

CLAIMS

What is claimed is:

1. A handheld device for treating a skin condition, comprising:
an applicator arrangement applying a composition to skin, the composition comprising an active ingredient for treating the skin condition and a tracer;
a detector arrangement obtaining image data corresponding to an image of an area of skin; and
a processing arrangement analyzing the image data to determine whether an artifact corresponding to the skin condition is detected at a location within the imaged area of the skin and to determine an amount of the tracer detected from the location, the processing arrangement directing the applicator arrangement to apply the composition to the location when the artifact is detected and the amount of the tracer is less than a predetermined threshold level.
2. The device of claim 1, wherein the applicator arrangement is configured to apply a fixed dosage of the composition to the skin.
3. The device of claim 1, wherein the processor is configured to analyze the image data to determine an artifact magnitude of the artifact at the location, determine a dose of the composition to be applied to the location as a function of the artifact magnitude and the amount of the tracer, and direct the applicator arrangement to apply the dose of the composition to the location when the artifact is detected and the amount of the tracer is less than a predetermined threshold level.
4. The device of claim 1, wherein the predetermined threshold level of the tracer corresponds to a desired dosage threshold for the active ingredient.
5. The device of claim 1, wherein the detector arrangement comprises a first light source for delivering a far-red light or an infra-red light to the area of skin, and a sensor for detecting light from the area of skin.

6. The device of claim 5, wherein the far-red light has a peak wavelength of about 690 nm.
7. The device of claim 5, further comprising a second light source for delivering a green light, and a third light source for delivering an infra-red light.
8. The device of claim 5, wherein the second light source has a peak wavelength of about 540 nm, and the third light source has a peak wavelength of about 840 nm.
9. The device of claim 6, wherein the tracer absorbs light in a far-red spectrum and does not significantly absorb light in a visual red spectrum.
10. The device of claim 9, wherein the tracer is a cyan dye or a cyan pigment.
11. The device of claim 10, wherein the tracer is a non-sulfonated cyanine dye.
12. The device of claim 9, wherein the tracer absorbs light having a peak wavelength of about 690nm and does not significantly absorb light having a peak wavelength of about 610nm.
13. The device of claim 1, wherein the tracer is not visible to a human.
14. The device of claim 13, wherein the tracer is a fluorescent dye or a fluorescent pigment.
15. The device of claim 1, wherein the composition comprises at least one cosmetic ingredient for modifying an appearance of the skin.
16. The device of claim 15, wherein the composition comprises at least one of an opaque substance, a cosmetic pigment, and a cosmetic dye.
17. The device of claim 15, wherein the composition further comprises a reflectance modifying agent.

18. The device of claim 1, wherein the skin condition is selected from a group consisting of excessive melanin deposits, infection, inflammation, acne, wrinkles, and nonuniformities in skin color.

19. A method for operating a handheld device for applying a composition to a skin, comprising:

obtaining, by a detector arrangement, image data corresponding to an image of an area of the skin;

analyzing, by a processing arrangement, the image data to determine whether an artifact corresponding to the skin condition is detected at a location within the imaged area of the skin and to determine an amount of the tracer detected from the location; and

applying, by an applicator arrangement, the composition to the location when the artifact is detected from the location and the amount of the tracer is less than a predetermined threshold level, wherein the composition comprises an active ingredient for treating a skin condition and the tracer.

20. The method of claim 19, wherein the analyzing step comprises:

determining, by the processor, an artifact magnitude of the artifact at the location and the amount of the tracer detected from the location,

determining, by the processor, a dose of the composition to be applied to the location as a function of the artifact magnitude and the amount of the tracer detected, and

wherein the applicator arrangement applies the dose of the composition to the location when the artifact is detected and the amount of the tracer is less than a predetermined threshold level.