EFFECT OF HYDROGENATED POLYISOBUTENE ON SKIN MOISTURIZATION

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ABSTRACT

Hydrogenated Polyisobutene (HP) is an emollient used mostly in lip care and personal care formulations. However, its effects and role in delivering pleasant skin feel are yet unknown. Recognizing that some of the physical properties of HP such as film formation and wearing resistance may contribute in certain mechanisms, to skin moisturization, we designed a short-term pilot study to follow changes in skin hydration. HP incorporation into o/w emulsion at 5% yielded increased viscosity and reduced emulsion droplet size as compared to emollient ester CCT (Capric/Caprylic Triglyceride) or a blank formulation. Quantitative data indicate that application of formulation consisting of o/w emulsion of either HP or CCT significantly elevated skin moisture content and thus reduced Trans Epidermal Water Loss (TEWL) to a maximum of 33.36% against blank formulation within 3 h. The effect was maintained for up to 6 h. Visual observation of skin treated with HP containing formulation showed fine texture and clear contrast as compared to the blank or that containing CCT, confirming this effect. As a result of increased hydration skin conductivity as measured by corneometer was also elevated significantly by about 10 fold in as early as 20 min., after HP or CCT application and was maintained throughout the test period. Throughout the test period HP formulation was 5-10% more effective than CCT containing formulation both in reduction of TEWL as well as increased skin conductivity. Pleasing skin feel and texture upon application, coupled with the unique capability of HP in retaining skin moisture over a longer period, unveils its potential for use in a multitude of skin care applications.

INTRODUCTION

Structure of hydrogenated polyisobutene (HP)
Branch chain aliphatic hydrocarbon

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\begin{align*}
\text{CH}_3 & \quad \text{CH}_3 \\
\text{HC} & \quad \text{H}_2 \text{C} \quad \text{H}_2 \text{C} \quad \text{C} \quad \text{CH}_2 \quad \text{CH} \\
\text{CH}_3 & \quad \text{CH}_3
\end{align*}
\]

RATIONALE

Moisture retention in skin can be improved by covering it with a film that:
- Reduces water evaporation from skin surface.
- Results in reduction of Trans Epidermal Water Loss.
- Increases capacity of skin to hold water.

OBJECTIVE

The objective of this clinical study was to evaluate the function of HP as a moisturizer in comparison to known emollient ester CCT with reference to its effects on TEWL, skin conductivity and skin texture.

Study design
- Skin applied with 8% o/w emulsions containing hydrogenated polyisobutene (HP), capric/caprylic triglyceride (CCT) product, or blank formulation were compared with untreated site.
- 10 female panelists (ages 35-54) enrolled in study
- On the day of study, panelists were allowed to equilibrate in closed environment with T= 70°F; RH = 30%
- 4 test sites on skin of left volar forearms of 50 cm² are used for each panelist of which one was untreated site for control
- 0.2 ml of each test product applied at each test site by technician and rubbed until absorbed
- Biophysical measurements of panelists taken before and after application

RESULTS

Hydrogenated polyisobutene increases stability of emulsion and affects film formation
Emulsion droplet size reduced upon HP application

Microscopic evaluation of emulsion droplet size

HP application to significantly reduces TEWL and contributes to increased moisturization

CONCLUSION

HP caused changes in emulsion properties by reducing droplet size:
- Effects film formation – skin smoothness and feel
- Increased stability
- Improves skin moisturization
  - By reducing TEWL
  - Measured by enhanced conductance
- Improves
  - Skin feel and texture
  - Clear contrast

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