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(54) Title: NEW SAPONIN COMPOUND, SAPONIN SOLUTION CONTAINING THE SAME A PREPARATION METHOD THEREOF, AND PHARMACEUTICAL COMPOSITIONS, HEALTH FOODS AND COSMETICS CONTAINING THE SAPONIN AS AN ACTIVE COMPONENT

(57) Abstract: Disclosed are a novel saponin compound, a saponin composition liquid containing the same, a preparation method thereof, and a pharmaceutical composition, functional food and cosmetic product containing the composition liquid as an active ingredient. The pharmaceutical composition and functional food has various pharmacological effects, including immune enhancement, vitality enhancement, improvement of liver function, withdrawal of hangover, promotion of protein generation, promotion of cerebral activities and improvement of attention, activated recuperation of health after surgical operation, and prevention or treatment of diabetes, impaired blood circulation, depression, dermal inflammatory disease, dermal eczema, dermatophytosis, allergic rhinitis, empyema, and so on.

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Applicant

CHOI, Jang Youn

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NEW SAPONIN COMPOUND, SAPONIN SOLUTION CONTAINING THE SAME A PREPARATION METHOD THEREOF, AND PHARMACEUTICAL COMPOSITIONS, HEALTH FOODS AND COSMETICS CONTAINING THE SAPONIN AS AN ACTIVE COMPONENT

Technical Field

The present invention relates to a novel saponin compound, a saponin composition liquid containing the same, a preparation method thereof, and a pharmaceutical composition, functional food and cosmetic product containing the saponin compound or the saponin composition as an active ingredient.

Background Art

To date, ginseng has been widely known as a representative nutritive tonic agent. There are a number of reports on the ingredients and pharmacological activities of ginseng that have been known up to now include anti-aging, anti-arteriosclerosis, treatment of hyperlipidemia, treatment of hepatic insufficiency, improvement of liver function, protection from radiation injury, immune enhancement, improvement of cerebral function, anti-thrombotic, anti-stress, anti-diabetic, anti-hypertensive, anti-tumor effects, etc.

In particular, research into such various pharmacological effects has focused on studies of ginseng extracts, specifically saponins that have been known to play a key role in exhibiting the efficacy of ginseng.

Saponin components of ginseng are largely classified into three groups according to chemical structure: protopanaxadiol (PD); protopanaxatriol (PT); and oleanolic acid. Saponin existing on the plant system is a family of oleanane saponin, while ginseng saponin is dammarane-family triterpenoid saponin that is not isolated from the plant system. Ginseng saponins were found to be completely different from those found in other kinds of plants, thus they are called ginsenoside, meaning ginseng glycoside, so that they can be distinguished from other plant saponins.

Prior research has revealed that saponin components contained in ginseng in a large quantity, that is, over 90%, include dammarane-family triterpenoid diols or triols. In more detail, main components of ginseng saponin include three benzene rings, cyclopentane, sugar moieties (glycon) and more than 450 kinds of non-sugar moieties (aglycon).

There have been many attempts to increase pharmacological potency of ginseng, in particular, by increasing specific components contained therein. To this end, various studies on processing methods of ginseng, and physiological activities and changes in physiologically active materials of the processed ginseng have been carried out. In other words, ginseng was processed to obtain processed ginseng having enhanced pharmacological effects compared to existing fresh ginseng, white ginseng and red ginseng, and various components contained in the processed ginseng were isolated to verify their pharmacological efficacy. In the course of such investigations, novel saponin components different from those isolated from original ginseng were discovered.

It is known that although saponin components Rh1, Rh2, Rg2, Rg3 and the like are rarely isolated from fresh ginseng or white ginseng, they are prevalent in red ginseng.

The inventor of the present invention has further carried out the experimental investigation concerning ginsenoside components. As a result of the investigation, the inventor has discovered that a saponin composition liquid containing the novel saponin compound had a different structure from the conventional saponin compound, which will be referred to as "Rxn", in which n is an integer between 1 and 100, suggesting that there would be approximately 100 types of structures available. Also, the inventor has reached findings that the novel saponin composition liquid has enhanced therapeutic effects of dermal eczema, tinea pedis, allergic dermatitis or atopic dermatitis, and treatment of other various diseases occurring to skin, eye, nose, mouth, tongue, pharynx, larynx, etc. as well as the same

pharmacological efficacy as that of the conventional saponin composition liquid, finally completing the present invention.

Disclosure of the Invention

It is an object of the present invention to provide a novel saponin compound, a saponin composition liquid containing the same, and a preparation method thereof.

It is another object of the present invention to provide a pharmaceutical composition and functional food containing the novel saponin compound or a saponin composition liquid containing the same as an active ingredient.

It is still another object of the present invention to provide a cosmetic product containing the novel saponin compound or a saponin composition liquid containing the same as an active ingredient.

Brief Description of the Drawings

FIG. 1 is a spectral diagram showing High Performance Liquid Chromatograph (HPLC) analysis of a composition liquid according to the present invention;

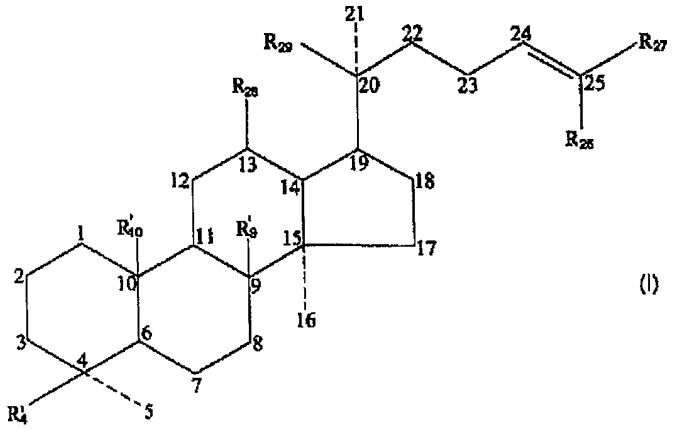
FIG. 2 is a spectral diagram showing HLPC analysis of a composition prepared by Keumsan Ginseng Association of Korea; and

FIG. 3 a spectral diagram showing HLPC analysis of a composition of a Cheongkwanjang product that is Korean red ginseng prepared by KT&G Corporation.

Best mode for carrying out the Invention

The present invention will now be described in more detail through embodiments.

To achieve the above objects, the present invention provides a novel saponin compound having the formula:



(I)

wherein 1~25 indicate carbon numbers in the backbone of a general saponin, radicals R_{26} ~ R_{29}, R'_4, R'_9 and R'_{10} represent hydrogen atom, or a glycon of monosaccharides, disaccharides, oligosaccharides or polysaccharides, a glycon of monosaccharides, disaccharides, oligosaccharides or polysaccharides may be optionally bonded to a carbon[C] on a double bond of the hexagonal ring or the pentagonal ring, and

wherein at least one selected from the group consisting of the following groups is induced by an addition reaction into the radicals R_{26} ~ R_{29}, R'_4, R'_9 and R'_{10} or a carbon atom on a double bond of the hexagonal ring or the heptagonal ring:

a group of edible organic acids containing 1 to 20 carboxyl groups;

a group of flavonoids having a backbone containing three phenyl groups contained in edible propolis;

a group of primary, secondary and tertiary unsaturated triglycerides having 9 or more carbons contained in edible oils;

a group of alcohols having 3 or more carbons as edible alcohols;

a group of amino acid or nucleic acid derivatives contained in edible protein of animals and plants, the amino acid or nucleic acid derivatives being one singly or 2, inclusive, to 20, exclusive, in combination with each other;

a group of steroids contained in edible animals and plants; and

a group of edible inorganic materials including a single substance or a

mixture of two or more materials selected from the group consisting of gold, silver, platinum, sodium, calcium, zinc, iron, copper, sulfur, magnesium, barium, aluminum, carbon, silicon, germanium, phosphorus and selenium.

The novel saponin compound according to the present invention has a variety of chemical structures according to the position where the addition reaction occurs.

The novel saponin compound and a saponin composition liquid comprising the novel saponin compound are prepared in the following manner.

The above formula can be simply explained based on the Onewholeness Theory, as proposed by the inventor of the present invention, the data of which is available upon request.

1) Pre-treatment step

Ginseng is immersed in a sweet drink made from rice or a residual liquid produced in the previous preparation process of the saponin composition liquid for 10 minutes to 1 hour, and aged in a closed vessel. That is, the ginseng or dried ginseng of either stem or leaf is aged at a temperature of 40 to 60 ℃ for 7 to 21 days, and fresh ginseng is aged at a temperature of 20 to 50 ℃ for 1 to 7 days. The aging may cause degeneration of alkaloid compounds on the epidermis of the ginseng.

2) Sugar addition step

The pretreated ginseng was injected into an extraction reactor with a reflux device together with saccharides, edible organic acids, edible salts, reaction catalysts and water, or optionally with edible sweeteners. To induce extraction, the reaction was maintained at 120 ℃, under atmospheric pressure for 20 hours or more, and the injected materials including ginseng is removed (filtered) and evaporated under reduced pressure for removal of water so that the amount of the reactant is substantially the same as that of water used, thereby preparing the saponin composition liquid containing the saponin compounds of the formula I having two or more glycon radicals by sugar addition.

The preheated ginseng is used in an amount of 1 to 30 wt%, preferably 5 to 25 wt%, based on the total weight of water used.

Examples of the saccharide useful in the present invention include honey, monosaccharides, disaccharides, oligosaccharides, and polysaccharides. The saccharide is used in an amount of 1 to 20 wt%, preferably 1.5 to 15 wt%.

Examples of the polysaccharide include one selected from the group consisting of pulluran, amylose xyloglucans, amylopectin, dextran, cyclodextrin, mannans, hydroxyethyl dextrans, inulin, chitin, chitosans, and aqueous celluloses.

Examples of the edible salt useful in the present invention include a single substance or a mixture of two or more materials selected from the group consisting of bay salt, bamboo salt, mineral salt, and parched salt, and is used in an amount of 0.05 to 2 wt%, preferably 0.1 to 1 wt%.

Examples of the reaction catalyst useful in the present invention include a single substance or a mixture of two or more materials selected from the group consisting of platinum, gold, silver, zinc, copper, selenium and elvan, and is used in an amount of 0.05 to 2 wt%, preferably 0.1 to 1 wt%.

Examples of the edible organic acid dried pharmaceutical agent useful in the present invention include a single substance or a mixture of two or more materials selected from the group consisting of formic acid, citric acid, succinic acid, maleic acid, acetic acid, alum, plum, Chinese quince, mugwort, motherwort, garlic extract, persimmon vinegar, and unhulled rice vinegar, and is used in an amount of 0.1 to 3 wt%, preferably 0.3 to 2 wt%.

Examples of the edible sweetener useful in the present invention include a single substance or a mixture of two or more materials selected from the group consisting of honey, royal jelly, monosaccharide, disaccharides, such as oligosaccharides, polysaccharide, black sugar, jujube, licorice, raisin. dried persimmon, arrow root, Schisandra chinensis, rubus schizostylu, cornus officinalis, lycium chinense, cuscuta japonica, Rehmaniae radix preparata, poria cocos, ox bezoar, musk, powdered cervi cornus, cervi pantotrichum cornu, bear

gall, pig gall, and edible proteins including mushrooms. The edible sweetener is used in an amount of 0.1 to 3 wt%, preferably 0.3 to 2 wt%.

In this step, based on the total weight of the general saponin components, at least 1 wt% is converted into novel saponin compounds of the formula I by a sugar addition reaction.

3) Purification and isolation

Pure compounds of the formula I can be isolated by subjecting the saponin compounds to general purification and separation techniques, such as chromatography or extraction using an organic solvent.

In accordance with another aspect, the present invention provides a pharmaceutical composition and functional food containing the novel saponin compound of the formula I or a saponin composition liquid containing the saponin compound as an active ingredient.

The pharmaceutical composition and functional food have various pharmacological effects including immune enhancement, vitality enhancement, improvement of liver function, withdrawal of hangover, promotion of protein generation, promotion of cerebral activities and improvement of attention, activated recuperation of health after surgical operation, and prevention or treatment of diabetes, impaired blood circulation, depression, dermal inflammatory disease, dermal eczema, dermatophytosis, allergic rhinitis, and empyema, and promoting generation of protein effective in treatment and prevention of a bruise, a burn, bleeding internal diseases, and regeneration of protein in the cerebrum, medullar, or endothelium/exothelium. In particular, the pharmaceutical composition and functional food have enhanced therapeutic effects of dermal eczema, tinea pedis, allergic dermatitis or atopic dermatitis, and treatment of other various diseases occurring to skin, eye, nose, mouth, tongue, pharynx, larynx, etc.

In the pharmaceutical composition and function food, the novel saponin compound is preferably contained in an amount of not less than 0.01 wt%.

The pharmaceutical composition can be formulated in a variety of dosage

forms, including oral administration, parenteral administration and topical administration. In other words, the pharmaceutical composition can be formulated, in combination with a pharmaceutically acceptable carrier, into oral dosage forms including granules, capsules, solutions, or suspensions, injectables, suspensions, topical preparations including ointments, creams or solutions, suppositories, and other various dosage forms.

The carrier used in combination with the composition according to the present invention is a pharmaceutically acceptable carrier. For oral administration, examples of the carrier include binders, humectants, disintegrating agents, adjuvants, solubilizers, dispersants, stabilizers, suspensions, coloring agents, or flavoring agents. For injectable administration, examples of the carrier include preservatives, pain relieving agents, solubilizers, or stabilizers. For topical administration, examples of the carrier include basic matrixes, adjuvants, lubricants, or preservatives. The thus prepared pharmaceutical formulations can be administered either orally or parenterally. Also, in order to prevent the drug from being dissolved in gastric acid during oral administration, an obstipatia can also be used. Further, solid formulations for oral administration, e.g., granules, can be formulated in the enteric-coated dosage form.

Doses of the compositions according to the present invention may vary according to the formulation, and the desirable dose to be administered may be appropriately selected according to the absorption, inactivation rate and excretion speed of active ingredients, the age, sex and severity of a subject. According to the present invention, for an adult human, the saponin compound is preferably administered at a dose of 10 ~ 30 mg 1 ~ 3 times per day, and the saponin composition liquid is preferably administered at a dose of 20 ~ 30 cc 1 ~ 3 times per day.

In accordance with still another aspect, the present invention provides a cosmetic product comprising the novel saponin compound or the saponin composition liquid as an active ingredient.

When the cosmetic product contains the novel saponin composition liquid as the active ingredient, the novel saponin composition liquid is preferably contained in an amount of 30 ~ 90 wt% based on the total weight of the composition. Also, the cosmetic product of the present invention may include 5~25 wt% of edible ethyl alcohol, 0.5 ~ 5 wt% of a herbal extract, and 0.1~50 wt%, preferably 0.5~35 wt%, of a general additive. The herbal extract is one or more edible vegetable extracts selected from the group consisting of cucumber, sponge goard, aloe and cordyceps extracts, and one or more additives selected from the group consisting of bush mushroom, agaric mushroom, bus mushroom, topspin mushroom, Reishi mushroom, oak mushroom, cordyceps sinensis, Angelicae gigantis radix, rehmannia glutinosa, white poria cocos, ox bezoar, musk, cervi cornus powder, cervi pantotrichum cornu, bear gall, and pig gall. The general additive is one or more selected from the group consisting of one or more honey wax, paraffin oil, shark liver oil, caviar, pectins.

The cosmetic product according to the present invention can be formulated in the form of skin lotion, moisturizing lotion, or creams.

Also, the cosmetic product according to the present invention may be formulated in the form of a skin-cleansing agent, a hair care agent, shower and baths preparations, make-up cosmetics and skin care cosmetics.

The present invention is more specifically explained by the following examples. However, it should be understood that the present invention is not limited to these examples in any manner.

EXAMPLES

Preparation Example 1: Saponin composition liquid

Ginseng was first pretreated by immersing the same in a residual liquid produced in the previous preparation process of a saponin composition liquid for 60 minutes, and aging the resultant ginseng at a temperature of about 25℃ for one day. 300 g of the pretreated ginseng, 200 g of honey, 20 g of an edible sweetener, which is a dried pharmaceutical extract of a combination containing

licorice, rehmannia glutinosa, arrowroot and dried persimmon, 20 g of edible organic acid containing cider vinegar, persimmon vinegar, citric acid, plum, Chinese quince, and citric acid, 3 g of bamboo salt, 3 g of a pellet-type silver as a reaction catalyst, and 3000 g of water, were separately injected into an extraction reactor provided with a reflux device. That is, the reaction catalyst was injected into a lower portion of the extraction reactor, the saccharide, the bamboo salt and the organic acid were dissolved in water and the ginseng and the dried pharmaceutical agents were injected into an upper portion of the extraction reactor, causing a reaction for approximately 40 hours at approximately 120 ℃ under atmospheric pressure for extraction. Then, solid matters such as ginseng were filtered for removal and evaporated under reduced pressure for removal of water, yielding not greater than 3000 g of the extract, thereby obtaining a saponin composition liquid containing saponin compounds of the formula I.

Preparation Example 2: Saponin composition liquid

Ginseng was first pretreated by immersing the same in a residual liquid produced in the previous preparation process of a saponin composition liquid for 30 minutes and aging the resultant ginseng at a temperature of about 30℃ for two days. 250 g of the pretreated ginseng, 150 g of a combination containing 50 g of honey, 50 g of glucose and 50 g of millet jelly, 25 g of an edible sweetener containing 10 g of fresh rehmannia glutinosa, 10 g of licorice and 5 g of jujube, 25 g of edible organic acid consisting of 10 g of cider vinegar, 10 g of unhulled rice vinegar and 5 g of Chinese quince, 5 g of bamboo salt, a reaction catalyst consisting of 0.01 g of powdered silver and 9.99 g of pellet-type silver, and 3000 g of water, were separately injected into an extraction reactor provided with a reflux device. Then, a reaction was maintained for approximately 50 hours at approximately 120 ℃ under atmospheric pressure for extraction, solid matters such as ginseng were filtered for removal, and evaporated under reduced pressure for removal of water, yielding not greater

than 2500 g of the extract, thereby obtaining a saponin composition liquid containing saponin compounds of the formula I.

Preparation Example 3: Saponin composition liquid

Ginseng was first pretreated by immersing the same in a residual liquid produced in the previous preparation process of a saponin composition liquid for 20 minutes, and aging the resultant ginseng at a temperature of about 27℃ for 5 days. 200 g of the pretreated ginseng, 200 g of a combination containing 100 g of honey, 50 g of black sugar and 50 g of millet jelly, 15 g of an edible sweetener consisting of 10 g of jujube and 5 g of licorice, 25 g of an edible organic acid consisting of 10 g of Chinese quince and 15 g of unhulled rice vinegar, 10 g of bamboo salt, a reaction catalyst consisting of 15 g of elvan and 2 g of pellet-type gold, and 3000 g of water, were separately injected into an extraction reactor provided with a reflux device. Then, a reaction was maintained for approximately 70 hours at approximately 120 ℃ under atmospheric pressure for extraction, solid matters such as ginseng were filtered for removal, and evaporated under reduced pressure for removal of water, yielding not greater than 2000 g of the extract, thereby obtaining a saponin composition liquid containing saponin compounds of the formula I.

Preparation Example 4: saponin composition liquid

Ginseng was first pretreated by immersing the same in a residual liquid produced in the previous preparation process of a saponin composition liquid for 40 minutes, and aging the resultant ginseng at a temperature of about 25℃ for 10 days. 300 g of the pretreated ginseng, 100 g of a combination containing 80 g of honey, 10 g of glucose and 10 g of millet jelly, 40 g of an edible sweetener consisting of 20 g of jujube, 10 g of boiled rehmannia glutinosa, 5 g of licorice and 5 g of dried persimmon, 20 g of an edible organic acid consisting of 19 g of plum and 1 g of citric acid, 1.5 g of bamboo salt, a reaction catalyst consisting of 19 g of elvan and 1 g of platinum sand, and 3000

g of water, were separately injected into an extraction reactor provided with a reflux device. Then, a reaction was maintained for approximately 40 hours at approximately 120 ℃ under atmospheric pressure for extraction, solid matters such as ginseng were filtered for removal, and evaporated under reduced pressure for removal of water, yielding not greater than 1500 g of the extract, thereby obtaining a saponin composition liquid containing saponin compounds of the formula I.

Preparation Example 5: Saponin composition liquid

Ginseng was first pretreated by immersing the same in a residual liquid produced in the previous preparation process of a saponin composition liquid for 15 minutes, and aging the resultant ginseng at a temperature of about 32℃ for one day. 350 g of the pretreated ginseng, 150 g of a combination containing 100 g of honey and 50 g of millet jelly, 30 g of an edible sweetener consisting of 25 g of jujube, 2 g of licorice and 3 g of boiled rehmannia glutinosa, 5 g of licorice and 5 g of dried persimmon, 40 g of an edible organic acid consisting of 20 g of plum, 10 g of Chinese quince, 5 g of cider vinegar and 5 g of unhulled rice vinegar, 2 g of bamboo salt, a reaction catalyst consisting of 5 g of pellet-type silver and 25 g of elvan, and 3000 g of water, were separately injected into an extraction reactor provided with a reflux device. Then, a reaction was maintained for approximately 70 hours at approximately 120 ℃ under atmospheric pressure for extraction, solid matters such as ginseng were filtered for removal, and evaporated under reduced pressure for removal of water, yielding not greater than 3000 g of the extract, thereby obtaining a saponin composition liquid containing saponin compounds of the formula I.

Preparation Example 6: Cosmetic product

A skin lotion having the following composition was prepared using the saponin composition liquid prepared in Preparation Example 1:

Saponin composition liquid	60 wt%
Alcohol (edible ethyl alcohol)	20 wt%
Aloe extract and Reishi extract	5 wt%
Jasmin flavor	0.05 wt%
Alkoxyglycerol (Shark liver oil) and Iranian caviar	1 wt%
Water	13.95wt%

Preparation Example 7: Cosmetic product

A moisturizing lotion having the following composition was prepared using the saponin composition liquid prepared in Preparation Example 1:

Saponin composition liquid	70 wt%
Honey wax	3 wt%
Paraffin oil	10 wt%
Sodium palmitic acid	0.5 wt%
Cucumber, sponge goard or Cordyceps extract	7 wt%
Rose fragrance	0.03 wt%
Alkoxyglycerol and Iranian caviar	1 wt%
Water	8.47 wt%

Experimental Example 1. Content analysis

In order to analyze the contents of the saponin composition liquid prepared in Preparation Example 1, 100 mg of the sample was dissolved in 10 ml of 40% acetonitrile and filtered using a 0.2 μm membrane filter (10000 ppm), followed by subjecting to column for HPLC.

For comparison, a red ginseng liquid produced by Keumsan Ginseng Association of Korea and a red ginseng liquid produced by KT&G Corporation were evaluated under the same analysis conditions. The results thereof are shown in FIGS. 1 through 3.

[Measurement conditions]

Column: μ-Bondapak C18

Solvent: A= H_2O, B=Acetonitrile

0 min (B 17%); 10 min (B 33%); 88 min (B 60%); 100 min (80%);

102 min (B 17%); 110 min (B 17%)

Flow rate: 1 ml/min

In FIGS. 1 through 3, the abscissa indicates a time (unit: min) and the ordinate indicates a voltage (unit: mV).

As shown in FIG. 1, a peak profile that is quite different from that exhibited by the conventional red ginseng was shown in a time domain from 0.777 to 3 min (compound 1). Also, a new peak profile not previously detected in the conventional red ginseng was exhibited in a time domain between 27.647 and 7 min (compound 2). In a time domain between 70 and 110 min, a gentle peak gradient that has also never been detected in the conventional red ginseng (compound 3) was exhibited. The compounds 1 through 3 are presumably novel compounds prepared by the present invention.

It is well-known that the peaks of the conventional red ginseng are mostly 7mV or less in the region of the compound 1. However, the peaks detected from the compound according to the present invention were greater than or equal to 9 mV. Also, the peak exhibited by the compound 2 is not detectable from the conventional red ginseng and a gentle peak of 2.5 mV was observed. In the compound 3 region, while the conventional red ginseng exhibits several sharp peaks having a height of approximately 5 mV, the peak exhibited by the compound according to the present invention has a gentle profile around 100 minutes, which is completely new compared to the conventional case, suggesting that the new peak is exhibited by the novel compound prepared in the present invention.

Tables 1 and 2 show the results illustrated in FIGS. 1 and 2. The contents of the saponin components according to the present invention are measured using data shown in Table 1, and the measurement results are shown in Table 3.

Table 1

retention time [min]	area [mV.s]	height [mV]	area [%]	height [%]	WO5 [min]
0.777	7.862	1.432	0.1	0.8	0.09
1.153	474.880	41.796	7.0	22.6	0.20
1.333	321.299	38.976	4.7	21.1	0.12
1.960	1418.665	74.964	20.9	40.5	0.29
2.387	753.594	14.970	11.1	8.1	0.49
5.477	40.641	1.144	0.6	0.6	0.65
7.283	13.968	0.475	0.2	0.3	0.49
15.600	0.798	0.033	1.2e-02	1.8e-02	0.29
16.283	6.215	0.130	0.1	0.1	0.74
19.040	0.384	0.008	5.7e-03	4.3e-03	0.01
19.427	0.963	0.027	1.4e-02	1.5e-02	0.33
27.647	117.196	0.998	1.7	0.5	2.03
29.243	18.505	0.311	0.3	0.2	1.01
32.810	197.931	2.574	2.9	1.4	1.29
34.547	51.039	0.708	0.8	0.4	1.10
37.543	193.748	2.548	2.9	1.4	1.25
39.467	23.865	0.431	0.4	0.2	1.00
41.520	0.378	0.020	5.6e-03	1.1e-02	0.28
42.913	2.848	0.057	4.2e-02	3.1e-02	0.97
44.300	2.256	0.045	3.3e-02	2.5e-02	0.57
57.170	2.130	0.049	3.1e-02	2.7e-02	0.54
58.493	0.045	0.010	6.7e-04	5.2e-03	0.02
60.613	1.856	0.012	2.7e-02	6.5e-03	0.02
102.113	3124.956	3.331	46.1	1.8	23.30
Total	6776.023	185.049	100.0	100.0	

Table 2

retention time [min]	area [mV.s]	height [mV]	area [%]	height [%]	W05 [min]
1.100	62.529	6.604	1.8	11.5	0.13
1.740	88.724	6.852	2.6	12.0	0.14
18.760	95.953	2.829	2.8	4.9	0.59
19.433	130.594	3.219	3.8	5.6	0.69
29.200	429.811	5.397	12.6	9.4	1.05
33.173	58.409	1.339	1.7	2.3	0.71
34.287	137.839	1.649	4.0	2.9	1.30
38.247	67.495	2.007	2.0	3.5	0.52
39.747	126.591	3.144	3.7	5.5	0.60
41.093	83.712	2.006	2.5	3.5	0.56
43.860	121.572	2.912	3.6	5.1	0.56
57.113	153.520	3.146	4.5	5.5	0.71
58.213	176.866	3.497	5.2	6.1	0.75
70.907	39.638	0.507	1.2	0.9	1.13
73.633	29.165	0.367	0.9	0.6	1.05
77.227	55.591	0.457	1.6	0.8	1.15
91.293	191.388	1.763	5.6	3.1	1.19
95.840	232.409	1.456	6.8	2.5	3.29
97.867	452.415	3.967	13.3	6.9	2.45
101.020	669.812	4.080	19.7	7.1	3.09
Total	3404.034	57.198	100.0	100.0	

Table 3

extract	total saponin (%)	crude saponin (%)	PD/PT	Ginsenoside (W/W%)										
				Rb1	Rb2	Rc	Rd	Re	Rf	Rg1	Rh1		Rh3	
											s-Rb1	r-Rb1	s-Rb3	r-Rb3
X	6.9113	5.03	0.8126	2.871	0.005	0.189	0.019	0.007	0.043	0.004	3.389	0.370	0.014	0.0003

Clinical tests were carried out using the saponin compositions and cosmetic products prepared in Preparation Examples 1 ~ 7 in the following manners.

Clinical test example 1

Age: 55 (Male)

Symptoms: Hand eczema, dermatophytosis

Result: 0.5 ~ 1 g of the saponin composition liquid prepared in Preparation Example 1 was applied to a subject having eczema sites on hand and foot three times daily over a period of 3 to 10 days. The result showed that the skin became softened and bright-complexioned without inducing any symptoms of the eczema.

Clinical test example 2

Age: 55 (Male)

Symptoms: Hangover

Result: After binge drinking to reach a state of unconsciousness, 20 ~ 30 cc of the saponin composition liquid prepared in Preparation Example 2 was diluted in 1 cup of water and administered twice in the morning and evening. Binge drinking of to an unconsciousness state severely impairs respiratory organs, liver, heart and lung. 1 to 2 days after administering the mixed liquid, the hangover was withdrawn. The lips, turned dark yellow as a result of overdrinking were recovered to the original scarlet color, 2 to 3 days after administration of the mixed liquid.

Clinical test example 3

Age: 18 (Male)

Symptoms: Chronic fatigue, unusually dark skin

Result: Each 20 cc of the saponin composition liquid prepared in Preparation Example 3 was administered twice over a period of 90 days. Thereafter, vitality was recovered and chronic fatigue was cured while the attention was improved. Also, unusually dark and rough skin was whitened and softened.

Clinical test example 4

Age: 41 (Female)

Symptoms: Chronic fatigue, depression, darkened skin

Result: 20 ~ 30 cc of the saponin composition liquid prepared in Preparation Example 4 was diluted in 1 cup of water and administered once or twice daily over a period of 100 days. After administration of the diluted saponin composition liquid, the state of depression was overcome, the vitality was recovered and the fatigue was cured. The dark-yellow, coarse skin became whitened, softened and bright-complexioned.

Clinical test example 5

Age: 6 (Female)

Symptoms: Pneumonic symptoms, weakened immunity

Result: 5 cc of the saponin composition liquid prepared in Preparation Example 5 was administered twice daily over a period of 2 weeks. After administration of the saponin composition liquid, the vitality was recovered and the fatigue was cured. The dark-yellow, coarse skin became whitened and softened.

Clinical test example 6

Age: 36 (Female)

Symptoms: Allergic rhinitis

Result: 20 cc of the saponin composition liquid prepared in Preparation Example 1 was administered twice daily over a period of 30 days. After administration of the saponin composition liquid, the vitality was recovered and the immunity was fortified so that rhinitis symptoms were withdrawn.

Clinical test example 7

Age: 38 (Male)

Symptoms: Common cold and complications due to weakened immunity

Result: After administration of 20 cc of the saponin composition liquid prepared in Preparation Example 2 once daily over a period of 60 days, the

immunity was fortified and the vitality was recovered, so that cold complications were withdrawn from the subject without suffering from the cold.

Clinical test example 8

Age: 54 (Male)

Symptoms: Symptoms occurring during the period of convalescence after gastrotomy

Result: After administration of 30 cc of the saponin composition liquid prepared in Preparation Example 3 twice daily over a period of 45 days, the subject could lead a normal life owing to increased capability producing a protein. Also, severe sweetening, which is one of sequelae of the gastrotomy, was relieved and the vitality was restored to a normal state.

Clinical test example 9

Age: 20 (Male)

Symptoms: Empyema, common cold

Result: After administration of 20 cc of the saponin composition liquid prepared in Preparation Example 4 once daily over a period of 110 days, the immunity was fortified so that the empyema was cured and the onset of common cold was withdrawn. Also, the mental lucidity and attention were notably improved.

Clinical test example 10

Age: 50 (Female)

Symptoms: Crural bloat due to impaired blood circulation and diabetic symptoms

Result: After administration of 30 cc of the saponin composition liquid prepared in Preparation Example 5 once daily over a period of 90 days, the bloat was cured, the vitality was recovered and the immunity was fortified, so that the diabetic fatigue and other complications were withdrawn.

Clinical test example 11

Age: 60 (Female)

Symptoms: Dark and coarse skin, severe fatigue, particularly on an uphill road, due to lack of crural muscular strength, frequent onset of cold

Result: After administration of 25 cc of the saponin composition liquid prepared in Preparation Example 1 once daily over a period of 60 days, the fatigue was cured, the capability of generating protein was fortified owing to enhanced immunity. Also, frequent onset of cold was overcome, the skin became whitened, elastic and bright-complexioned.

Clinical test example 12

Age: 72 (Female)

Symptoms: Diabetes, cold and bacterial complications

Result: After administration of 25 cc of the saponin composition liquid prepared in Preparation Example 2 twice daily over a period of 40 days, the immunity for bacterial diseases was fortified and the vitality was recovered, so that various complications were withdrawn. Also, fortified metabolism of carbohydrates noticeably lowered the glucose level.

Clinical test example 13

Skin lotion and moisturizing lotion prepared in Preparation Examples 6 and 7 were continuously applied to seven 22 to 42 old women who cannot use general cosmetic products due to their hypersensitive skin three times daily over a period of a week. As a result, no hypersensitive response and skin irritation occurred.

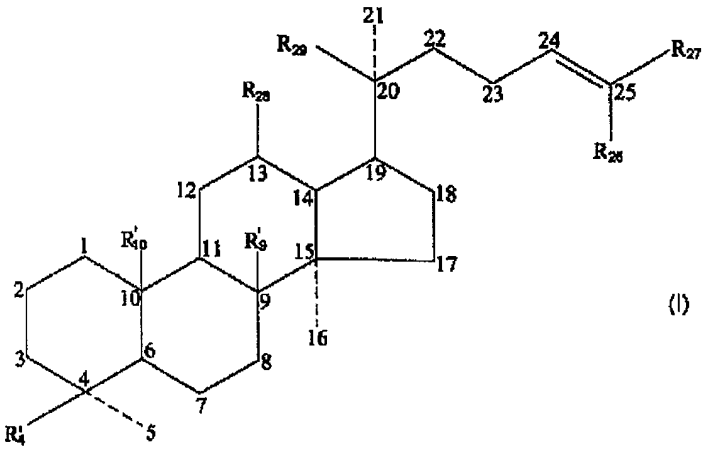
Industrial Applicability

According to the present invention, the pharmaceutical composition and functional food comprising a saponin compound or a saponin composition liquid

containing the same as an active ingredient has various pharmacological effects, including immune enhancement, vitality enhancement, improvement of liver function, withdrawal of hangover, promotion of protein generation, promotion of cerebral activities and improvement of attention, activated recuperation of health after surgical operation, and prevention or treatment of diabetes, impaired blood circulation, depression, dermal inflammatory disease, dermal eczema, dermatophytosis, allergic rhinitis, empyema, and so on. Also, the cosmetic product comprising the saponin compound or a saponin composition liquid containing the saponin compound can also be suitably applied to the person who has sensitive skin.

Claims

1. A novel saponin compound having the formula:



(I)

wherein 1~25 indicate carbon numbers in the backbone of a general saponin, radicals R_{26} ~ R_{29}, R'_4, R'_9 and R'_{10} represent hydrogen atom or a glycon of monosaccharides, disaccharides, oligosaccharides or polysaccharides, a glycon of monosaccharides, disaccharides, oligosaccharides or polysaccharides may be optionally bonded to a carbon [C] on a double bond of the hexagonal ring or the heptagonal, and

wherein at least one selected from the group consisting of the following groups is induced by an addition reaction into the radicals R_{26} ~ R_{29}, R'_4, R'_9 and R'_{10} or a carbon atom on a double bond of the hexagonal ring or the heptagonal ring:

a group of edible organic acids containing 1 to 20 carboxyl groups;

a group of flavonoids having a backbone containing three phenyl groups contained in edible propolis;

a group of primary, secondary and tertiary unsaturated triglycerides having 9 or more carbons contained in edible oils;

a group of alcohols having 3 or more carbons as edible alcohols;

a group of amino acid or nucleic acid derivatives contained in edible protein of animals and plants, the amino acid or nucleic acid derivatives being

one singly or 2, inclusive, to 20, exclusive, in combination with each other;

a group of steroids contained in edible animals and plants; and

a group of a single substance or a mixture of two or more edible inorganic materials selected from the group consisting of gold, silver, platinum, sodium, calcium, zinc, iron, copper, sulfur, magnesium, barium, aluminum, carbon, silicon, germanium, phosphorus and selenium.

2. The saponin compound of claim 1, wherein two or more groups of newly generated groups in the radicals R_{26} ~ R_{29}, R'_4, R'_9 and R'_{10}, or the carbons on the double bond of the hexagonal ring and the heptagonal ring are a glycon of monosaccharides, disaccharides, oligosaccharides, or polysaccharides.

3. A saponin composition liquid comprising not less than 1 wt% of the saponin compound claimed in claim 1 based on the total weight of saponin.

4. A method for preparing the saponin composition liquid of claim 3, the method comprising:

pretreating ginseng by immersing the same in a residual liquid produced in the previous preparation process of the saponin composition liquid for 10 minutes to 1 hour, and aging the resultant ginseng in a closed vessel at a temperature of about 20 to 60℃ for 1 to 20 days;

separately injecting 1 ~ 30 wt% of the pretreated ginseng, 1 ~ 20 wt% of saccharide, 0.1 ~ 3 wt% of edible sweetener, 0.1 ~ 3 wt% of edible organic acid dried pharmaceutical agent, 0.05 ~ 2 wt% of an edible salt, 0.05 ~ 2 wt% of a reaction catalyst and 95 ~ 55 wt% of water into an extraction reactor provided with a reflux device, reacting the resultant mixture for 20 to 70 hours at approximately 120 ℃, under atmospheric pressure for extraction;

filtering solid matters including ginseng for removal; and

evaporating under reduced pressure for removal of water, so that the

amount of the extract is not greater than that of water injected.

5. The method of claim 4, wherein the saccharide is a single substance or a mixture of two or more materials selected from the group consisting of honey, royal jelly, monosaccharide, disaccharide, oligosaccharide, and polysaccharide, the edible salt is a single substance or a mixture of two or more materials selected from the group consisting of bay salt, bamboo salt, mineral salt and parched salt, the reaction catalyst is a single substance or a mixture of two or more materials selected from the group consisting of platinum, gold, silver, zinc, copper, selenium and elvan, the edible organic acid dried pharmaceutical agent is a single substance or a mixture of two or more materials selected from the group consisting of formic acid, citric acid, succinic acid, maleic acid, acetic acid, alum, plum, Chinese quince, mugwort, motherwort, garlic extract, persimmon vinegar, and unhulled rice vinegar.

6. The method of claim 4, wherein the edible sweetener is a single substance or a mixture of two or more materials selected from the group consisting of honey, monosaccharides, disaccharides, oligosaccharide, black sugar, jujube, licorice, raisin dried persimmon, arrow root, Schisandra chinensis, rubus schizostylu, cornus officinalis, lycium chinense, cuscuta japonica, Rehmaniae radix preparata, poria cocos, ox bezoar, musk, powdered cervi cornus, cervi pantotrichum cornu, bear gall, pig gall, and edible proteins including mushrooms.

7. The method of any one of claims 4 through 6, wherein in the pretreating step, the ginseng or dried ginseng of either stem or leaf is aged at a temperature of 40 to 60 ℃ for 7 to 21 days, and fresh ginseng is aged at a temperature of 20 to 50 ℃ for 1 to 7 days.

8. A pharmaceutical composition comprising the saponin compound of

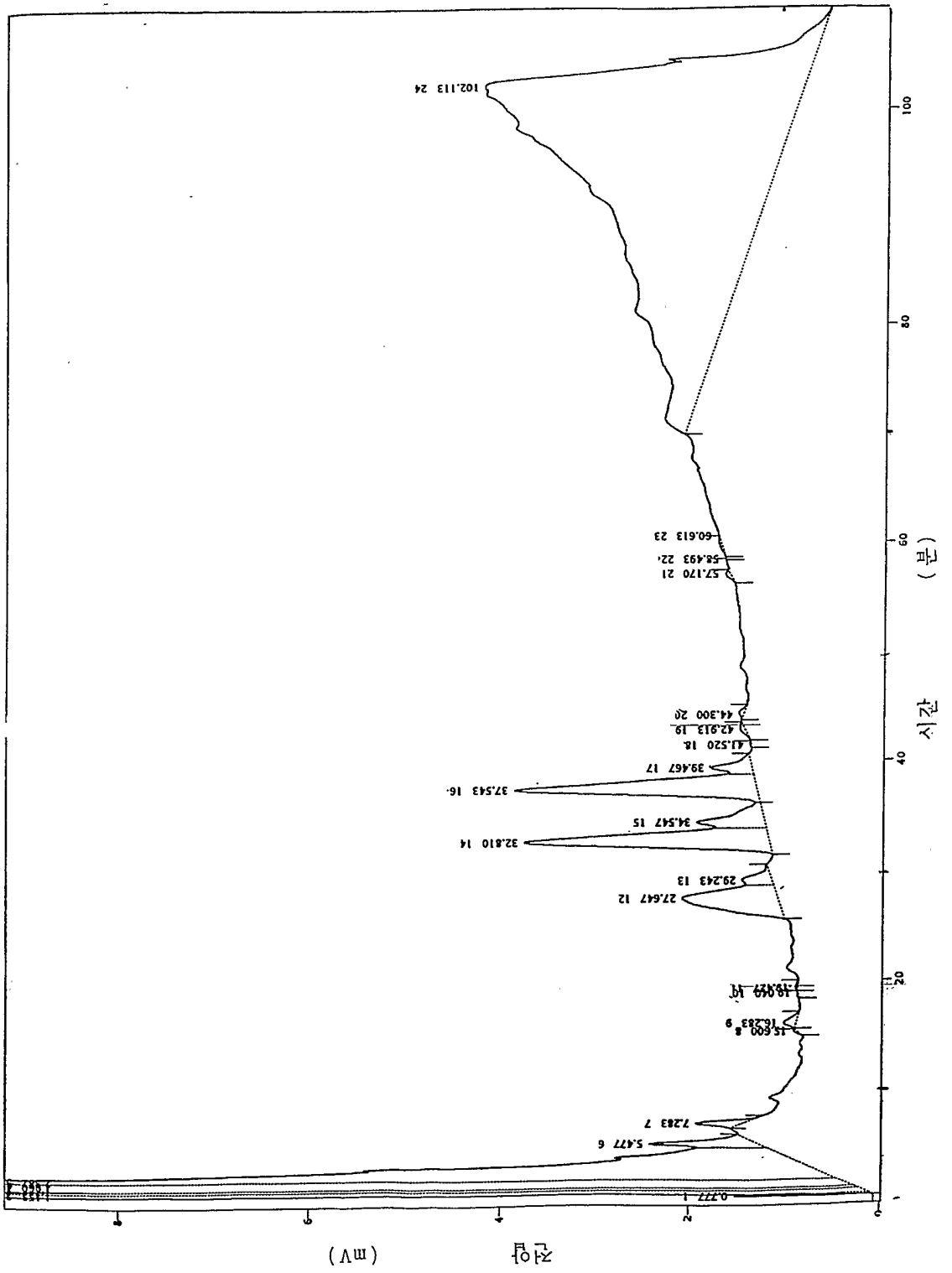
claim 1 or the saponin composition liquid of claim 3 or 4 as an active ingredient, and having pharmacological efficacy including immune enhancement, vitality enhancement, improvement of liver function, withdrawal of hangover, promotion of protein generation, promotion of cerebral activities and improvement of attention, activated recuperation of health after surgical operation, and prevention or treatment of diabetes, impaired blood circulation, depression, dermal inflammatory disease, dermal eczema, dermatophytosis, allergic rhinitis, and empyema, and promoting generation of protein effective in treatment and prevention of a bruise, a burn, internal bleeding diseases, and regeneration of protein in the cerebrum, medullar, or endothelium/exothelium.

9. Functional foods comprising the saponin compound of claim 1 or the saponin composition liquid of claim 3 or 4 as an active ingredient, and having pharmacological efficacy including immune enhancement, vitality enhancement, improvement of liver function, withdrawal of hangover, promotion of protein generation, promotion of cerebral activities and improvement of attention, activated recuperation of health after surgical operation, and prevention or treatment of diabetes, impaired blood circulation, depression, dermal inflammatory disease, dermal eczema, dermatophytosis, allergic rhinitis, and empyema, and promoting generation of protein effective in treatment and prevention of a bruise, a burn, internal bleeding diseases, and regeneration of protein in the cerebrum, medullar, or endothelium/exothelium.

10. A cosmetic product comprising the saponin compound of claim 1 or the saponin composition liquid of claim 3 or 4, as an active ingredient.

11. The cosmetic product of claim 10, being formulated in the form of a skin-cleansing agent, a hair care agent, shower and bath preparations, make-up cosmetics and skin care cosmetics.

[Fig.1]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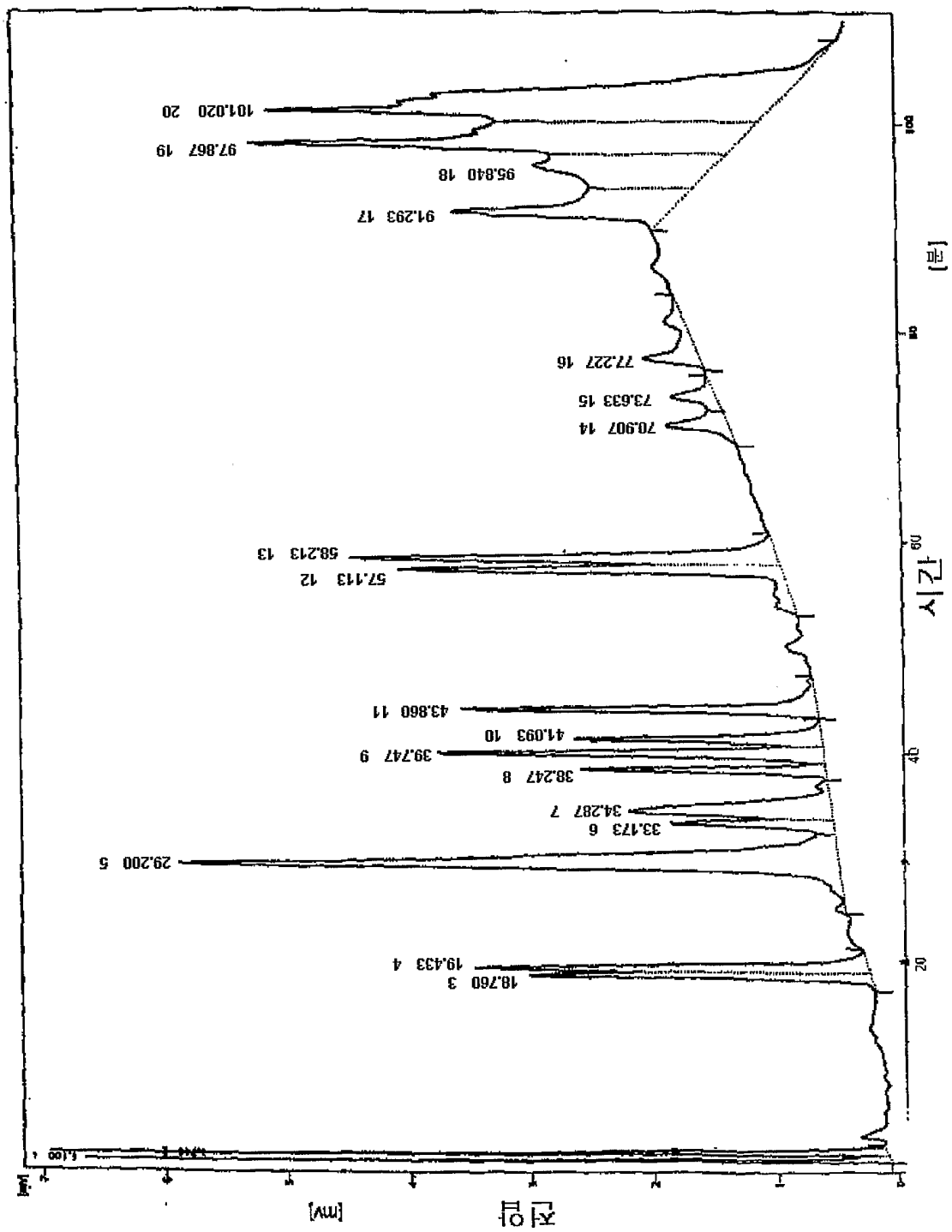
57.170 21
44.300 20
39.467 17
37.543 16
34.547 15
32.810 14
29.243 13
27.647 12
7.283 7
5.477 6
0.777 1
시간 (분)
전압 (mV)

[Fig. 2]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95.840 18
91.293 17
77.227 16
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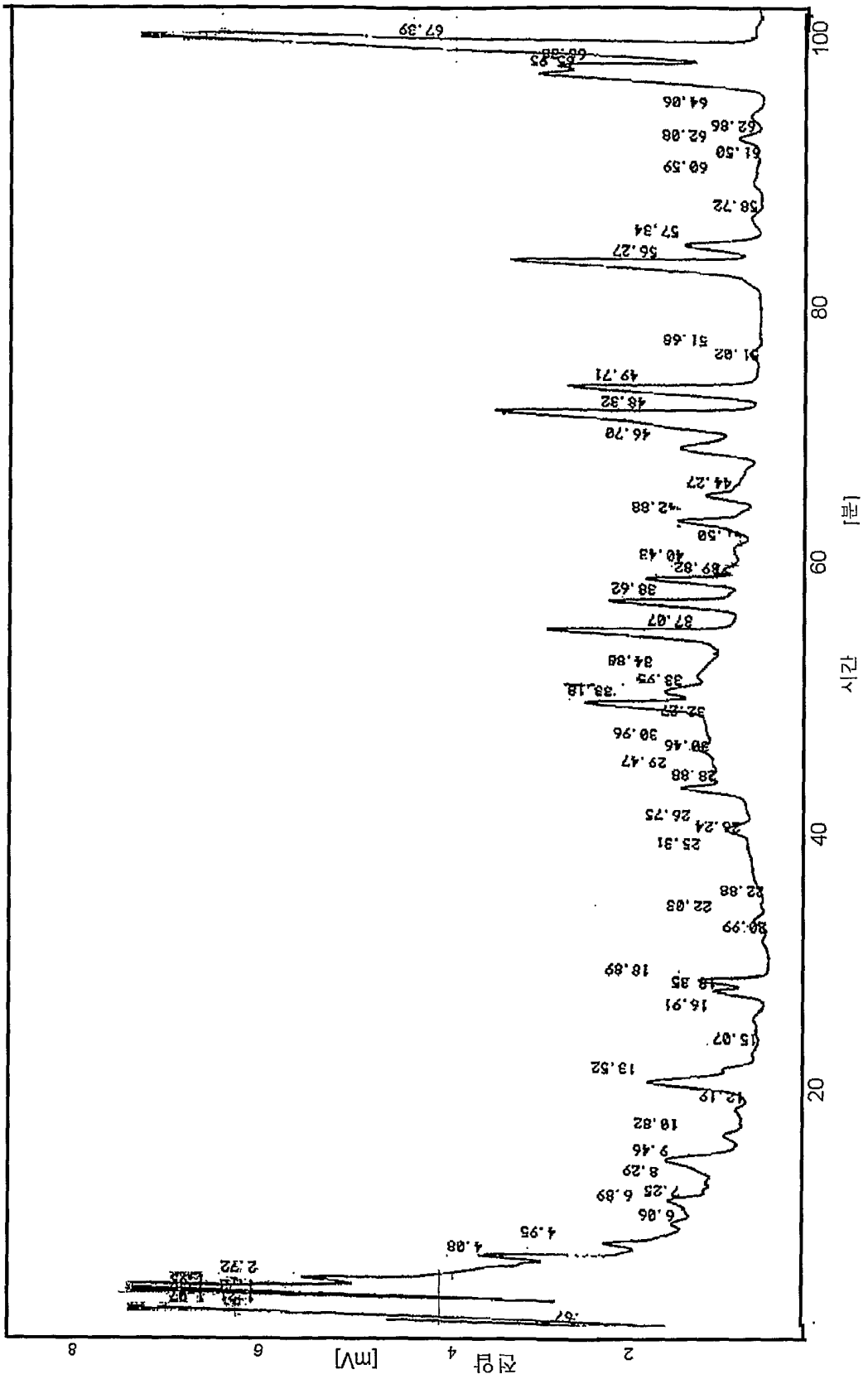
58.213 13
57.113 12
43.860 11
41.093 10
39.747 9
38.247 8
34.287 7
33.173 6
29.200 5
19.433 4
18.760 3
[mv]
전압
시간
[분]

[Fig. 3]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18.35
18.89
20.99
22.03
22.88
25.31
25.24
26.75
28.88
29.47
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32.27
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33.93
34.88
37.07
38.62
39.82
40.43
42.50
42.88
44.27
46.78
48.32
49.71
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51.66
56.27
57.34
58.72
60.59
61.50
62.86
62.08
64.06
67.39
68.88
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2
4
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8
[mV]
전압
20
40
60
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시간
[분]