

Glyco-intelligence: From Glycan Signature Deciphering to self-image perception enhancement

Aina Queiroz^a; Carine Quenel^a; Ludovic Landemarre^b; Jean Guezennec^c; Bethsabée Coutaz^a
^aSEQENS Cosmetics (ID bio), ^bGLYcoDiag, ^cAiMB (Advices in Marine Biotechnology)

Introduction

Glycans structures play critical roles at the cutaneous level in communication and recognition processes like cell-matrix interactions or skin repair. SEQENS deciphered a very high-molecular weight sugar, EPS Mo278, according to 2 dimensions:

- **An active dimension:** by characterizing the 3D patterns at the core of the macrostructure to anticipate biological activities mediated by protein-sugar interactions.
- **An emotional dimension:** by measuring the ability of this EPS to significantly improve self-perception of volunteers *versus* placebo.

1 Active Dimension: Glycobiological structure efficacy

Material & Method

3D glycan patterns deciphering: EPS Mo278 is tested by GLYcoDIAG lectin microarray technology.

GLYcoPROFILING

Neutral sugar content is determined by the resorcinol sulfuric micromethod¹. The GLYcoPROFILE, interaction profiling of EPS with proteins, is carried out on 20 lectins with key roles at skin level. The products are unlabelled and interaction profiles are determined through an indirect method based on the inhibition by the sample of the interaction between a specific lectin-glycan couple (figure 1).

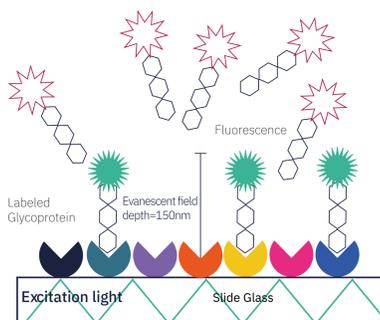


Figure 1. Lectin microarrays

Results

EPS Mo278 presents key "skin glycan signatures"

Mannose mimics are accessible for glycobiological interactions: predictive interaction with **DC-SIGN**, playing a role in immunomodulation² (figure 2).

Rhamnose-like structure: interaction with **CorM**, a rhamnose specific lectin modulating epidermal regeneration^{3;4}.

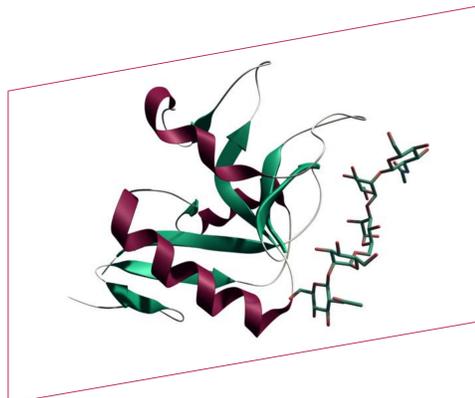


Figure 2. DC-SIGN interactions with mannose

Visualize and interact with the DC-SIGN complex in augmented reality

This deciphering allowed the prediction of effects on skin brightness/luminosity and hydration (data not shown).

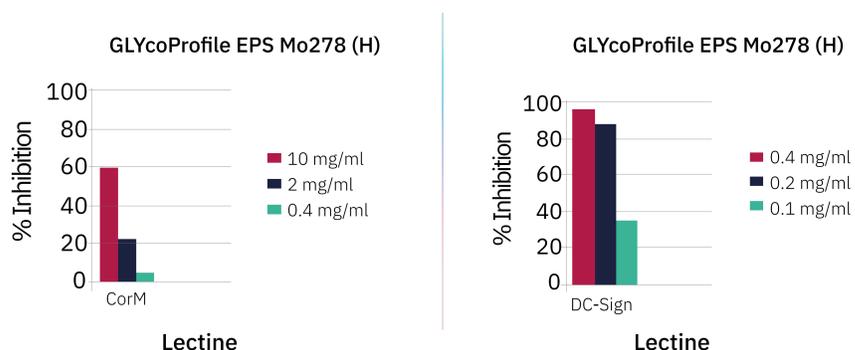


Figure 3: GLYcoPROFILE obtained with EPS Mo 278

2 Emotional Dimension: Self & allo-perception improvement

Material & Method

Mirror-test: EPS Mo278, formulated at 1%, is clinically tested by Emospin on emotional parameters *versus* placebo.

Prosody



Subjects confronted with their own reflection are requested to describe their image on a double-blind clinical study. The analysis of the prosody consists in capturing the vocal signal of subjects. Two main variables are extracted:

- **Loudness** (i.e. vocal intensity): mean amplitude (dB).
 - **Pitch** (i.e. tone): mean fundamental frequency (Hz).
- The combination of these two variables allows the assessment of vocally-expressed stress.

Verbatim

Word-for-word capture is analyzed during this mirror test with responses to 2 questions:

- **Self-Perception:** "How could you describe yourself physically?"
- **Allo-Perception:** "What would be the first impression of someone meeting you for the first time?"

The results are illustrated with a factorial analysis of correspondence for Q1, and Q2.

Results

EPS Mo278 improves emotional state and self-appreciation

Prosody

Decrease of vocal markers of emotional load between T0 and T28 is significantly greater for subjects treated with EPS Mo278 (group B) *versus* placebo (group A; see figure 4).

Variable	n	Mean	SD	t	p
Evolution in pitch A	22	-2,360	6,957	1,869	0,069/+
Evolution in pitch B	23	-6,137	6,603		
Evolution in loudness A	22	-1,675	6,879	2,201	0,033/*
Evolution in loudness B	23	-5,945	6,126		

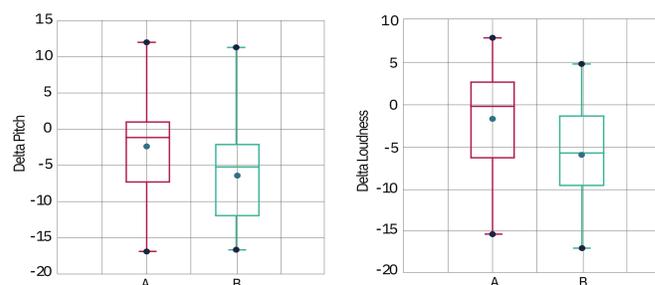


Figure 4: Results on prosody Delta of pitch and loudness: group A (placebo) and group B (treated with EPS Mo278)

Verbatim

Dominant vocabulary used after 28 days is more positive than wording expressed at T0 for volunteers treated with EPS Mo278 (group B), *versus* placebo (group A).

Subjects treated with EPS Mo278 express a more positive self-appreciation compared to volunteers, after their 28-day treatment (figure 5).



Figure 5: Results on self-appreciation Specific terms significantly represent each verbal corpus. EPS Mo278 is formulated at 1%

Conclusion

This double-dimensional study reveals beneficial effects at skin level for EPS Mo278 :

- Presence of 3D specific glycan patterns, playing key roles on skin immunomodulation and epidermal regeneration
- Improvement of emotional state, self and allo-perception at clinical level *versus* placebo, formulated at 1%

This first success paves the way for characterized active ingredients specifically designed to enhance the perception of beauty and emphasizes the company's willingness and motivation to offer a generation of "emotional beauty enhancer" solutions.

References

- ¹Monsigny M, et al., "Colorimetric determination of neutral sugars by a resorcinol sulfuric acid micromethod." Analytical biochemistry 175.2 (1988): 525-530.
- ²Zhang, Y., et al. "DC-SIGN promotes allergen uptake and activation of dendritic cells in patients with atopic dermatitis." Journal of dermatological science 84.2 (2016): 128-136.
- ³Andres, E., et al. Pharmacological properties of rhamnose-rich polysaccharides, potential interest in age-dependent alterations of connective tissues." Pathologie Biologie 54.7 (2006): 420-425.
- ⁴Delbarre-Ladrat, C. et al. "Exopolysaccharides produced by marine bacteria and their applications as glycosaminoglycan-like molecules." Frontiers in chemistry 2 (2014): 85.