Imbert Isabelle, 655, route du Pin Montard 06904 Sophia Antipolis, iimbert@ashland.com

Abstract

Background The well-being is at the center of consumer preoccupations. Oxytocin, known as the “feel-good molecule”, participates to global well-being, being associated with positive social interactions, romantic attachment and with anti-aging properties. The human skin has acquired the ability to sense and produce oxytocin, and in coordination with the presence of mechanosensory nerve fibers, is at the center of well-being. We have screened and developed an innovative botanical extract to balance these aspects in the skin.

Methods A clinical study was designed to evaluate various parameters, on 34 subjects aged from 36 to 66 yo, applying on the face, a formulation containing a botanical extract vs placebo. One group applied on the face a cream containing an exclusive botanical extract, and the other group applied a placebo cream, for 28 days, twice a day. The well-being of volunteers was evaluated by three different methods and skin relaxation and complexion were evaluated by silicone replica analysis and spectrophotometry.

Results: The study revealed an improvement of the well-being and emotional status of the volunteers after 28 days of application of the formulated botanical extract, and that was not the case with the placebo. Besides, the enhancement of skin complexion and the decrease of the forehead surface roughness parameters were observed for the group applying the formulated botanical extract compared to the placebo group, suggesting healthier skin complexion and more relaxed skin.

Conclusion: Overall, this study tends to suggest a potential beneficial effect on the emotional and sensory aspects of skin physiology.

Keywords: well-being, mechanoreceptors, emotion, oxytocin

Introduction.

The well-being and well-feeling associated with looking healthy, feeling healthy, positive emotions and better aging is at the center of consumer preoccupations. Oxytocin, known as the “feel-good molecule” and the “love molecule”, participates to global well-being, being associated with positive social interactions, parental care, romantic attachment, love and with anti-aging properties [1]. The human skin has acquired the ability to sense via the presence of mechanoreceptors (piezo 1 & piezo 2) and nerve fibers [2] but also to produce oxytocin in response to gentle touch [3-5]. This communication between the nervous and endocrine systems is at the center of well-being and shape altered skin physiology [6]. To explore this way, we have screened and developed an innovative botanical extract obtained from *Jasminum Grandiflorum* flower (*Jasminum. G*). The application of this extract on *ex-vivo* skin helps to preserve the expression of piezo 1, a mechanoreceptor decreasing with age and being in relation with cellular junction integrity as well as in relation with peripheric oxytocinergic pathway. In this study, we evaluated the ability of this extract, formulated in a cream, to potentialize the well-being and well-aging of volunteers applying a cream containing 2% of *Jasminum. G* extract.

Materials and Methods.

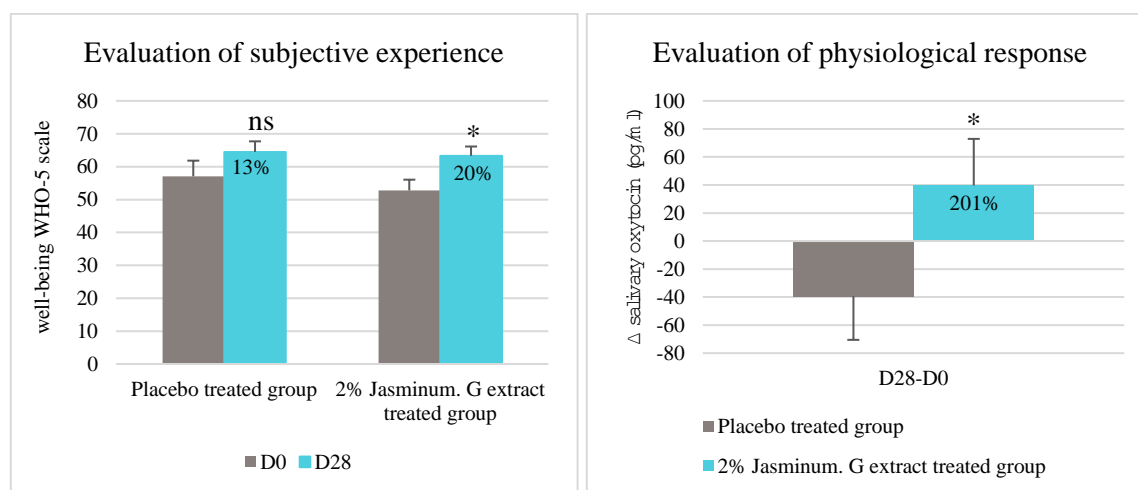
A double-blind clinical study was designed to evaluate various parameters on subjects applying on the face, a formulation containing 2% of *Jasminum. G* extract vs placebo. The study enrolled 34 volunteers aged 36 to 66 yo. They were divided in two groups of 17 volunteers, homogeneous in age and gender. One group applied on the face the extract containing cream, and the other group applied a placebo cream, for 28 days, morning and evening. The well-being of volunteers was evaluated by three different methods following the three components characterizing the psychological state (subjective experience, physiological response and behavioral response). The subjective experience was evaluated

by the WHO-5 Well-being Index, the physiological response was evaluated by measuring the salivary oxytocin level by ELISA method, and to finish, the behavioral response was evaluated by the innovative method Emotion Capture©, allowing to assess the emotional state of the volunteers in real time. This method was developed by ICONIK® and consists in measuring galvanic skin responses, skin temperature and cardiac rhythm in real time, by a wristlet wearing by volunteers during the clinical visit. These three components are well known to increase with stress, and by a specific algorithm, also developed by ICONIK®, the emotional state of volunteers was acquired. To complete this study, skin relaxation and healthy glow effect were also evaluated by silicone replica image analysis and by measuring skin complexion.

All the measurements were done the first day of the study, before cream applications (D0) and at the end of the study, after 1 month of applications (D28). The results were analyzed using the Student's *t*-test or Wilcoxon test depending on whether the data followed a normal distribution or not at determined times.

Results.

The study revealed an improvement of the well-being and emotional status of the volunteers after 28 days of application of the formulated botanical extract, and that was not the case with the placebo (**Figure 1**).



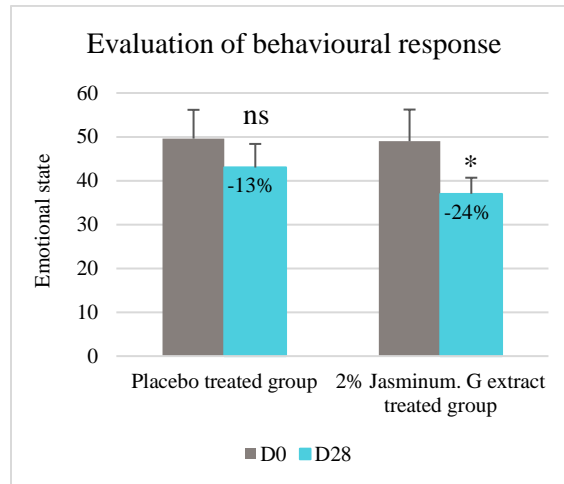


Figure 1: Measurements of well-being for the 2% *Jasminum. G* treated group and placebo treated group by three different methods: WHO-5 Well-being Index (n=34 +/- sem) – Salivary oxytocin by ELISA (n=23 +/- sem) – Emotional state (n=14 +/-sem). ns: not significant; *: significant with Student's *t*-test or Wilcoxon test depending on whether the data followed a normal distribution or not.

Oxytocin is a nonapeptide playing a key role in physiological function (eg: milk ejection...) as well as in certain kinds of behavioral regulation such as social recognition attachment and anxiety. Several studies suggest that pleasant touch is associated with the release of oxytocin and induced relaxing behavioral effects [3].

In this study, after 1 month of application, a significant improvement of well-being was observed in the group applying the cream containing 2% of *Jasminum. G* extract compared to the placebo group suggesting that *Jasminum. G* extract may improve the well-being via its effect on mechanoreceptor piezo 1. This result also demonstrated that the activation of mechanoreceptor in the skin may improve the well-being by triggered oxytocin release and may highlight the communication between the nervous and endocrine systems.

To evaluate the effect of well-being improvement on the skin features, skin microrelief and skin complexion were carried out.

After 28 days of applications, surface roughness on the forehead parameters decreased for the group applying 2% *Jasminum. G* containing cream compared to placebo group (**Figure 2**).

Evaluation of surface roughness parameters on the forehead

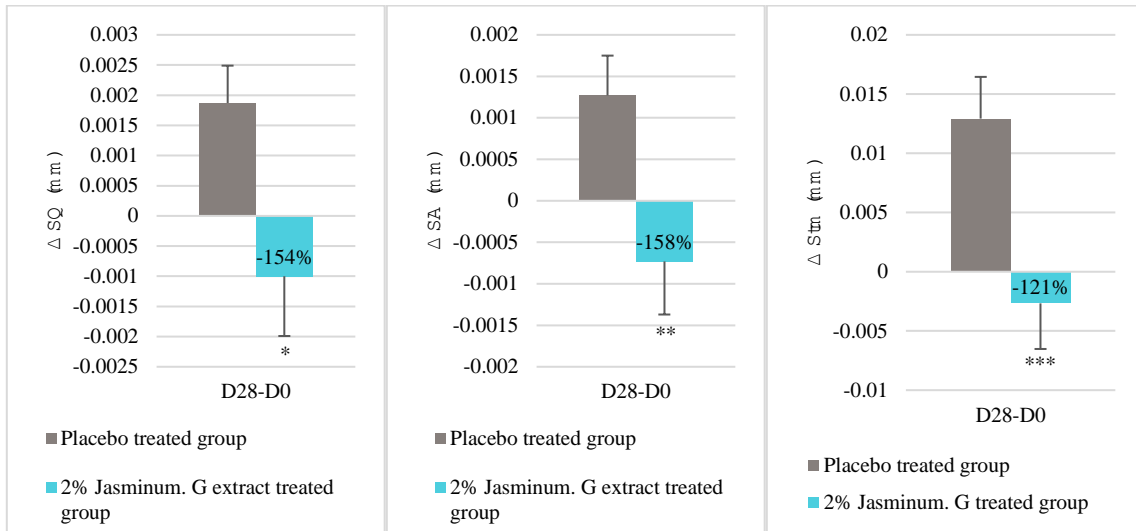


Figure 2: Measurement of surface roughness parameters, of forehead, on silicone replica, for the 2% *Jasminum. G* treated group and placebo treated group. n=30; +/- sem *: significant; **: very significant, *: highly significant; with Student's *t*-test or Wilcoxon test depending on whether the data followed a normal distribution or not.**

These results could be observed on 3D and color picture, where skin microrelief was smoother on the forehead but also under the eyes (**Figure 3-4-5**).

Skin roughness pictures

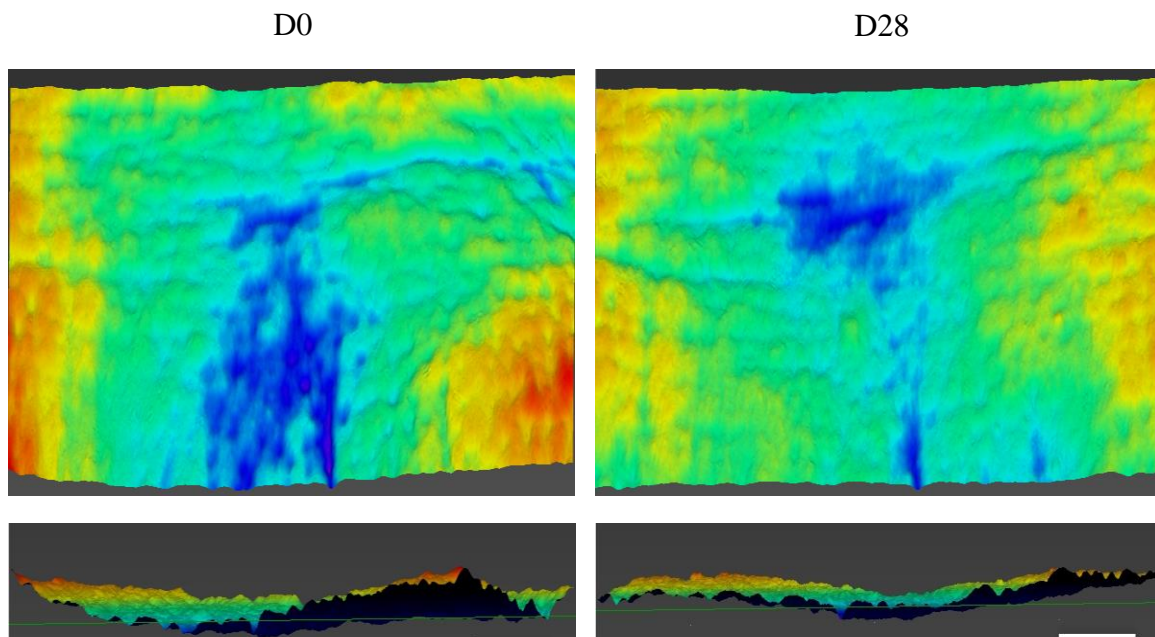
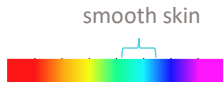


Figure 3: 3D representation of skin roughness. (# 21; man; 58 year-old) for the 2% *Jasminum. G* treated group



Color pictures of skin smoothness – under the eyes and on the forehead- 2% *Jasminum. G* treated group

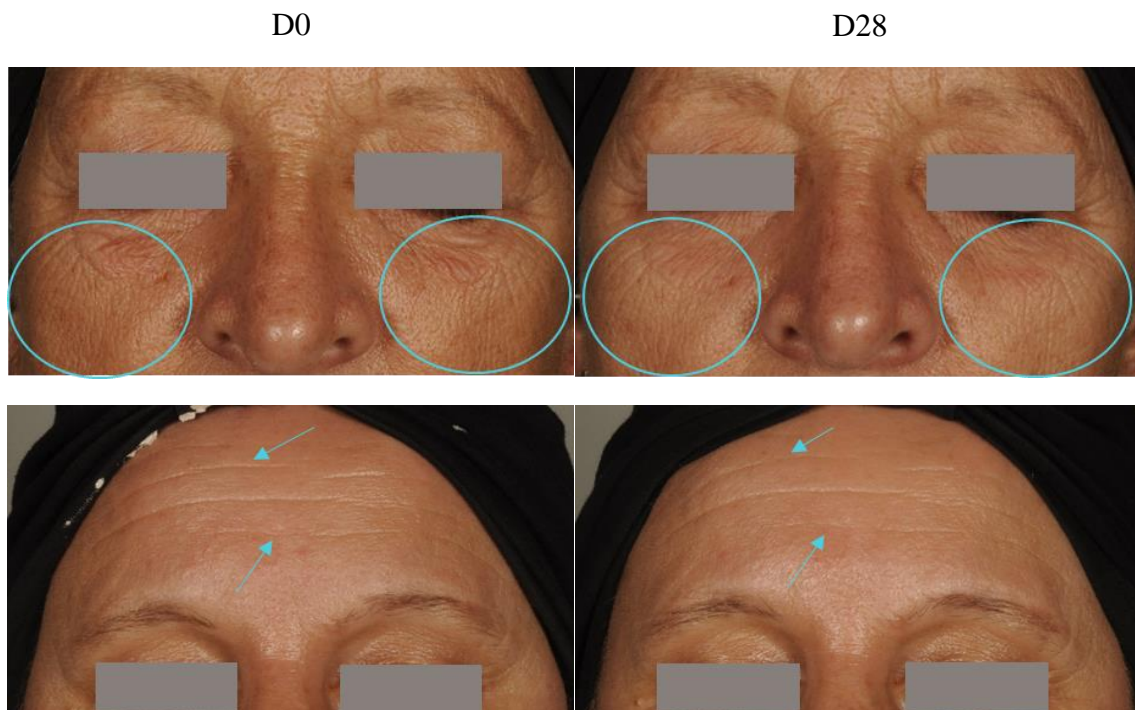


Figure 4: Color pictures under the eye (# 04; woman; 60 years-old) and of the forehead (# 14; woman; 52 years-old) for the 2% *Jasminum. G* treated group

Color pictures of skin smoothness – on the forehead- Placebo treated group

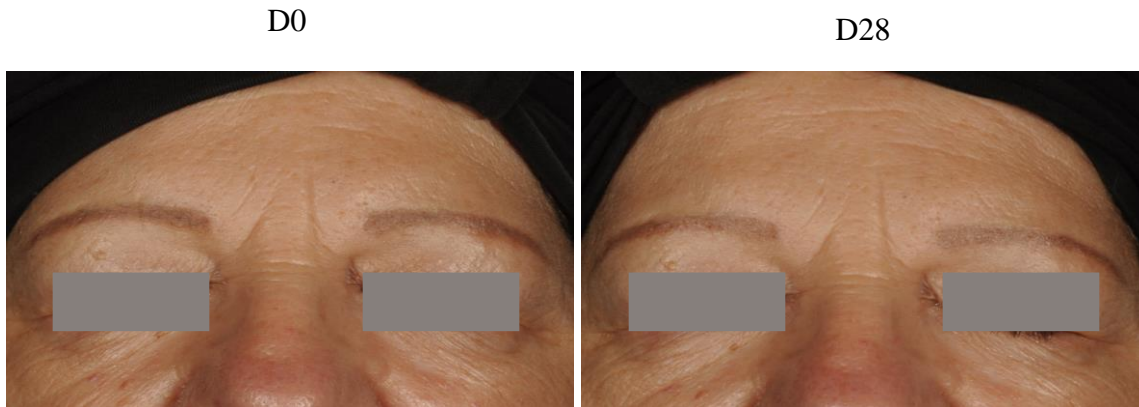


Figure 5: Color pictures of the forehead (# 01; woman; 66 year-old) for the placebo treated group

The fine line on the forehead and under the eyes are most of the time due to fatigue and stressful life [7]. The reduction in skin roughness on the forehead and under the eyes showed a more relaxed skin with less fine lines due to stress supported the well-being effect observed previously. Besides, enhancement of skin complexion was observed for the group applying the extract compared to the placebo group after one month of applications (**Figure 6**).

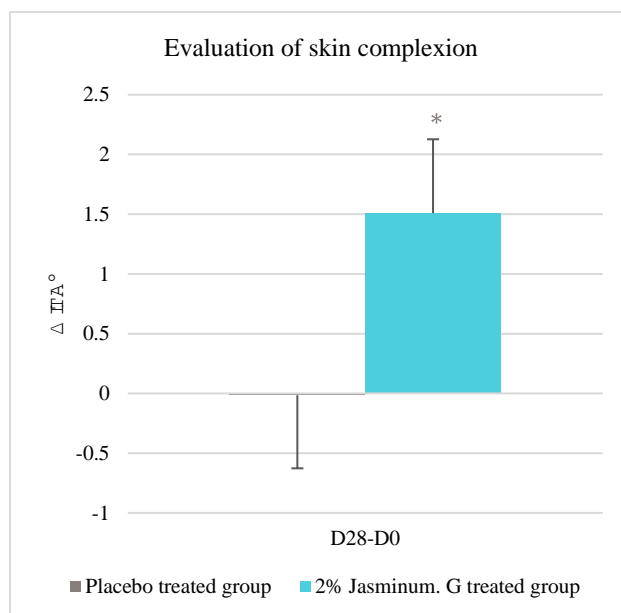


Figure 6: Measurement of skin complexion, for the 2% *Jasminum. G* treated group and placebo treated group. n=30; +/- sem *: significant; with Student's *t*-test or Wilcoxon test depending on whether the data followed a normal distribution or not.

Once again, this result supports the relaxing effect of the extract via the activation of piezo 1. In fact, after cream application containing the extract, dull and rougher skin imply by stress and fatigue were counteracted [7].

At the end of the study, the trained expert noticed an improvement of skin complexion and less fine lines and an improvement of skin global appearance that is in concordance with the objective measurements (**Figure 7**).

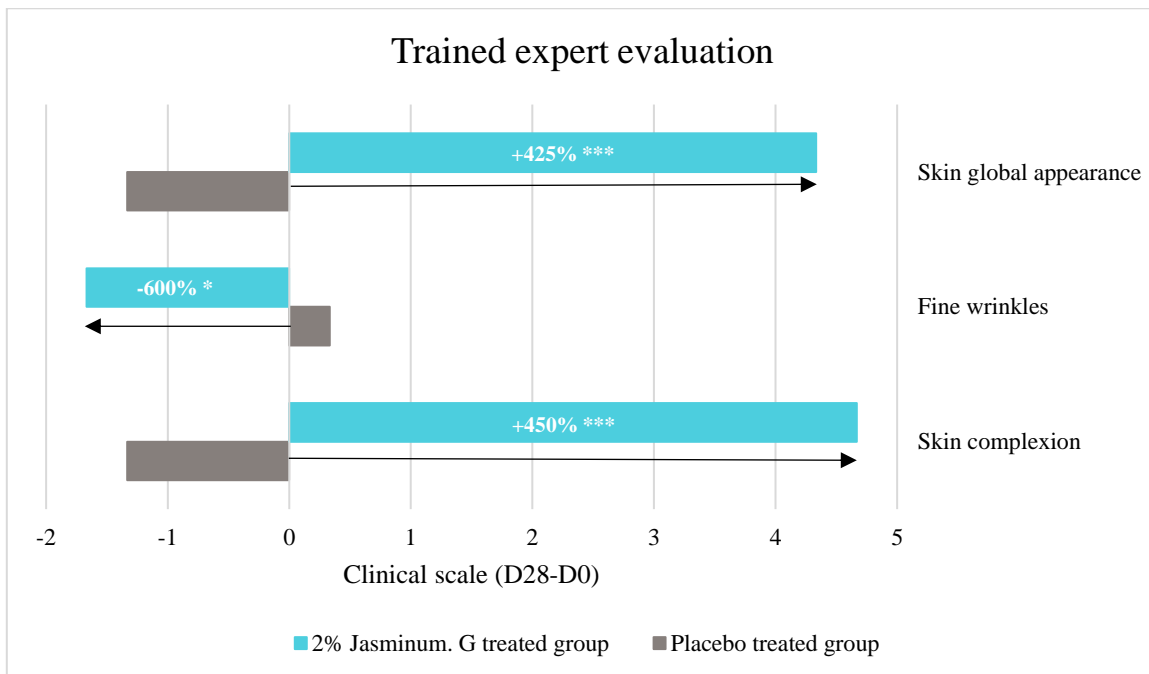


Figure 7: Trained expert evaluation, for the 2% *Jasminum. G* treated group and placebo treated group. n=30; +/- sem *: significant; *: highly significant; with Student's *t*-test or Wilcoxon test depending on whether the data followed a normal distribution or not.**

Conclusion. This study tends to suggest the potential beneficial effect of activating mechanosensory receptors on overall well-being by triggered oxytocin release, highlighting the communication between the nervous and endocrine systems in the skin. This improvement on overall well-being also allowed to counteract signs of stressful life on the skin.

Conflict of Interest Statement.

NONE

References

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