

Precision Skincare: revealing and addressing true skin needs through a continuous learning model

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Introduction of research

Skin is a dynamic biological tissue, which responds to signals, both internal and external. Today skincare on the market is a trial-and-error approach for many customers. Unaware of their biological needs, consumers must navigate thousands of possible products. If tested, products are tested on a limited set of individuals which may or may not reflect the consumer's skin physiology, ethnicity, and other factors impacting that individual consumer's skin. There is no guarantee that the claims of a given product will provide the same benefits in each individual consumer, fueling the growing interest in safe and science-backed personalized skincare¹⁻².

The precision skin care approach consists of an objective system and method for assessing each individual consumer's skin physiology and need and making skincare recommendations and skincare formulations that target those specific underlying skin needs. The approach flips the current model to start with consumers and creates the technology and data tools to educate, inform, and empower consumers that is missing in the industry today. Measuring skin needs and creating a suitable treatment rooted in science allows for a transparent and objective approach to product recommendation and evaluation.

The Precision Skincare Methodology

The precision skincare method is based on measuring a combination of parameters that impact skin health and appearance³⁻⁵. These parameters are summarized in an overall skin radiance score that describes how light interacts with skin at the surface as well as deeper layers, as a proxy for its underlying biological state. The optical radiance of skin is a composite of the underlying physiology including how much light gets absorbed (by pigment and blood) and where, how much light gets reflected at the skin surface by shine or by skin dryness, how much shadowing is created by lines or under-eye puffiness, and how much light gets bounced back from the collagen to the surface, creating that soft and dewy, diffuse radiance.

The overall radiance score for each individual is decomposed into six high level skin parameters including: skin barrier/hydration, smoothness, skin tone, skin mileu, energy supply and dermal fibers. Those parameters are multiple sub-parameters linking to a series of underlying biological processes that are measured for each individual person. Both visible surface and invisible subsurface skin characteristics can be quantified using known gold standard equipment⁶⁻⁷: parallel/cross polarized and UV imaging, spatial frequency domain imaging (SFDI), hyperspectral imaging, and Courage and Khazaka bio-instrumentation measurements. By combining the outcome of these different measurement modalities, we are able to build an individual composite skin signature for each consumer and objectively measure his/her skin needs.



Based on the obtained results, a patented AI data pipeline predicts the most efficient ingredient combination for that specific skin profile. To do so, each individual skin need is evaluated compared to all others, and an overall ranking of individual biological needs is created. Based on the relative weights of needs an optimal combination of ingredients is selected. The optimal combination of active ingredients with known mechanism of action is most likely to improve overall radiance.

Further, via re-measurement an empirical testing feedback loop is created testing predicted efficacy in each individual by tracking their progress in response to their personalized treatment. Thereby continuously optimizing each individual's treatment regimen and improving treatment efficacy for future consumers with similar signatures.

Conclusion

The Precision Skincare System redefines consumer education and product selection. It starts with the individual, identifies individual needs, and builds the most optimal product based on those needs. This enables more efficacious treatment, greater consumer satisfaction, and creates a learning model where individual skincare routines continually adapt with the consumer's changing skin needs and the overall efficacy skincare treatment can be improved.

References

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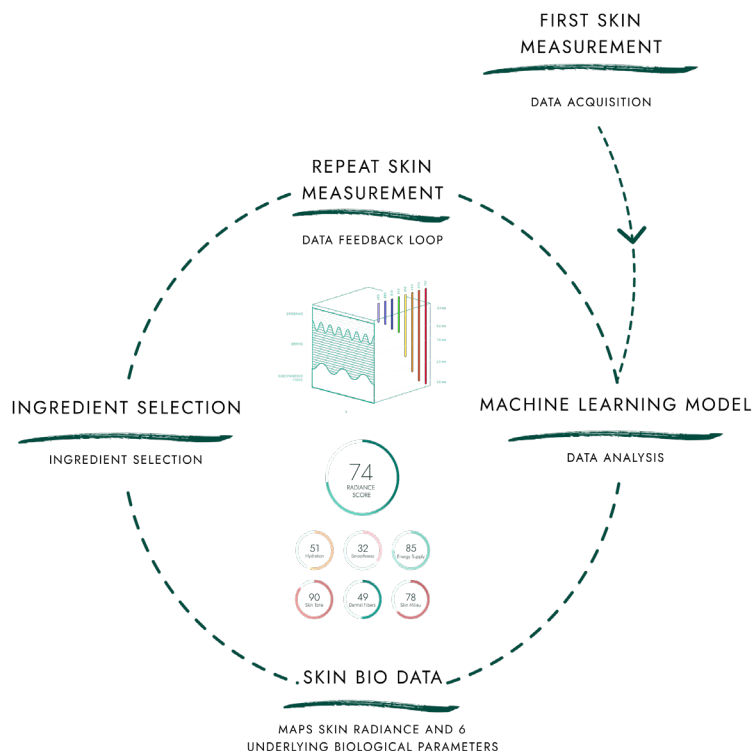


Figure 1: Precision Skincare Learning Loop

About the speaker - Liyuan Ji



Bio: Liyuan is currently working as the formulation chemist at Compass Beauty, Inc. She is an enthusiastic and motivated scientific professional with over 6 years of experience in formulation development, clinical and bio-membrane research. She earned her M.S in Pharmaceutical Sciences and B.S in the field of Chemistry. She is driven to make an impact on the cosmetic world through the translation of science to practical application. Liyuan is the recipient of the 2018 SCC Young Scientist Award and serves as a committee member of SCC Membership Affairs & Chapter Formation.