

## Description

Title of Invention: FOOD OR BEVERAGE IN TRANSPARENT CONTAINER AND OFF-FLAVOR PREVENTION METHOD

### Technical Field

[0001] The present invention relates to a food or beverage in a transparent container, and more particularly, to a food or beverage in a transparent container, which is made by filling a food or beverage containing fruit pulp and/or fruit juice into a transparent container. With this constitution, off-flavor produced through irradiation with light such as sunlight or fluorescent lamp light can be prevented.

### Background Art

[0002] In recent years, various types of foods and beverages such as a fruit juice beverage, a fruit-containing ice cream, a fruit-containing dessert, and the like have been developed along with diversification of fruit-containing foods and beverages. In particular, a food or beverage containing fruit pulp or fruit juice derived from a natural fruit or the like is attracting consumers because of consumers' interest in nature-oriented goods.

[0003] Problems and the like with regard to an ice cream which is one of foods and beverages containing fruit pulp or fruit juice are described below.

In general, an ice cream which is displayed and sold in a shop front is provided with being packed in a light-blocking paper

container or plastic container in many cases. Further, in general, an ice cream containing fruit pulp or fruit juice is also provided with being packed in a light-blocking paper container or plastic container in many cases.

However, in general, the light-blocking container has no transparency in itself. It is therefore impossible to visually observe ice cream containing fruit pulp or fruit juice from the outside of the container and to appeal its commercial value, even if big fruit pulp which is a feature of the content is contained, or various patterns are formed by contriving how to mix ice cream having milky white color with fruit pulp or fruit juice having another color.

[0004] Therefore, an ice cream containing fruit pulp or fruit juice packed in a transparent container is on sale. However, in general, in the case of using the transparent container, the ice cream containing fruit pulp or fruit juice is exposed to light such as sunlight or fluorescent lamp light during display in the shop front to produce off-flavor probably due to a milk fat, a vegetable oil and fat, or the like. The main component of the off-flavor is a certain kind of aldehyde, ketone, or the like. The off-flavor may affect flavor and quality of a product to significantly impair its commercial value.

[0005] Hitherto, there have been known, as technologies for preventing deterioration of an oil and fat-containing food such as an ice cream due to, for example, oxidation by heat or light,

a method involving adding a specific kind of antioxidant (for example, Patent Literature 1), a method involving using a container produced by adding, for example, sintered black and/or aniline black with a focus on blocking of ultraviolet light (see for example, Patent Literature 2), a method involving adjusting an average fat particle size and free fat ratio of ice cream to suppress oxidation (see Patent Literature 3), a method involving incorporating bubbles of an inert gas into a frozen sweet or an ice cream (see Patent Literature 4), and the like.

[0006]        However, in the case of using a food additive such as an antioxidant as the technology of Patent Literature 1, an original flavor may be impaired. In addition, the container as described in Patent Literature 2 is different from a transparent container, and the content of the container cannot be substantially visually observed. Therefore, even if the content contains fruit pulp, fruit juice, or the like, its commercial value cannot be improved visually. In addition, the technology involving adjusting the fat particle size and the like and the technology involving incorporating bubbles of an inert gas as described in Patent Literatures 3 and 4 require a special manufacturing process, resulting in an increase in manufacturing cost.

[0007]        On the other hand, with regard to design of a product in manufacturing of an ice cream, for example, a fat content of a strawberry fruit is as small as about 0.1%, and considering a ratio of the fruit blended in the product, the content of

strawberry-derived fat in the product is further lower. Therefore, it has been considered that photooxidation is not caused by the strawberry-derived fat.

However, there has been known a case where foreign odor such as metal-like odor is generated through irradiation with sunlight or fluorescent lamp light in citrus-based fruit juice in a PET bottle (see Non Patent Literature 1), and it has been found that similar off-flavor is generated also in an ice cream containing fruit pulp or fruit juice.

#### Citation List

##### Patent Literature

[0008] [Patent Literature 1] JP 4383689 B2

[Patent Literature 2] JP 08-283495 A

[P Patent Literature 3] JP 3999920 B2

[Patent Literature 4] JP 2005-58131 A

##### Non Patent Literature

[0009] [Non Patent Literature 1] Toshihito Naka,

"Photosensitized Off-flavor of Citrus Juice in PET Bottles," Journal of Japan Association on Odor Environment, 41(4), p. 240-245 (2010)

#### Summary of Invention

##### Problems to be Solved

[0010] Therefore, an object of the present invention is to provide a food or beverage in a transparent container, such as an

ice cream or dessert which is displayed and sold in the shop front where the food or beverage is liable to be affected by sunlight or fluorescent lamp light, in particular, a food or beverage in a transparent container, which includes a food or beverage containing fruit pulp and/or fruit juice as a content and which can prevent off-flavor produced by oxidation due to exposure to light significantly even when the transparent container is used as a container.

#### Means for Solving the Problems

[0011] The inventors of the present invention have made intensive studies in view of the above-mentioned conventional problems, and as a result, have discovered that production of off-flavor can be prevented significantly by using a specific transparent container as a container for a food or beverage containing fruit pulp and/or fruit juice, thus completing the present invention.

[0012] The present invention provides a food or beverage in a transparent container made by filling a food or beverage containing fruit pulp and/or fruit juice into a transparent container which can substantially block light in a specific wavelength range.

[0013] The transparent container is a transparent container which substantially blocks light in wavelength ranges of 300 nm to 500 nm and 550 nm to 720 nm.

[0014] A preferred example of the transparent container is one including a light-blocking material.

[0015] , Another preferred example of the transparent container is one having a transparent container main body and a light-blocking coating layer formed by applying a coating material onto the transparent container main body.

[0016] Still another preferred example of the transparent container is one having a light-blocking film.

In this case, the transparent container may be formed of a light-blocking film alone or may be formed by attaching a light-blocking film to the outer surface of a transparent container main body.

[0017] The present invention also provides a method of preventing off-flavor produced through irradiation of a food and beverage containing fruit pulp and/or fruit juice with light, the method including filling the food and beverage into a transparent container which substantially blocks light in wavelength ranges of 300 nm to 500 nm and 550 nm to 720 nm.

#### Advantageous Effects of Invention

[0018] The food or beverage in a transparent container of the present invention has an advantage in that the amount of off-flavor produced by oxidation due to exposure to light is small even when the food or beverage is displayed and sold in the shop front where the food or beverage is liable to be affected by sunlight or fluorescent lamp light. According to the present invention, it is possible to provide a food or beverage such as an ice cream or dessert,

which does not exhibit off-flavor such as metallic odor when the food or beverage is taken. Further, even if the food or beverage is displayed in the shop front, for example, in a showcase, the food or beverage can be displayed for a long period of time.

[0019] Further, according to the present invention, it is possible to visually observe the content from the outside and to certainly appeal its commercial value because the container is transparent. For example, it is possible to certainly appeal a state where big fruit pulp which is a feature of the content is contained, a state where a frozen sweet containing a fruit is arranged around a cylindrical ice cream, or a state where various patterns are formed by alternately arranging an ice cream having a color of milky white and fruit pulp or fruit juice having another color in layers or mixing these materials. In particular, a large advantageous effect can be expected in a dessert containing fruit pulp or fruit juice or in an ice cream containing fruit pulp or fruit juice, which can appeal the product visually.

#### Brief Description of Drawings

[0020] [FIG. 1] FIG. 1 is a graph showing absorption spectra of various light-blocking films.

[FIG. 2] FIG. 2 is a bar graph showing the results obtained by: placing a dispersion prepared by mixing a frozen puree containing fruit pulp with water at a predetermined concentration in a transparent container made of a transparent container main body

covered with each of the light-blocking films shown in FIG. 1; freezing the dispersion at a temperature of  $-25^{\circ}\text{C}$ ; irradiating the resultant product with light to produce flavor components; and analyzing the components.

[FIG. 3] FIG. 3 is a bar graph showing the results obtained by: placing a frozen sweet containing fruit juice and fruit pulp in a transparent container made of a transparent container main body, part of which is coated with a coating material, covered with each of the light-blocking films shown in FIG. 1; freezing the sweet at a temperature of  $-25^{\circ}\text{C}$ ; irradiating the resultant product with light to produce flavor components; and analyzing the components.

#### Description of Embodiments for Carrying Out Invention

[0021] Hereinafter, the present invention is described in detail. However, the present invention is not limited to the respective embodiments described below.

[0022] A food or beverage used in the present invention is not particularly limited as long as it is a food or beverage containing fruit pulp or fruit juice, such as an ice cream (which includes a frozen sweet) containing fruit pulp, an ice cream (which includes a frozen sweet) containing fruit juice, a dessert containing fruit pulp, or a dessert containing fruit juice. The food or beverage used in the present invention may contain both of the fruit pulp and fruit juice or may contain any one of the fruit pulp and fruit juice. The food or beverage used in the present invention may be

a food in a solid or paste form or the like, or a beverage in a liquid form or the like.

The embodiment of the food or beverage is not particularly limited, and examples thereof include a frozen product, a refrigerated product, a shelf-stable food, and a heated product. Of those, a frozen product and a refrigerated product are preferred. Of the frozen product, an ice cream shown below as an example is the most preferred embodiment in the present invention because of high palatability and easy appeal to the eye.

It should be noted that the term "food or beverage" as used herein includes a beverage and a food other than the beverage.

[0023] The ice cream, which is one embodiment of the food or beverage of the present invention, includes ice cream, ice milk, lacto-ice, a frozen sweet, and the like. The ice cream used in the present invention can be manufactured by, for example, adding auxiliary raw materials (such as a flavor, a stabilizer, and an emulsifier) to main raw materials such as cow's milk and/or a milk product and a sugar.

It should be noted that the term "ice cream" as used herein is intended to encompass ice milk, lacto-ice, a frozen sweet, and the like as well as ice cream. Further, the term "frozen sweet" as used herein is intended to encompass frozen desserts including ices such as shaved ice, crushed ice, and ROCK ICE as well as a frozen sweet in the narrow sense.

[0024] Raw materials for the ice cream are specifically as

follows.

As main raw materials, there are used, for example, animal's milks (e.g., cow's milk, sheep's milk, and buffalo's milk), composition-adjusted milks which has been processed therefrom (e.g., skimmed milk, partially-skimmed milk, high-fat milk, mineral-fortified milk, concentrated milk, concentrated skimmed milk, and the like), milk products (e.g., cream, butter, condensed milk, powdered milk, cheese, fermented milk, whey, and the like), oils and fats (e.g., animal and vegetable oils and fats such as rapeseed oil, soybean oil, palm oil, coconut oil, lard, and the like), and sugars (e.g., sugar, maltose, sucrose, trehalose, lactose, starch syrup, dextrose syrup, and the like).

As auxiliary materials, there are used, for example, flavors (e.g., vanilla essence, and the like), stabilizers (e.g., gelatin, sodium alginate, CMC, locust bean gum, pectin, and the like) emulsifiers (e.g., a glycerin fatty acid ester, a sorbitan fatty acid ester, a propylene glycol fatty acid ester, a sucrose fatty acid ester, lecithin, and the like), dyestuffs, and the like.

[0025] A fruit used for obtaining fruit pulp and/or fruit juice as a material for the food or beverage of the present invention is not particularly limited, and examples thereof include: berries such as strawberry and raspberry; citrus fruits such as orange, lemon, and grapefruit; gourds such as melon and watermelon; and apple, pear, mango, passion fruit, grape, banana, and the like.

The term "fruit pulp and/or fruit juice" as used herein is

intended to encompass solid matter, paste matter, liquid matter, and the like each derived from a nut (e.g., chestnut, peanut, almond, and the like), a vegetable (e.g., tomato, pumpkin, carrot, and the like), and the like.

[0026] In the present invention, preferred exemplary embodiments of the fruit pulp and/or fruit juice include the whole of a fruit (e.g., strawberry and raspberry), pieces of fruit pulp (e.g., melon), puree-like fruit pulp (e.g., mango), fruit juice obtained by squeezing a fruit (e.g., lemon), and the like.

The pieces of the fruit pulp can constitute part of the food or beverage in a transparent container of the present invention by, for example, cutting the fruit pulp into pieces having an appropriate size and putting the pieces in a transparent container so that the pieces can be visually observed from the outside.

The puree-like fruit pulp and fruit juice can constitute part of the food or beverage in a transparent container of the present invention by simply adding the fruit pulp and fruit juice as raw materials for the food or beverage, or by adding the fruit pulp and fruit juice in flowable states to flow and then freezing and fixing the fruit pulp and fruit juice so that the resultant products can be visually observed by seeing the products through the transparent container.

[0027] A method of manufacturing the food or beverage in a transparent container of the present invention is not limited to a specific method, and examples thereof include a method of obtaining

a food or beverage in a transparent container using materials such as a main raw material, an auxiliary raw material, fruit pulp, and fruit juice in appropriate amounts by mixing, sterilization, cooling, filling into the transparent container, packing, and the like in accordance with conventional methods.

[0028]       The transparent container used in the present invention is a substantially transparent container formed by molding glass, a synthetic resin, or the like. The phrase "substantially transparent" as used herein refers to a state where the content in the transparent container can be visually observed directly from the outside of the transparent container through the transmission of at least part of light in a wavelength range other than the light-blocking wavelength ranges specified in the present invention.

[0029]       It is not necessary that the whole of the transparent container used in the present invention is transparent.

As examples of a partially transparent container, there are given: a container including an untransparent or semitransparent part in a label or print part for indication of the content and a transparent part in the rest; a container having a design formed by combining a transparent part and an untransparent part so that these transparent and untransparent parts represent different designs at a plurality of places; and a container including a transparent part with a size of a visual observation window and an untransparent part in most part of the container. Therefore, in other words, the transparent container used in the present

invention is a container having a transparent region which allow a person to visually observe at least part of the food or beverage filled in the inside of the container from the outside of the container.

[0030] As the material for the transparent container used in the present invention, a general material used as a material for a container for a food or beverage may be appropriately used. Examples of the material include, but not limited to, glass and synthetic resins such as polyethylene, polypropylene, polyethylene terephthalate, polyethylene naphthalate, ethylene-1-alkene copolymer, nylon, polystyrene, vinyl chloride, and the like.

[0031] The shape of the transparent container used in the present invention is not particularly limited, and examples thereof include general all shapes which can be applied to a container for a food or beverage, such as cup shapes, glass shapes, bottle shapes, pack shapes, sac-like shapes appropriate for bar or stick shapes, and the like. As a method of manufacturing the transparent container, a general method may be employed.

[0032] In the present invention, the transparent container substantially blocks light in a specific wavelength range.

The wavelength range of light substantially blocked preferably includes a specific wavelength range on the short wavelength side and a specific wavelength range on the long wavelength side.

The wavelength range of light substantially blocked on the short wavelength side is 300 nm to 500 nm, preferably 300 nm to

480 nm, more preferably 300 nm to 470 nm, more preferably 320 nm to 470 nm, more preferably 340 nm to 470 nm, more preferably 360 nm to 470 nm, more preferably 380 nm to 470 nm.

The wavelength range of light substantially blocked on the long wavelength side is 550 nm to 720 nm, preferably 580 nm to 700 nm, more preferably 580 nm to 690 nm, more preferably 580 nm to 680 nm, more preferably 600 nm to 680 nm.

The transmission rate (transmittance) of light substantially blocked is 50% or less, preferably 40% or less, more preferably 30% or less, still more preferably 20% or less, particularly preferably 10% or less.

[0033] As a method of imparting the above-mentioned optical properties to the transparent container, there is given, but not limited to, a method using, for example, a light-blocking pigment or dye having high absorption properties in the above-mentioned wavelength ranges (hereinafter, also referred to as "light-blocking pigment or the like"). Examples thereof include: a method involving forming a transparent container by adding the light-blocking pigment or the like to a main material for the transparent container (such as glass or synthetic resin) in advance or in molding; a method involving preparing a transparent container by applying a coating material containing the light-blocking pigment or the like onto a predetermined region of the outer surface of a transparent container main body after molding to form a light-blocking coating layer on part of the outer surface of the transparent container main body;

and a method involving preparing a transparent container by attaching a light-blocking film on part of the outer surface of a transparent container main body by tightly attaching light-blocking films colored with the light-blocking pigment or the like in laminate to a predetermined region of the outer surface of the transparent container main body after molding.

As the light-blocking pigment or the like, one kind of pigments or dyes generally used for a container for a food or beverage may be used singly, or two or more kinds thereof may be used in combination appropriately depending on the conditions of use.

#### Examples

[0034] Hereinafter, the present invention is described in more detail by way of Examples. However, the present invention is not limited by these Examples.

#### [0035] (Experimental Example 1)

A general frozen puree, which contains strawberry fruit pulp and is used for an ice cream, was mixed with water so that the ratio of the frozen puree in the total amount of the frozen puree and water was 2 mass%, to thereby prepare a dispersion.

Subsequently, 100 ml of the dispersion was placed in a transparent container to prepare six samples which resemble the food or beverage in a transparent container.

Each of the six samples was covered with any one of light-blocking films having a color of red, blue, yellow, or green

which has high absorption properties in specific wavelength ranges, an aluminum foil (control example as a substantially light-blocking state), and a transparent film (control example as a light-transmitting state). Each of the samples was frozen at a temperature of -25°C, and while remaining the temperature, an exposure test was conducted through irradiation with light of about 2,000 lux for 3 days. After that, a sensory test and a flavor component analysis were carried out by the following methods.

It should be noted that, as shown in FIG. 1, the sample covered with the light-blocking film having green color is an Example corresponding to the present invention. As shown in FIG. 1, the samples covered with the light-blocking films having red, blue or yellow color, the sample covered with the aluminum foil, and the sample covered with the transparent film are Comparative Examples not corresponding to the present invention. However, some of colors similar to the above-mentioned colors used in Comparative Examples may include a color which substantially blocks light in a specific wavelength range specified in the present invention. That is, the transparent container used in the present invention may have any color as long as the conditions of the transparent container specified in the present invention are satisfied.

[0036]           (Method for sensory test)

Five expert panelists (one man and four women) conducted a sensory test to judge sensory properties by calculating average scores of the sensory evaluation on the presence or absence of metallic

odor and sensory degrees of the odor based on scores of 0 (not detected) to 5 (strong metallic odor was detected).

[0037] (Method of measuring flavor components)

2 g of a content (dispersion) of each sample after irradiation with light and 8 g of saturated saline were placed in a container for analysis (volume; 20 ml), and flavor components in a headspace of the container for analysis were extracted by solid-phase microextraction (extraction conditions: 60°C, 40 minutes, solid-phase microfiber: SPME fiber 85 µm Carboxen/PDMS, manufactured by SUPELCO). After that, the amounts of the flavor components were measured by a GC/MS analysis (apparatus: 6890N/5975, manufactured by Agilent; column for GC: DB-WAX, manufactured by J&W; measurement conditions: 250°C, 5 minutes; GC oven temperature: 40°C (5 minutes)→(temperature rise at 15°C/min)→250°C (10 minutes); total ion detection mode (mass range: m/z 35 to 300)).

The measurement was carried out for "2-heptenal", "2-octenal" and "1-octen-3-one". The three kinds of components are oxidation index components. In the case where the total concentration of the measured values of the three kinds of components was 10 µg/L or more, the sample was evaluated as "large amount," in the case where the total concentration was 5 µg/L or more and less than 10 µg/L, the sample was evaluated as "middle amount," and in the case where the total concentration was 1 µg/L or more and less than 5 µg/L, the sample was evaluated as "small amount."

[0038] (Measurement of absorption spectrum)

Absorption spectra of the above-mentioned films at wavelengths of 300 nm to 800 nm were measured using a spectrophotometer (V-530; manufactured by JASCO Corporation). FIG. 1 shows the results.

[0039] (Results of sensory test)

According to the results of the sensory test, the order of average scores of the sensory evaluation on the six samples is as follows. It should be noted that the numerical values in the parentheses are average scores of the sensory evaluation.

Aluminum foil (0) < Green (0.2) < Blue (1.2) < Yellow (2.0)  
≈ Transparent (2.2) ≈ Red (2.4)

In the six samples, "metallic odor" was detected in the above-mentioned order. The metallic odor of the sample covered with the light-blocking film having green color was weaker than those of the samples covered with the light-blocking films having blue color and the others.

[0040] (Results of measurement of flavor components)

According to the results of measurement of flavor components, "2-heptenal," "2-octenal," and "1-octen-3-one" known as the oxidation index components were generated in large amounts in the samples covered with the light-blocking films having one of red, yellow, and blue colors (see FIG. 2). There were few differences in the amounts of the flavor components among these samples covered one of the three colors.

On the other hand, "2-heptenal," "2-octenal," and "1-octen-3-one" were generated in very small amounts in the sample

covered with the light-blocking film having green color.

[0041] Table 1 shows the results of the above-mentioned tests.

[0042] [Table 1]

|                                        |                        | Aluminum foil | Green        | Blue         | Yellow       | Trans-parent  | Red          |
|----------------------------------------|------------------------|---------------|--------------|--------------|--------------|---------------|--------------|
| Average score of sensory evaluation *1 |                        | 0             | 0.2          | 1.2          | 2.0          | 2.2           | 2.4          |
| Absorption property *2                 | Long wavelength range  | o             | o            | o            | x            | x             | x            |
|                                        | Short wavelength range | o             | o            | x            | o            | x             | o            |
| Three index components                 |                        | 0             | Small amount | Large amount | Large amount | Middle amount | Large amount |

\*1 0 (not detected) to 5 (strong metallic odor was detected)

\*2 o: Absorbed x: Transmitted (conceptually shown based on absorption spectra in FIG. 1)

[0043] As clear from the results shown in Table 1, in the sample covered with the light-blocking film having green color corresponding to the present invention, the concentrations of "2-heptenal," "2-octenal," and "1-octen-3-one" known as the oxidation index components which cause off-flavor were significantly lower than those of the other samples, and production of the three kinds of components was dramatically suppressed. Further, the results were confirmed by the sensory test.

[0044] (Experimental Example 2)

Six commercially available frozen sweets in transparent containers, each containing fruit juice and fruit pulp at a total concentration of 5% (trade name "Meiji Koori Ichigo Frappe" (which literally means "Meiji Ice Strawberry Frappe") 150 ml; manufactured

by Meiji Dairies Corporation) were prepared. It should be noted that each of the transparent containers was made of polystyrene and formed by applying a coating material onto part of a container main body. It should be also noted that each of the frozen sweets includes a portion made of shaved ice with strawberry syrup (i.e., a part made of ice and syrup) and a float portion (i.e., a part made of vanilla ice cream).

Each of the six samples was covered with any one of light-blocking films (red, blue, yellow or green color) having high absorption properties in specific wavelength ranges, an aluminum foil (control as a substantially light-blocking state), and a transparent film (control as a light-transmitting state). Each of the samples was frozen at a temperature of  $-25^{\circ}\text{C}$ , and an exposure test was conducted through irradiation with light of about 2,000 lux for 7 days.

It should be noted that the above-mentioned light-blocking films, aluminum foil, and transparent film were the same as those used in Experimental Example 1.

After that, only the part of "shaved ice with strawberry syrup" arranged outside the product was separated, and a sensory test and a flavor component analysis were carried out for the part of "shaved ice with strawberry syrup" by the following methods.

It should be noted that, as described in Experimental Example 1, the sample covered with the light-blocking film having green color is an Example corresponding to the present invention. The

samples covered with the light-blocking films having red, blue or yellow color, the sample covered with the aluminum foil, and the sample covered with the transparent film are Comparative Examples not corresponding to the present invention.

[0045] (Method for sensory test)

Five expert panelists (two men and three women) conducted a sensory test to judge sensory properties by calculating average scores of the sensory evaluation on the presence or absence of metallic odor and sensory degrees of the odor based on scores of 0 (not detected) to 5 (strong metallic odor was detected).

[0046] (Method of measuring flavor components)

The flavor components were measured and evaluated in the same manner as in "Method of measuring flavor components" in Experimental Example 1 except that "6890/5973" (manufactured by Hewlett-Packard) was used instead of "6890N/5975" (manufactured by Agilent) as an apparatus for a GC/MS analysis, and "Selected ion detection mode (selected mass: m/z 55, 70, and 83)" was used instead of "Total ion detection mode (mass range: m/z 35 to 300)" in the GC/MS analysis. It should be noted that, as mentioned above, in Experimental Example 2, the measurement was performed only for the portion of "shaved ice with strawberry syrup" and was not performed for the float portion (i.e. the part of vanilla ice cream).

[0047] (Results of sensory test)

According to the results of the sensory test, the order of average scores of the sensory evaluation on the six samples is as

follows. It should be noted that the numerical values in the parentheses are average scores of the sensory evaluation.

Aluminum foil (0) < Green (2.1) < Blue (3.3) < Transparent (3.5)  $\approx$  Yellow (3.7)  $\approx$  Red (3.7)

In the six samples, "metallic odor" was detected in the above-mentioned order. The metallic odor of the sample covered with the light-blocking film having green color was weaker than those of the samples covered with the light-blocking films having blue color and the others.

[0048] (Results of measurement of flavor components)

According to the results of measurement of flavor components, "2-heptenal," "2-octenal," and "1-octen-3-one" known as the oxidation index components were generated in large amounts in the samples covered with the light-blocking films having red or yellow color (see FIG. 3). There were few differences in the amounts of the flavor components between the samples having these two colors.

On the other hand, "2-heptenal," "2-octenal," and "1-octen-3-one" were generated in very small amounts in the sample covered with the light-blocking film having green color.

[0049] Table 2 shows the results of the above-mentioned tests.

[0050]

[Table 2]

|                                        |                        | Aluminum foil | Green        | Blue          | Yellow       | Trans-parent | Red          |
|----------------------------------------|------------------------|---------------|--------------|---------------|--------------|--------------|--------------|
| Average score of sensory evaluation *1 |                        | 0             | 2.1          | 3.3           | 3.7          | 3.5          | 3.7          |
| Absorption property *2                 | Long wavelength range  | o             | o            | o             | x            | x            | x            |
|                                        | Short wavelength range | o             | o            | x             | o            | x            | o            |
| Three index components                 |                        | 0             | Small amount | Middle amount | Large amount | Large amount | Large amount |

\*1 0 (not detected) to 5 (strong metallic odor was detected)

\*2 o: Absorbed x: Transmitted (conceptually shown based on absorption spectra in FIG. 1)

[0051] As clear from the results shown in Table 2, in the sample covered with the light-blocking film having green color corresponding to the present invention, the concentrations of "2-heptenal," "2-octenal," and "1-octen-3-one" known as the oxidation index components which cause off-flavor were significantly lower than those of the other samples, and production of the three kinds of components was dramatically suppressed. Further, the results were confirmed by the sensory test.

#### Industrial Applicability

[0052] The food or beverage in a transparent container of the present invention has excellent characteristics in that the amount of off-flavor produced by oxidation due to exposure to light is small even when the food or beverage is displayed and sold in the shop front where the food or beverage is liable to be affected by

sunlight or fluorescent lamp light and in that off-flavor such as metallic odor is not exhibited when the food or beverage is taken. Even if the food or beverage in a transparent container of the present invention is displayed in the shop front, for example, in a showcase, the food or beverage can be displayed for selling for a long period of time.

Further, according to the present invention, it is possible to appeal its attractive appearance which is a feature of the content, such as big fruit pulp or various designs (i.e. patterns), because the container is transparent, resulting in appealing its commercial value.

## Claims

1. A food or beverage in a transparent container, which is made by filling the food or beverage which contains fruit pulp and/or fruit juice into a transparent container, and wherein the transparent container substantially blocks light in wavelength ranges of 300 nm to 500 nm and 550 nm to 720 nm.

2. A food or beverage in a transparent container according to claim 1, wherein the transparent container comprises a light-blocking material.

3. A food or beverage in a transparent container according to claim 1, wherein the transparent container has a transparent container main body and a light-blocking coating layer formed by applying a coating material onto the transparent container main body.

4. A food or beverage in a transparent container according to claim 1, wherein the transparent container has a light-blocking film.

5. A food or beverage in a transparent container according to any one of claims 1 to 4, wherein the food or beverage comprises an ice cream.

6. A method of preventing off-flavor produced through irradiation with light of a food or beverage which contains fruit pulp and/or fruit juice, wherein the method comprises a step of filling the food or beverage into a transparent container which substantially blocks light in wavelength ranges of 300 nm to 500

nm and 550 nm to 720 nm.

7. A method of preventing off-flavor according to claim 6, wherein the food or beverage comprises an ice cream.