Claims

1. A mobile apparatus, comprising:

a radiating unit configured to radiate light;

a spectroscope configured to perform spectroscopy of light entered to output a measured value;

an identification unit configured to identify a kind of a food product corresponding to the light entered the spectroscope; and

a determination unit configured to determine a characteristic of the food product to output the characteristic of the food product, by referring to a storage unit configured to store a kind of a food product, a characteristic of the food product, and information about light in association with each other, based on the measured value output from the spectroscope and the kind of the food product identified by the identification unit;

the spectroscope includes a first spectroscope measuring a transmitted light transmitted through the food product and a second spectroscope measuring a scattered light scattered by the food product, the first spectroscope and the second spectroscope are located in different places from each other,

wherein

the information about light is stored in the storage unit in further association with a distinction between the scattered light and the transmitted light,

the determination unit is configured to determine the characteristic of the food product further based on the distinction between the scattered light measured by the second spectroscope and the transmitted light measured by the first spectroscope, and

the mobile apparatus is a smartphone, a tablet, or a PDA configured to fulfill a function corresponding to an installed application.

2. The mobile apparatus according to claim 1, wherein the spectroscope is detachable.

3. The mobile apparatus according to claim 1 or 2, wherein the radiating unit is detachable.

4. The mobile apparatus according to any one of claims 1 to 3, further comprising:

an image-capturing unit configured to generate an image by image-capturing, wherein

the identification unit is configured to identify the kind of the food product based on the image.

5. The mobile apparatus according to claim 4, wherein

the information about light is stored in the storage unit in further association with a part of the food product,

the identification unit is configured to identify the part of the food product based on the image, and

the determination unit is configured to determine the characteristic of the food product further based on the part of the food product.

6. The mobile apparatus according to any one of claims 1 to 5, wherein the characteristic of the food product includes at least any one of color, sugar content, acidity, maturity, firmness, or a functional ingredient amount.

7. The mobile apparatus according to any one of claims 1 to 6, wherein the radiating unit is configured to radiate light in a visible light band, and the spectroscope is configured to have sensitivity to the visible light band.

8. The mobile apparatus according to any one of claims 1 to 6, wherein the radiating unit is configured to radiate light in a near-infrared band, and the spectroscope is configured to have sensitivity to the near-infrared band.

9. The mobile apparatus according to any one of claims 1 to 8, wherein the radiating unit is configured to radiate light in an ultraviolet band, and the spectroscope is configured to have sensitivity to the ultraviolet band.

10. The mobile apparatus according to claim 1, wherein the information about light is a calibration curve.

11. The mobile apparatus according to claim 10, wherein the calibration curve is obtained by performing calibration using a standard sample that is different from the food product.

12. The mobile apparatus according to claim 1, wherein the information about light is calibrated information sent by an external server.

13. A food characteristics determination system having a mobile apparatus and a food characteristics determination device,

the food characteristics determination device comprising:

a storage unit configured to store a kind of food product, a characteristic of the food product, and information about light in association with each other;

a communication unit configured to communicate with the mobile apparatus; and

a determination unit configured to determine a characteristic of a food product by acquiring a kind of the food product and a measured value of spectroscopy from the mobile apparatus via the communication unit and referring to the storage unit, and output the characteristic of the food product to the mobile apparatus via the communication unit;

the mobile apparatus includes a spectroscope configured to perform spectroscopy of light entered to output a measured value;

the spectroscope includes a first spectroscope measuring a transmitted light transmitted through the food product and a second spectroscope measuring a scattered light scattered by the food product, the first

spectroscope and the second spectroscope are located in different places from each other, wherein

the information about light is stored in the storage unit in further association with a distinction between the scattered light and the transmitted light,

the determination unit is configured to determine the characteristic of the food product further based on the distinction between the scattered light measured by the second spectroscope and the transmitted light measured by the first spectroscope, and

the mobile apparatus is a smartphone, a tablet, or a PDA configured to fulfill a function corresponding to an installed application.

14. A food characteristics determination method performed by a mobile apparatus, comprising:

radiating light;

performing spectroscopy of light entered to acquire a measured value;

identifying a kind of a food product corresponding to the light entered in the performing the spectroscopy; and

outputting a characteristic of the food product by determining the characteristic of the food product by referring to a storage unit configured to store a kind of a food product, a characteristic of the food product, and information about light in association with each other, based on the measured value output in the performing the spectroscopy and the kind of the food product identified in the identifying, to determine the characteristic of the food product;

wherein, in the performing spectroscopy, a first spectroscope measuring a transmitted light transmitted through the food product and a second spectroscope measuring a scattered light scattered by the food product are used, and the first spectroscope and the second spectroscope are located in different places from each other,

wherein

the information about light is stored in the storage unit in further association with a distinction between the scattered light and the transmitted light,

in the outputting, the characteristic of the food product is determined further based on the distinction between the scattered light measured by the second spectroscope and the transmitted light measured by the first spectroscope, and

the mobile apparatus is a smartphone, a tablet, or a PDA configured to fulfill a function corresponding to an installed application.

15. A program for causing a mobile apparatus to perform:

radiating light from a radiating unit;

performing spectroscopy of light entered to acquire a measured value from a spectroscope;

identifying a kind of a food product corresponding to the light entered in the performing the spectroscopy; and

outputting a characteristic of the food product by determining the characteristic of the food product

by referring to a storage unit configured to store a kind of a food product, a characteristic of the food product, and information about light in association with each other, based on the measured value output in the performing the spectroscopy and the kind of the food product identified in the identifying, to determine the characteristic of the food product;

the spectroscope includes a first spectroscope measuring a transmitted light transmitted through the food product and a second spectroscope measuring a scattered light scattered by the food product, the first spectroscope and the second spectroscope are located in different places from each other,

wherein

the information about light is stored in the storage unit in further association with a distinction between the scattered light and the transmitted light,

in the outputting, the characteristic of the food product is determined further based on the distinction between the scattered light measured by the second spectroscope and the transmitted light measured by the first spectroscope, and

the mobile apparatus is a smartphone, a tablet, or a PDA configured to fulfill a function corresponding to an installed application.