

## ***formulation”***

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### **1. Introduction**

Skin redness is a common skin problem, which caused increasing burden on daily life. To provide a fast and effective daily skincare solution, this study will evaluate a novel serum containing panthenol, sphingomonas ferment extract, and bifida ferment lysate on improving skin redness after single use on facial areas. This strictly designed randomized controlled study is determined to provide some scientific insights on clinical application for skin redness.

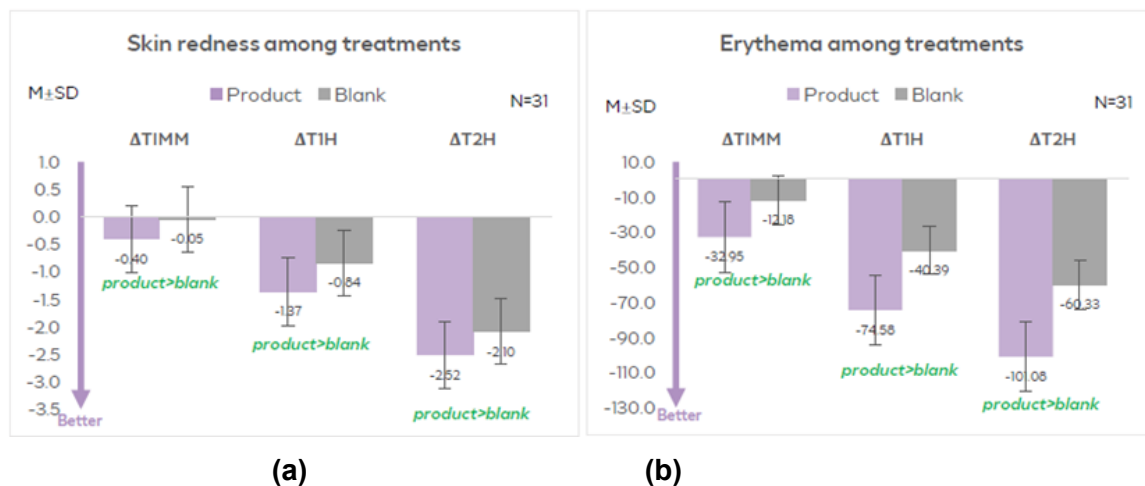
### **2. Materials and Methods**

This mono-centric randomized controlled study recruited 64 Chinese female participants. Of them, 64 completed the questionnaire self-evaluation, 31 completed the efficacy evaluation. Participants should wash face with standard cleanser on site before measurements. Skin redness (visual)  $\geq 4$  was induced by infrared light by dermatologist. The technician applied the test novel serum on the subjects' half face at the test site, keep another half face as blank control. One visit on-site includes BL (before induction), T0 (after induction), T10s, T1min, Timm/T5min, T1H (1 hour after product) and T2H. To comprehensively confirm the anti-redness effect of test serum, a half-face randomized controlled study was performed via assessing the blood perfusion by PeriCam PSI NR. One visit on-site includes D0T0 (baseline, after induction), T0T10s, T0T30s and D0T1min.

### **3. Results**

#### ***1. Test serum has good efficacy on improving skin redness and skin erythema***

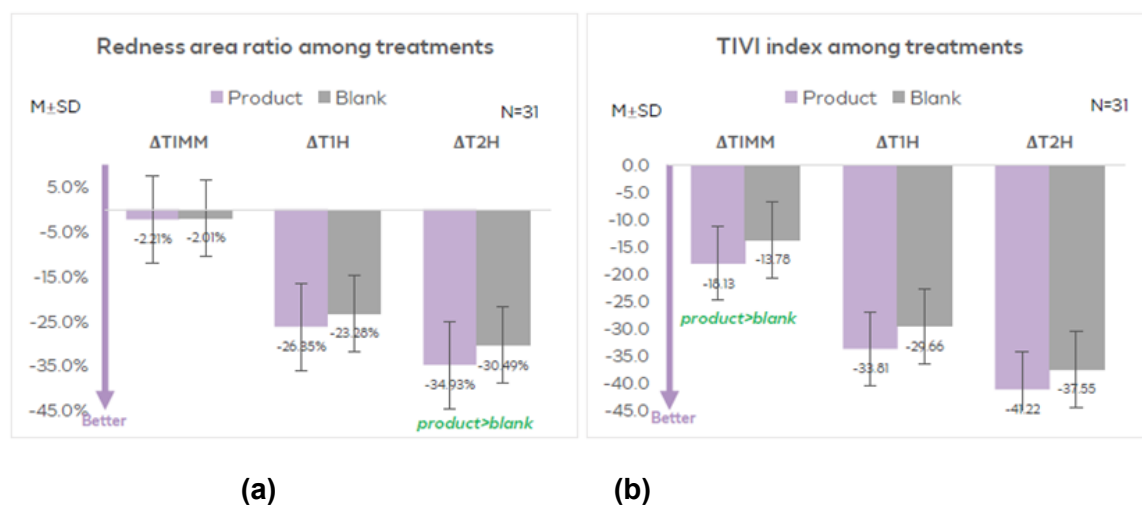
Compared to T0 (after redness induction), test serum significantly improved skin redness and skin erythema at Timm, T1H and T2H (Figure 1). Compared with blank control, test serum significantly better improved skin redness (Figure 1a), skin erythema (Figure 1b) at Timm, T1H and T2H.



**Figure 1.** (a) absolute decrease of skin redness from T0 by clinical grading; (b) absolute decrease of skin erythema from T0 by Mexameter MX18.

### 2. Test serum has good efficacy on improving redness area ratio and decreasing TIVI index

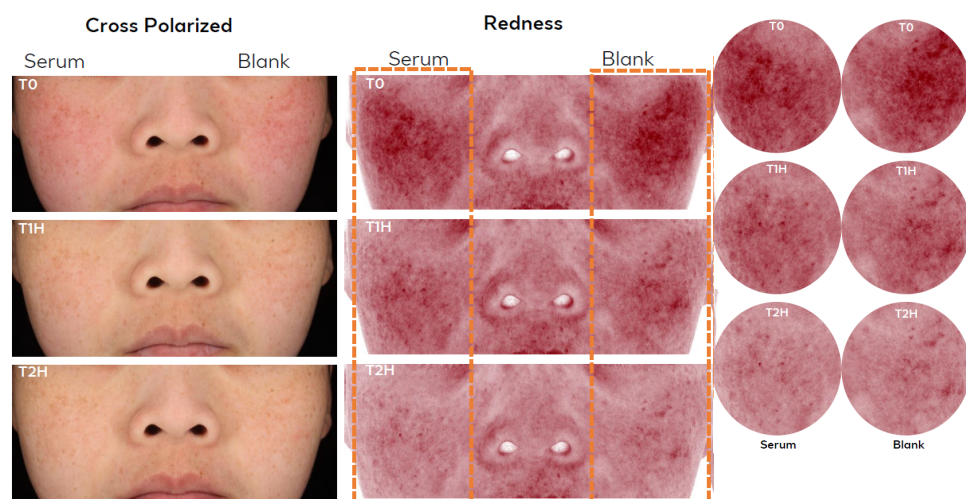
Compared to T0, test serum significantly improved redness area ratio at T1H and T2H (Figure 2a), significantly improved TIVI (Tissue Viability Imaging) index at Timm, T1H and T2H (Figure 2b). Compared with blank control, test serum has significant better effects on improving redness area ratio at T2H (Figure 2a) and decreasing TIVI index at Timm (Figure 2b).



**Figure 2.** (a) absolute decrease of redness area ratio from T0 by IPP analysis; (b) absolute decrease of TIVI index from T0.

### 3. Test serum has good efficacy on improving skin redness and skin erythems

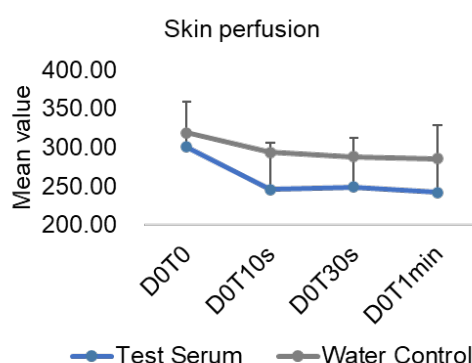
Consistent with previous data results, improvements of skin redness were also evidenced by photos captured by VISIA 7 (Figure 3). Compared to blank control, test serum showed significant better and faster improvement on skin redness at T2H ( $p = 0.032$ ).



**Figure 3.** Average case of skin redness by VISIA 7.

#### 4. Test serum has good efficacy on decreasing skin blood perfusion

In half-face randomized controlled study, the preliminary data showed that test serum significantly decreased the blood perfusion, when compared to the distilled water control (Figure 4).



**Figure 4.** Skin blood perfusion results (N=3) assessing by PeriCam PSI NR.

## 4. Discussion

The findings align with previous studies demonstrating panthenol's role in enhancing skin hydration and barrier repair. The observed reductions in TEWL and erythema index corroborate hypotheses that these components synergistically stabilize barrier integrity and mitigate hypersensitivity. Notably, sustained efficacy post-cessation suggests long-term barrier remodeling, a critical advantage for sensitive skin management. Future studies should explore mechanistic pathways (e.g., microbiome modulation, cytokine profiling) and validate results across diverse demographics. Extending follow-up periods and integrating multi-omics approaches could further elucidate durability and broader applications in chronic dermatoses.

## 5. Conclusion

Collectively, these two study results demonstrated the novel serum can deliver instant anti-redness efficacy after single application.