

【CLAIMS】**【Claim 1】**

A device for measuring skin changes caused by blue light, comprising:

at least one light source for irradiating light of a blue light band at different

5 light amounts to a plurality of test areas set on a skin area to be tested; and

a control unit for detecting a minimum pigmentation point among the test areas and calculating a light amount of the corresponding test area as a minimum pigmentation dose (MPD) for blue light.

10 **【Claim 2】**

The device for measuring skin changes caused by blue light according to claim 1, wherein the control unit adjusts either light intensity or irradiation time or both such that the light amount of the light source is larger at least twice than an average ultraviolet light amount.

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【Claim 3】

The device for measuring skin changes caused by blue light according to claim 1, wherein the light source is configured to irradiate light in a range between 450 and 470 nm.

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【Claim 4】

The device for measuring skin changes caused by blue light according to

claim 1, wherein the control unit calculates and compares a first MPD and a second MPD of test areas to which a blue light blocking product to test is not applied and test areas to which the blue light blocking product to test is applied, respectively.

5 **【Claim 5】**

The device for measuring skin changes caused by blue light according to claim 4, wherein the blue light blocking product is a blue light shield product, and

Protection grade of Blue-light (PB) of the blue light shield product is calculated by [Equation 1]:

10 [Equation 1]

$$\text{Protection grade of Blue-light (PB)} = \frac{\text{MPD of skin with blue light blocking product}}{\text{MPD of skin without blue light blocking product}}$$

【Claim 6】

A method for measuring skin changes caused by blue light, comprising:

15 setting a plurality of test areas on a skin area to be tested, and irradiating light of a blue light band at different light amounts to the test areas; and

detecting a minimum pigmentation point among the test areas, and calculating a light amount of the corresponding test area as a minimum pigmentation dose (MPD) for blue light.

20 **【Claim 7】**

The method for measuring skin changes caused by blue light according to

claim 6, wherein either light intensity or irradiation time or both is adjusted such that the light amount of the blue light is larger at least twice than an average ultraviolet light amount.

5 **【Claim 8】**

The method for measuring skin changes caused by blue light according to claim 6, wherein the blue light band ranges from 450 to 470 nm.

【Claim 9】

10 The method for measuring skin changes caused by blue light according to claim 6, wherein the minimum pigmentation point is determined based on whether a contour of the test area is formed, whether pigmentation occurred at a preset area or more of the test area, or whether a change in melanin index before and after blue light irradiation is equal to or larger than a preset value or a preset percentage.

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【Claim 10】

The method for measuring skin changes caused by blue light according to claim 6, comprising:

calculating a first MPD of test areas to which a blue light blocking product to
20 test is not applied; and

calculating a second MPD of test areas to which the blue light blocking product is applied.

【Claim 11】

The method for measuring skin changes caused by blue light according to claim 6 or 10, wherein the skin area is a skin area of Fitzpatrick skin type III or above.

5 【Claim 12】

The method for measuring skin changes caused by blue light according to claim 11, wherein the blue light blocking product is a blue light shield product, and

Protection grade of Blue-light (PB) of the blue light shield product is calculated by [Equation 1]:

10 [Equation 1]

$$\text{Protection grade of Blue-light (PB)} = \frac{\text{MPD of skin with blue light blocking product}}{\text{MPD of skin without blue light blocking product}}$$

~~【Claim 13】~~

15 ~~A blue light irradiation device for irradiating a plurality of blue light beams, comprising:~~

~~a plurality of light sources to emit blue light and a plurality of glass fibers each connected to each light source;~~

~~a light irradiation unit connected to each of the plurality of glass fibers, and including a plurality of openings each for irradiating a concentric blue light beam; and~~

20 ~~a control unit to control power supplied to the plurality of light sources,~~

~~wherein each of the plurality of light sources include a plurality of light emitting~~

diodes (LEDs).

~~—【Claim 14】—~~

5 ~~The blue light irradiation device according to claim 13, wherein the control unit controls a light amount of each of the plurality of blue light beams by adjusting either power supplied to each of the plurality of light sources or irradiation time, or both.~~

~~—【Claim 15】—~~

10 ~~The blue light irradiation device according to claim 13, wherein each of the plurality of light sources is configured to irradiate light with peak wavelength of 456 nm and full width at half maximum (FWHM) of 21 nm.~~

~~—【Claim 16】—~~

15 ~~The blue light irradiation device according to claim 13, wherein the plurality of blue light beams irradiated through each of the plurality of openings is simultaneously irradiated with each separate light intensity, irradiation time and irradiation type.~~

~~—【Claim 17】—~~

20 ~~The blue light irradiation device according to claim 16, wherein the irradiation type is a pulse beam or continuous beam type.~~

~~—【Claim 18】—~~

~~The blue light irradiation device according to claim 13, wherein the light irradiation unit includes six openings each for irradiating the blue light beam, and each of the plurality of light sources includes four mono-wavelength LEDs.~~

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~~—【Claim 19】—~~

~~The blue light irradiation device according to claim 13, further comprising:
a heat sink and a cooling fan disposed around the plurality of light sources.~~

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~~—【Claim 20】—~~

~~The blue light irradiation device according to claim 13, wherein each of the plurality of blue light beams irradiated through each of the plurality of openings is such that blue light emitted from the plurality of LEDs is irradiated in a form of a concentric beam having a luminance difference of a reference value or less through each of the plurality of glass fibers.~~

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