Abstract: Quantification of erythema and/or pigmentation is important for in vivo assessment of skin reactions to external stimuli such as ultraviolet radiation. Measurement of lesional color is also useful for quantitative evaluation of the efficacy of therapies for skin lesions. Several types of portable optoelectronic instruments have recently become available for these purposes and have been applied to research in dermatology, physiology, pharmacology, and cosmetic science. As color is not a genuine physical quantity but a sensory perception based on color vision, any colorimetric data obtained for the skin should be interpreted carefully. Erythema and melanin indices derived from skin reflectance data should also be evaluated in relation to the optical properties of the skin to avoid misuse. In this article, various methods for quantifying skin color and related parameters are reviewed and the characteristics of each method are discussed theoretically using an optical model of the skin. J. Med. Invest. 44: 121-126, 1998

Key Words: colorimetry, spectrophotometry, erythema index, melanin index
Skin color measurement

The diagram shows the CIELAB color space, which is a standard color space used for colorimetry. It represents color in terms of three dimensions: L* (lightness), a* (redness), and b* ( yellowness). The diagram includes the following axes:

- **L***: Lightness, ranging from 0 (black) to 100 (white).
- **a***: Redness, ranging from -a* (green) to +a* (red).
- **b***: Yellowness, ranging from -b* (blue) to +b* (yellow).

The diagram also includes the *Hue* axis, which represents the angle of the color in the chromaticity diagram, and the *Chroma* axis, which represents the saturation or purity of the color.
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