668439 AUSTRALIA

PAUUU1 24/91
Section 29

Patents Act 1990

PATENT REQUEST: STANDARD PATENT/PATENT OF ADDITION

We, being the person identified below as the Applicant, request the grant of a patent to the person identified below as the Nominated Person, for an invention described in the accompanying standard complete specification.

Full application details follow.

[71]	Applicant:	INSTITUTE OF GENERAL BEAUTY & MEDICAL SCIENCE
	Address:	3-7-10, SHIMO-MEGURO, MEGURO-KU, TOKYO, JAPAN
[70]	Nominated Person:	INSTITUTE OF GENERAL BEAUTY & MEDICAL SCIENCE
	Address:	3-7-10, SHIMO-MEGURO, MEGURO-KU, TOKYO, JAPAN
[54]	Invention Title:	METHOD AND APPARATUS TO REDUCE SKIN TISSUE
[72]	Name(s) of actual inventor(s):	YOSHIHIRO ITO and KAZUSHI MIYAKE

[74] Address for service in Australia: c/o WATERMARK PATENT & TRADEMARK ATTORNEYS, of The Atrium, 290 Burwood Road, Hawthorn, Victoria 3122, Australia Attorney Code: WM

BASIC CONVENTION APPLICATION(S) DETAILS

[31] Application Number	[33] Country	Country Code	[32] Date of Application
29818/93	JAPAN	JP	26TH JANUARY 1993

Basic Applicant(s): INSTITUTE OF GENERAL BEAUTY & MEDICAL SCIENCE

Drawing number recommended to accompany the abstract ...../.....

By our Patent Attorneys,
WATERMARK PATENT & TRADEMARK ATTORNEYS

.....

Darryl B. Mischlewski
Registered Patent Attorney

DATED this 24th day of December 1993.

AU52627 93

P/00/009b 12/11/91
Section 29 (1)
Regulation 3.1 (2)

AUSTRALIA

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NOTICE OF ENTITLEMENT

We, INSTITUTE OF GENERAL BEAUTY & MEDICAL SCIENCE of 3-7-10, Shimo-Meguro, Meguro-Ku, Tokyo, Japan, being the applicant in respect of Application No. 52709/93 state the following:-

The Person nominated for the grant of the patent has entitlement from the actual inventors by virtue of assignment.

The person nominated for the grant of the patent is the applicant of the basic application listed on the patent request form.

The basic application listed on the request form is the first application made in a Convention country in respect of the invention.

By our Patent Attorneys,
WATERMARK PATENT & TRADEMARK ATTORNEYS

February 16, 1996

Carolyn J. Harris
Registered Patent Attorney

AU9352709

(12) PATENT ABRIDGMENT (11) Document No. AU-B-52709/93
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 668439

(54) Title
METHOD AND APPARATUS TO REDUCE SKIN TISSUE

(51)[5] International Patent Classification(s)
A61N 001/20

(21) Application No. : 52709/93 (22) Application Date : 24.12.93

(30) Priority Data

(31) Number	(32) Date	(33) Country
5-29818	26.01.93	JP JAPAN

(43) Publication Date : 04.08.94

(44) Publication Date of Accepted Application : 02.05.96

(71) Applicant(s)
INSTITUTE OF GENERAL BEAUTY & MEDICAL SCIENCE

(72) Inventor(s)
YOSHIHIRO ITO; KAZUSHI MIYAKE

(74) Attorney or Agent
WATERMARK PATENT & TRADEMARK ATTORNEYS , Locked Bag 5, HAWTHORN VIC 3122

(56) Prior Art Documents
GB 2097258
US 4226246
US 2073428

(57) Claim

1. A method for reducing oxidized skin tissue by applying negative high-voltage pulses to the oxidized skin tissue so that the oxidized skin tissue is reduced by an electron addition reaction.

P/00/011 28/5/91
Regulation 3.2(2)

AUSTRALIA

Patents Act 1990

668439

ORIGINAL
COMPLETE SPECIFICATION
STANDARD PATENT

Application Number:
Lodged:

Invention Title: METHOD AND APPARATUS TO REDUCE SKIN TISSUE

The following statement is a full description of this invention, including the best method of performing it known to us :-

METHOD AND APPARATUS TO REDUCE SKIN TISSUE

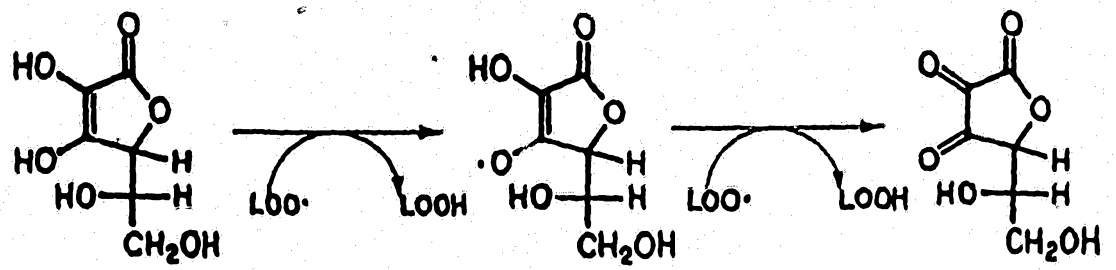
BACKGROUND OF THE INVENTION

1. Field of the Invention

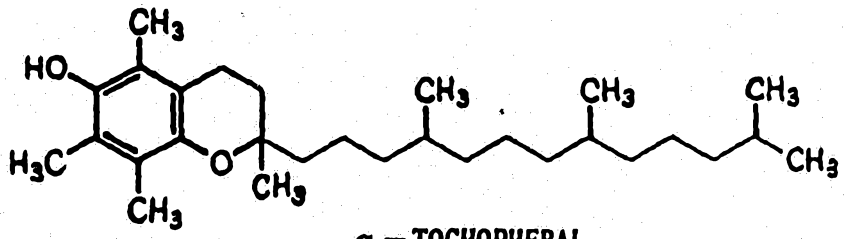
The present invention relates to a method and apparatus to reduce oxidized skin tissue, and more specifically, to the method and apparatus to electrically reduce the oxidized skin tissue. The reduction is achieved through addition of electrons.

2. Description of the Related Art

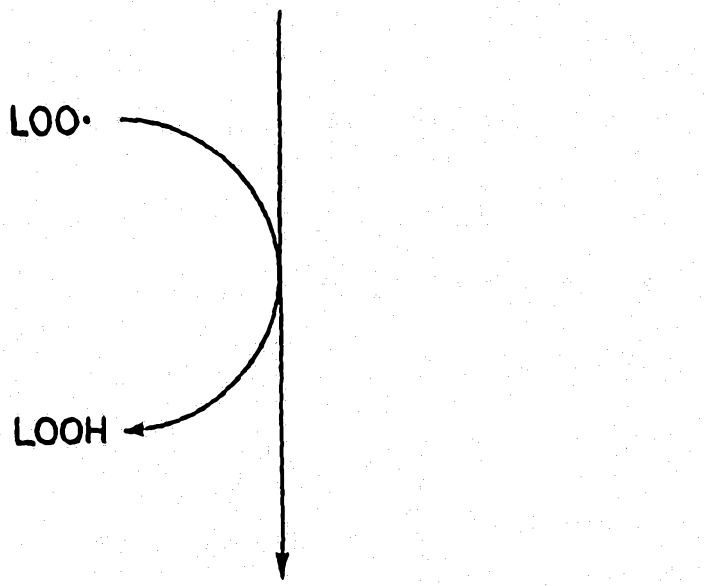
One of the factors to cause deterioration of the skin is oxidation of the skin tissue. When the skin tissue is oxidized, its metabolic function is damaged and the activation of the skin tissue is prevented. Accordingly, in order to prevent the deterioration of the skin, the oxidized skin tissue would be reduced. One of the methods to reduce the oxidized skin tissue that has been conventionally employed is ingestion of tocopherol (vitamin E) or ascorbic acid (vitamin C) yielding in vivo reducing function as shown in a below chemical reaction formula 1.

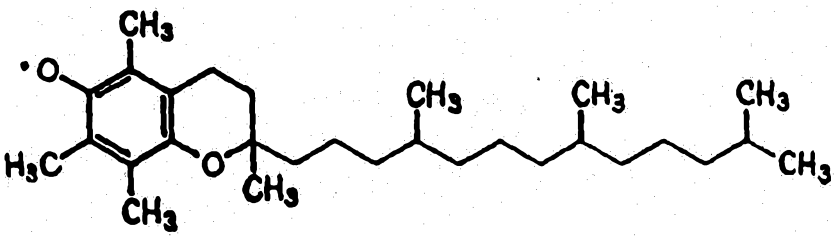


ASCORBIC ACID ASCORBIC ACID RADICAL DEHYDROASCORBIC ACID



α — TOCHOPHERAL





α — TOCHOPHERAL RADICAL

Chemical Reaction Formula 1

In the above mentioned method for reducing oxidized skin tissue, reducing substances such as the vitamin C must be ingested, and since those reducing substances cannot be synthesized in vivo, they must be ingested through foods or drugs in a form of synthesized products. However, the vitamin C ingested in a form of the foods or synthesized products takes a lot of time to be brought to the oxidized skin tissue to reduce it. In addition, since the vitamin C ingested spreads all over the body, the vitamin C does not contribute only to the reduction of the oxidized skin tissue, but rather the reduction effect may be dispersed through the whole body, which may lead to unexpectedly low results.

SUMMARY OF THE INVENTION

In view of the above-described problems of the known prior art, the present invention is aimed at providing a method and an apparatus for steadily reducing oxidized skin tissue in a short time period.

According to one aspect of the present invention, for achieving the objects described above, there is provided a method to reduce oxidized skin tissue by applying negative high-voltage pulses to the oxidized skin tissue, so that the oxidized skin tissue is reduced by an electron addition reaction.

According to another aspect of the present invention, there is provided an apparatus to reduce an oxidized skin tissue, comprising a high-voltage generating means to generate negative high-voltage pulses, and a contact element, which is connected to the high-voltage generating means and which applies negative high-voltage pulses generated by the high-voltage generating means to the skin when it is brought close to or in contact with

the surface of the skin, so that the oxidized skin tissue is reduced by an electron addition reaction. A sufficiently high voltage is of the order of 15 kV (peak to zero).

The nature, principle and utility of the invention will become more apparent from the following detailed description when read in conjunction with the accompanying drawings and diagrams.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

FIG.1 illustrates a perspective view of one example of a skin tissue reducing apparatus according to the present invention;

FIG.2 is a block diagram showing the structure of one example of a high-voltage generating circuit incorporated in the skin tissue reducing apparatus according to the present invention;

FIG.3 is a graph showing electron spin resonance (ESR) spectra of A: potassium permanganate solution saturated with pure nitrogen and B: irradiation of the skin tissue reducing apparatus for 45 min. in the solution A;

FIG.4 is a graph showing changes of the optical density at 420 [nm] with time, wherein solution A is pyrogallol solution under atomosphere (control group) and solution B is irradiation of the skin tissue reducing apparatus in the solution A;

FIG.5 is a graph showing differences of the optical density at 420 [nm] with time between the solution A (control group) and the solution B (irradiation group) in FIG.4;

FIGs.6A to 6D are graphs showing an HPLC of ubiquinone in $EtOH-H_2O$ (3:1) solutions before and after irradiation of the sking tissue reducing

apparatus according to the present invention;

FIG. 7 is a graph showing a ration of the ubiquinone (a) and the ubiquinol (b) by irradiation of the skin tissue reducing apparatus according to the present invention; and

FIGs. 8A and 8B are graphs showing an HPLC of the ubiquinone in EtOH solutions before and after irradiation of the skin tissue reducing apparatus according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Generally speaking, when an atom, a molecule or an ion acquires electrons, it is called "reduced". That means, the reduction is a reaction due to an addition of electrons. For example, an iron ion of tri-valent Fe^{3+} is reduced to an iron ion of di-valent Fe^{2+} by adding an electron e^- as shown in a chemical reaction formula 2. A manganese ion of hepta-valent Mn^{7+} is reduced to a manganese ion of di-valent Mn^{2+} by the addition of five electrons ($5e^-$) as shown in a chemical reaction formula 3.

$$Fe^{3+} + e^- \rightarrow Fe^{2+}$$

Chemical Reaction Formula 2

$$Mn^{7+} + 5e^- \rightarrow Mn^{2+}$$

Chemical Reaction Formula 3

Accordingly, it is possible to electrically reduce the oxidized skin tissue.

In fact, it is known that the potential energy of an ion in the reduced state is greater than that of the precursor, and there is a great energy barrier between the state transitions. Thus, the in vivo reduction is performed with the intervention of an energy transmission system and an enzyme. Accordingly, a relatively high voltage (or field strength) is required for reducing the oxidized skin tissue electrically. In order to carry out electrically efficient reduction of the oxidized skin tissue, an AC or a pulsed voltage is required, which can easily penetrate the skin.

From the above description, it can be concluded that an efficient electrical reduction of the oxidized skin tissue requires an application of negative high-voltage pulses to the skin.

FIG.1 illustrates a perspective view of one example of a skin tissue reducing apparatus according to the present invention, wherein a contact element 2, functions to guide negative high-voltage pulses generated by a high-voltage generating circuit, to the surface of the skin. When the apparatus is brought close to or in contact with the skin surface, a sufficient coupling is formed with the skin. The contact element 2 which attached to a main body 1, is incorporates the high-voltage generating circuit. The main body 1 of the skin tissue reducing apparatus is a portable cylindrical form, and a power source line 3 is connected to one side bottom portion thereof. The contact element 2 is mounted on another side bottom portion. An end terminal of the power source line 3 is connected to a DC power source to operate the skin tissue reducing apparatus. The contact element 2 has a contact portion 2A in a form of an umbrella at the top portion thereof so as to contact with the skin. Besides, the

contact element 2 is attachable and detachable to the main body 1. Another function of the contact element 2, in addition to the above-mentioned one, is to give appropriately dispersed impedance to prevent the skin from being burnt by the concentration of the electric current. The contact element 2 which has the above functions and is used in the present invention includes the following forms;

① a glass tube with an electrode coated on one end, in which air or gas having a reduced pressure is sealed.

② a glass tube in which air or gas having a reduced pressure, and an electrode are sealed.

③ a glass tube in which air or gas having a reduced pressure is sealed and a metal deposition electrode is formed on an inner wall of the glass tube.

④ a metal plate, foil or net coated with an insulating material such as glass, resin or the like.

FIG. 2 shows a block diagram illustrating the structure of an example of a high-voltage generating circuit to generate negative high-voltage pulses, which is incorporated in the main body 1 of the skin tissue reducing apparatus according to the present invention. The DC voltage (for example, +12V) which is inputted from a DC power source through the power source line 3 is stepped up by a voltage step-up circuit 11 incorporating a step-up oscillator (not shown). Positive electric charges are then accumulated in a storage capacitor 12, and the accumulation is continued

until the voltage reaches to a predetermined value (for example, +100V at a point A). After the charging is completed, a trigger pulse is generated in a trigger generating circuit 13 and sent to a gate of a thyristor 14. This trigger operation provides quick conduction between an anode and a cathode of the thyristor 14 and the positive electric charges accumulated in the storage capacitor 12 are discharged by the thyristor 14 through the primary side of the high-voltage transformer 15. At this time, negative high-voltage pulses (for example, 15 KVp-o at a point B) are generated on the secondary side of the high-voltage transformer 15.

After the completion of discharge of the storage capacitor 12, by a counter electromotive force caused by the magnetic energy remaining in the high-voltage transformer 15, current continues through the thyristor 14, as far as the current is more than the lowest holding current of the thyristor 14, which charges storage capacitor 12 into negative (minus at point A). After the negative charging is completed, the accumulated negative electric charges are flown to the primary side of the high-voltage transformer 15 through a diode 16 and an attenuation resistance 17 which are connected in series and are in parallel with the thyristor 14. However, since the energy of accumulated negative electric charges are attenuated quickly by the attenuation resistance 17, the voltage of the positive pulses generated on the secondary side of the high-voltage transformer 15 is controlled to be a low level. The high-voltage pulses thus generated, biased negatively, are applied to the skin 10 of a human through the contact element 2.

Here, in addition to the method using the voltage step-up transformer shown in the above-mentioned embodiment of FIG.2, a means to

generate the negative high-voltage pulses includes the following methods ① to ③;

① Flyback Method:

An electric current flowed in an inductance including a transformer is then shut off quickly.

② Rectification Method:

An AC pulsed high voltage obtained by using a transformer and the like is rectified by a high-voltage rectifier.

③ Induction Coil Method:

An electromagnetically inductive coil of resonance type or non-resonance type is employed.

Experimental examples to show the reducing effect of the skin tissue reducing apparatus according to the present invention to effectively reduce the skin tissue will be described as follows. The contact element 2 used here comprises a Pyrex thin wall glass tube having a tubular electrode fixed at one end, in which nitrogen of 3 mmHg is sealed.

The first experiment was carried out to prove the reduction of Mn (VII) to Mn (II) by addition of electrons using the skin tissue reducing apparatus. Irradiation of the skin tissue reducing apparatus to a 0.1mM potassium permanganate was carried out for 45 minutes. FIG.3 shows electron spin resonance (ESR) spectra of a curve A before and a curve B after the irradiation of the skin tissue reducing apparatus. Since Mn (VII) has a diamagnetic characteristics, it does not show the ESR spectrum. After the irradiation, a characteristics A of ESR spectrum of Mn (II) was observed in

this solution as shown in a characteristics B of FIG.3. This results clearly demonstrated that Mn (VII) is to Mn (II) by the electon addition effect of the skin tissue reducing apparatus as shown in a below chemical reaction formula 4.

$$Mn^{7+} + 5e^- \rightarrow Mn^{2+}$$

Chemical Reaction Formula 4

As a model, a 0.1mM potassium permanganate aqueous solution saturated with pure nitrogen was used. FIG.3 shows characteristic curves on the analytical results of the aqueous solution by an electron spin resonance (ESR) spectra of before and after the contact element 2 of the present apparatus was immersed in the aqueous solution and worked for 45 minutes. As it is clear from the graphs in FIG.3, the aqueous solution prior to the working of the contact element 2 contained manganese ions Mn (VII) of hepta valent (characteristic curve A), while the aqueous solution after the working, was changed to contain manganese ions Mn (II) of di valent (characteristic curve B). This shows that the manganese ions Mn (VII) was reduced to Mn (II) by the electron addition effect of the skin tissue reducing apparatus according to the present invention.

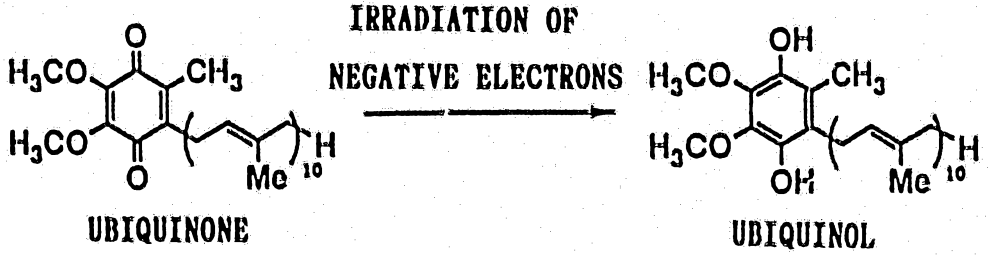
The second experiment was performed based on the reducing effect of an enzyme, superoxide dismutase (SOD) which eliminates peroxides in a living body (refer to a dissertation written by Stefan Marklund and Gudrun Marklund, "Involvement of the Superoxide Anion Radical in the Autoxidation of Pyrogallol and a Convenient Assay for Superoxide Dismutase", Eur. J. Biochem. Vol.47, 1974, pp.469-474). The pyrogallol solution of the model is

a basic solution, subject to autoxidation, colored by the oxidation, and the color is deepened as the degree of the oxidation is raised. Accordingly, when the optical density (O.D.) of the pyrogallol solution is measured by a spectrophotometer as a predetermined wave length, the intensity of the coloration, i.e. the degree of the oxidation can be obtained. The reaction is inhibited by the vitamin C. FIG.4 shows the change of the optical density at 420 [nm] with time of A: a pyrogallol solution which was autoxidized under atomosphere (control group), and B: a pyrogallol solution which irradiated by the skin tissue reducing apparatus according to the present invention. As it is clear from the graphs in FIG.4, it is proved that the oxidation of the pyrogallol solution was inhibited or the oxidized pyrogallol solution was reduced by the skin tissue reducing apparatus according to the present invention. FIG.5 shows the differences of the optical density at 420 [nm] with time between A (control group) and B (irradiation group). The fact that the difference between the optical density of the pyrogallol solutions is nearly linearly increased with time when the experiments were carried out at a constant voltage and a constant frequency, has demonstrated the reduction effect of the present apparatus.

The third experiment was performed on the reduction of ubiquinone to ubiquinol by using the skin tissue reducing apparatus according to the present invention. The ubiquinone and ubiquinol are matter which participate with the transmission of electrons in an organism. It is well known that the ubiquinol strongly have been acting as anti-oxidizing agents in the organism. However, since the ubiquinol are transformed to the

ubiquinone by autoxidation and anti-oxidizing power of the ubiquinol become decreasing. Therefore, it is necessary to give back by reducing the ubiquinone to the ubiquinol.

FIGs.6A to 6D show a high performance liquid chromatogram (HPLC) of an ubiquinone solution in E_tOH : H_2O (3:1), in which the contact element 2 of the present invention was immersed and worked. The analysis result shown in FIG.6A at start time shows that the initial solution has 100 % of the ubiquinone (a). The analysis result shown in FIG.6B after an hour shows that the solution has 49 % of the ubiquinone (a) and 18 % of ubiquinol (b). The analysis result shown in FIG.6C after two hours shows that the solution has 23 % of the ubiquinone (a) and 19 % of the ubiquinol (b). The analysis result shown in FIG.6D after three hours shows that the solution has 2% of the ubiquinone (a) and 16 % of the ubiquinol (b). These results mean that the ubiquinone is effectively reduced into the ubiquinol by using the skin tissue reducing apparatus according to the present invention as shown in a below chemical reaction formula 5.



Chemical Reaction Formula 5

Graphs of FIG.7 show the variation in the difference between

quantities of the ubiquinone (a) and the ubiquinol (b) shown in FIGs.6A to 6D with time (hour) and a ratio(%) of the composition. Since the ubiquinol (b) is increasing with passing time within two hours, it was proved that the ubiquinone (a) was reduced by the skin tissue reducing apparatus according to the present invention. The ubiquinone and vitamin K are the same group and the ubiquinone is converted into the ubiquinole in a live body of the human or the like. The ubiquinone is an activated substance having a strong reducing effect and an anti-oxidation operation and is effective for the human body. That is, it is possible to convert the vitamin K into the activated substance and the activated substance becomes to the ubiquinole after the operation due to the ubiquinol. Then, the skin tissue reducing apparatus according to the present invention can again convert the ubiquinone into the activated substance. Therefore, the skin tissue reducing apparatus of the present invention is also able to activate the vitamin K.

FIGs.8A and 8B show the high performance liquid chromatogram of an ubiquinone in E_tOH : Ether solution (3:1), in which the contact element 2 of the present invention was immersed and worked. The analysis result shown in FIG.8A at start time shows that the solution has 100 % of the ubiquinone (a). The analysis result shown in FIG.8B after two hours shows similarly that the solution has 100 % of the ubiquinone (a). This means that the ubiquinol is not formed by reducing the ubiquinone in a non-aqueous system.

As stated above, since the reduction from the ubiquinone to the ubiquinol is not formed in non-aqueous solvent, but is formed in aqueous solvent, the reduction of organic compounds by the skin tissue reducing

apparatus according to the present invention need water (H_2O). Namely, it is considered that protons require reduction of carbonyl groups given by the water.

As stated by the above explanations, according to the method and the apparatus of the present invention, the oxidized skin tissue can be reduced in a short time and the deterioration of the skin can be prevented since the negative electrons are added to the oxidized skin tissue. In addition, by measuring the reduction power of a pyrogallol solution containing a predetermined amount of vitamin C, the correlation between the amount of vitamin C and the working time of the present invention can be obtained. The effect equivalent to, or more than, that provided by ingestion of the vitamin C of the predetermined amount can be efficiently achieved by the present invention.

It should be understood that many modifications and adaptations of the invention will become apparent to those skilled in the art and it is intended to encompass such obvious modifications and changes in the scope of the claims appended hereto.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

WHAT IS CLAIMED IS:

1. A method for reducing oxidized skin tissue by applying negative high-voltage pulses to the oxidized skin tissue so that the oxidized skin tissue is reduced by an electron addition reaction.

2. A method for reducing oxidized skin tissue which comprises the steps of bringing a contact element which is connected to a high-voltage generating means to generate negative high-voltage pulses close to or in contact with a surface of an oxidized skin, generating the negative high-voltage pulses by the high-voltage generating means, applying said negative high-voltage pulses to the oxidized skin by the contact element, and, reducing the oxidized skin tissue by an electron addition reaction.

3. An apparatus to reduce skin tissue, which comprising a high-voltage generating means to generate negative high-voltage pulses, and a contact element which is connected to the high-voltage generating means and applies negative high-voltage pulses generated by the high-voltage generating means to the skin when it is brought close to or in contact with a surface of the skin, whereby an oxidized skin tissue is reduced by an electron addition reaction.

4. An apparatus to reduce skin tissue according to Claim 3, wherein the high-voltage generating means includes a voltage step-up transformer so as to generate the negative high-voltage pulses.

5. An apparatus to reduce skin tissue according to Claim 3, wherein the high-voltage generating means dispatching flows of an electric current in an inductance including a transformer and quickly shuts off the electric current so as to generate the negative high-voltage pulses.

6. An apparatus to reduce skin tissue according to Claim 3, wherein the high-voltage generating means rectifies an AC pulsed high-voltage obtained by a transformer by means of a high-voltage rectifier so as to generate the negative high-voltage pulses.

7. An apparatus to reduce skin tissue according to Claim 3, wherein the high-voltage generating means comprises an electromagnetic inductive coil of resonance type or non-resonance type so as to generate the negative high-voltage pulses.

8. An apparatus to reduce skin tissue according to Claim 3, wherein the contact element comprises a glass tube with an electrode coated on one end, and depressurized air or gas is sealed in the glass tube.

9. An apparatus to reduce skin tissue according to Claim 3, wherein the contact element comprises a glass tube in which depressurized air or gas and an electrode is sealed in side the glass tube.

10. An apparatus to reduce skin tissue according to Claim 3, wherein the contact element comprises a glass tube in which depressurized air or gas

is sealed inside and a metal deposition electrode is formed on the inner wall of the glass tube.

11. An apparatus to reduce skin tissue according to Claim 3, wherein the contact element comprises a metal plate, a foil or a net which is coated with an insulating material such as glass, resin or the like.

DATED this 30th day of December 1993.

INSTITUTE OF GENERAL BEAUTY & MEDICAL SCIENCE

WATERMARK PATENT & TRADEMARK ATTORNEYS
"THE ATRIUM"
290 BURWOOD ROAD
HAWTHORN. VIC. 3122.

ABSTRACT OF THE DISCLOSURE

The present method is a method for reducing an oxidized skin tissue by applying negative high-voltage pulses to the oxidized skin tissue so that the oxidized skin tissue is reduced by an electron addition reaction. A high-voltage generating circuit which is incorporated in a main body generates negative high-voltage pulses. Those negative high-voltage pulses are applied to the skin through a contact element which is connected to the main body, so that the oxidized skin tissue is reduced by the electron addition reaction. Further, the present apparatus is an apparatus to reduce a skin tissue, comprising a high-voltage generating means to generate negative high-voltage pulses, and a contact element which is connected to the high-voltage generating means and applies negative high-voltage pulses generated by the high-voltage generating means to the skin when it is brought close to or in contact with a surface of the skin, whereby an oxidized skin tissue is reduced by the electron addition reaction.

52709/93

FIG. 1

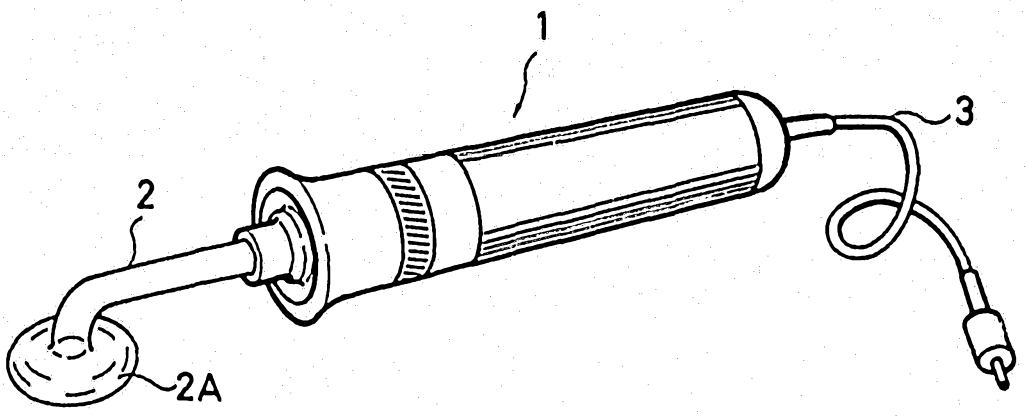


FIG. 2

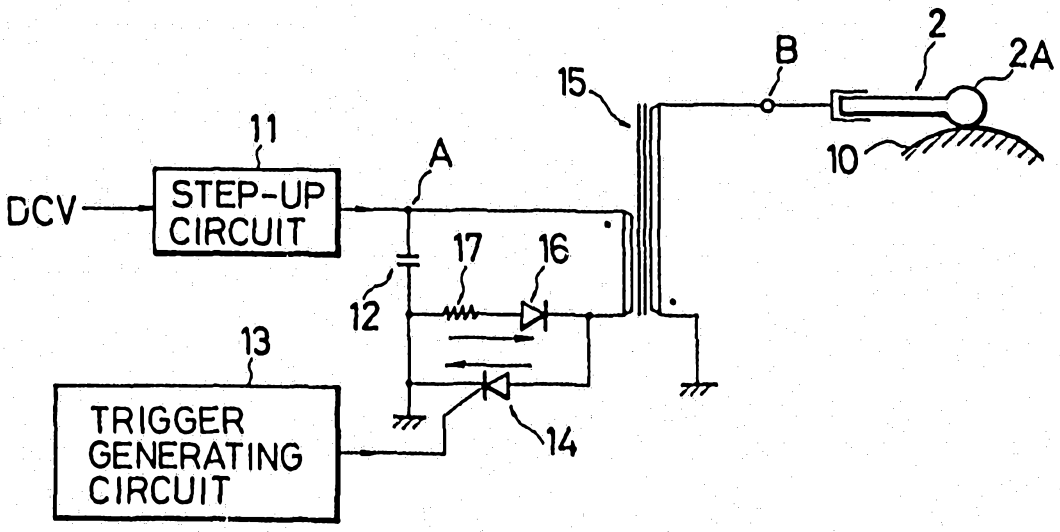
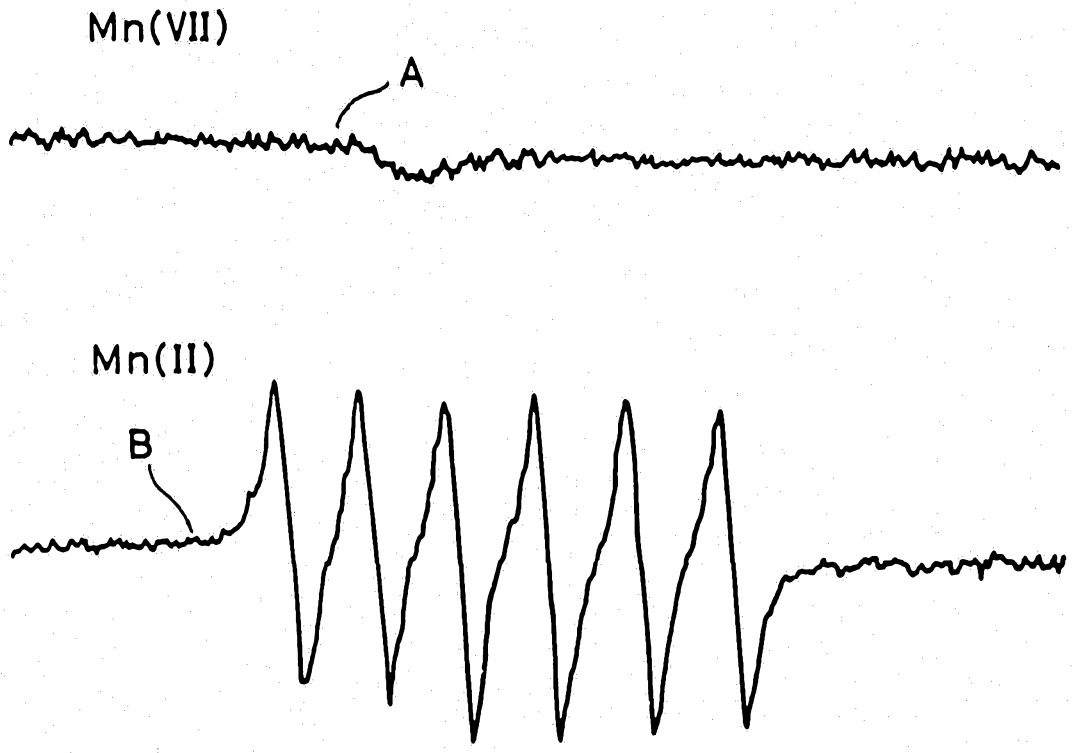


FIG.3



COUPLING CONSTANT OF Mn(II): g_0=2.0042

FREQUENCY OF Mn(II)
RESONATING MAGNETIC FIELD: A_0=9.39mT

FIG. 4

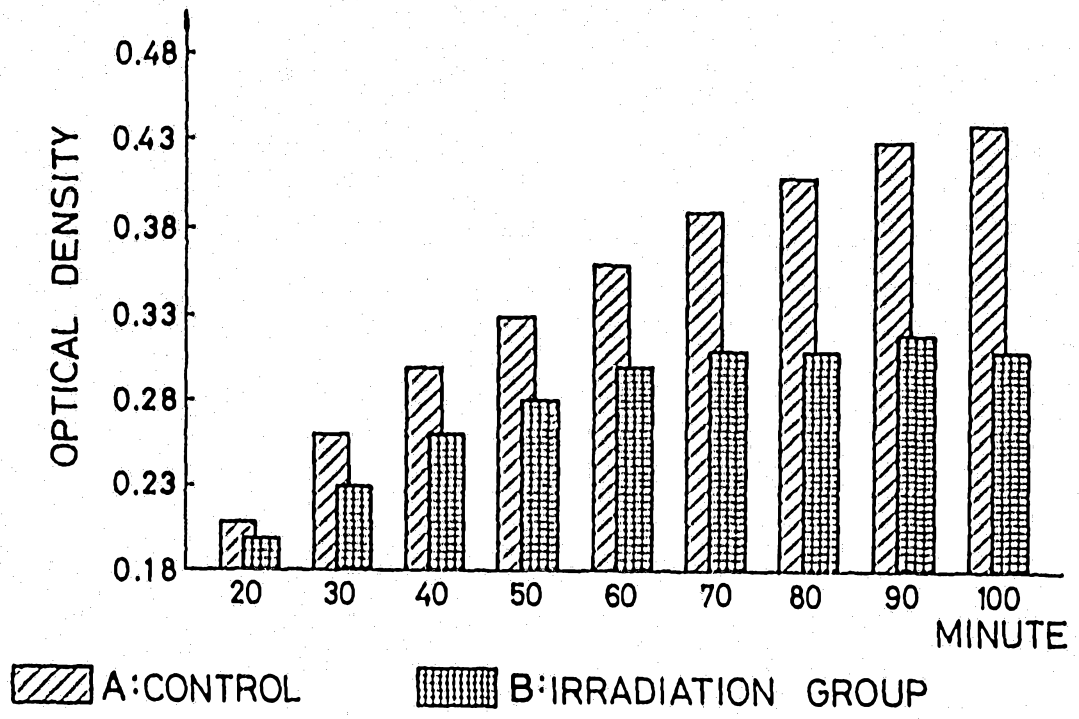
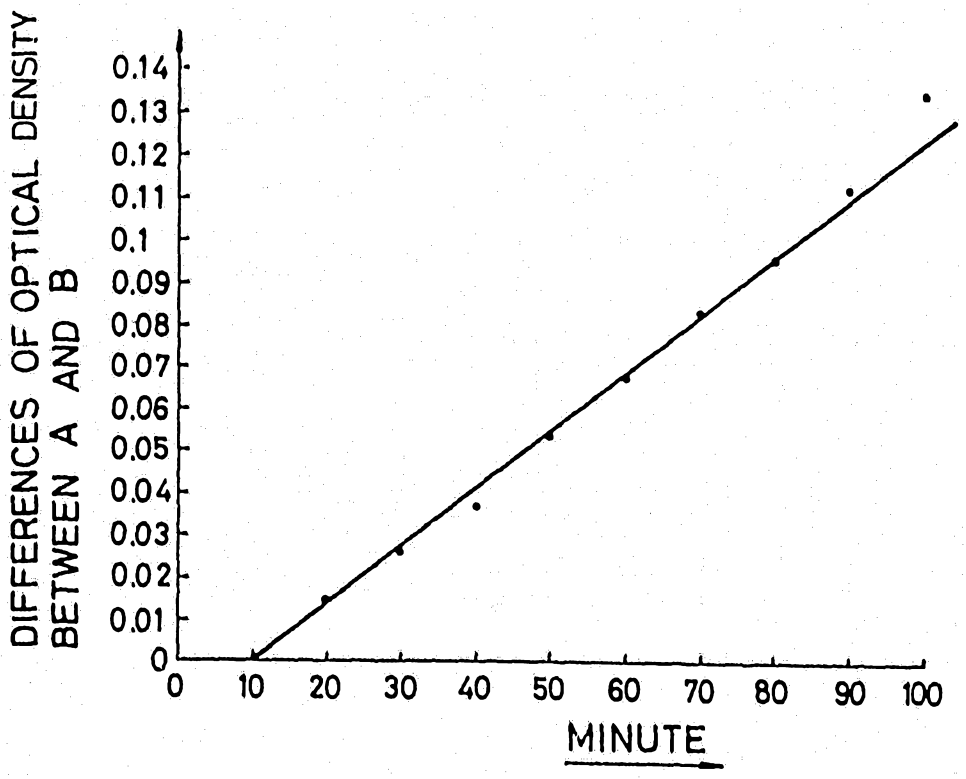

OPTICAL DENSITY
0.48
0.43
0.38
0.33
0.28
0.23
0.18
20
30
40
50
60
70
80
90
100
MINUTE
A:CONTROL
B:IRRADIATION GROUP

FIG. 5


DIFFERENCES OF OPTICAL DENSITY BETWEEN A AND B
0.14
0.13
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0.08
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0.05
0.04
0.03
0.02
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70
80
90
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MINUTE

FIG. 6A

START

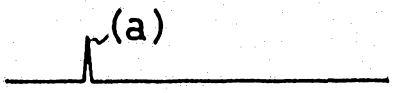
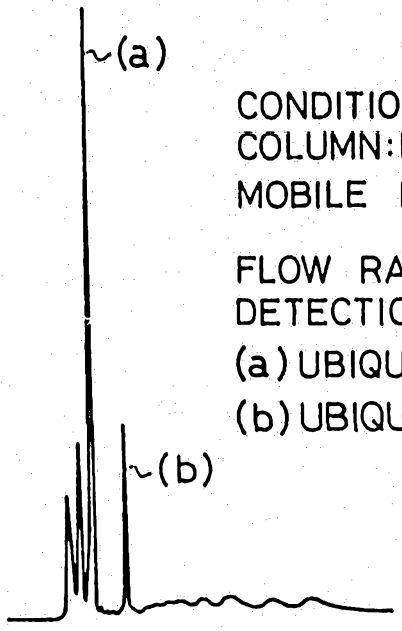


FIG. 6B

1HR



CONDITIONS OF HPLC
COLUMN: LICHROSPHER Si 100(5μm)
MOBILE PHASE: 1% ISOPROPANOL
-n- HEXANE
FLOW RATE : 1.0 mℓ/min
DETECTION: UV 292 nm
(a) UBIQUINONE
(b) UBIQUINOL

FIG. 6C

2HR

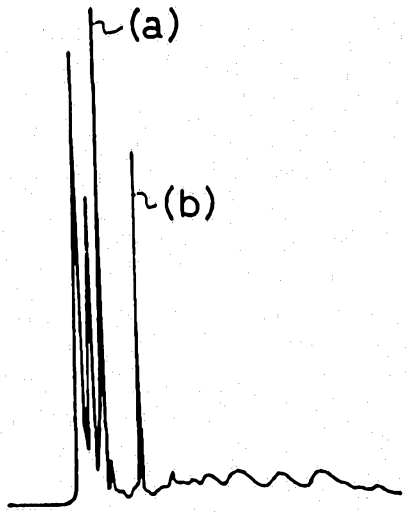


FIG. 6D

3HR

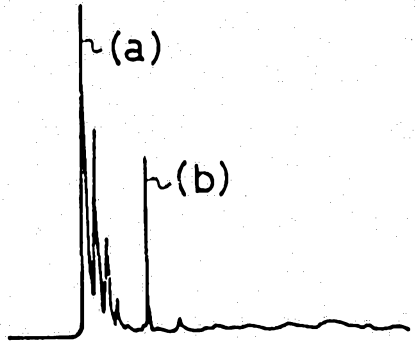


FIG. 7

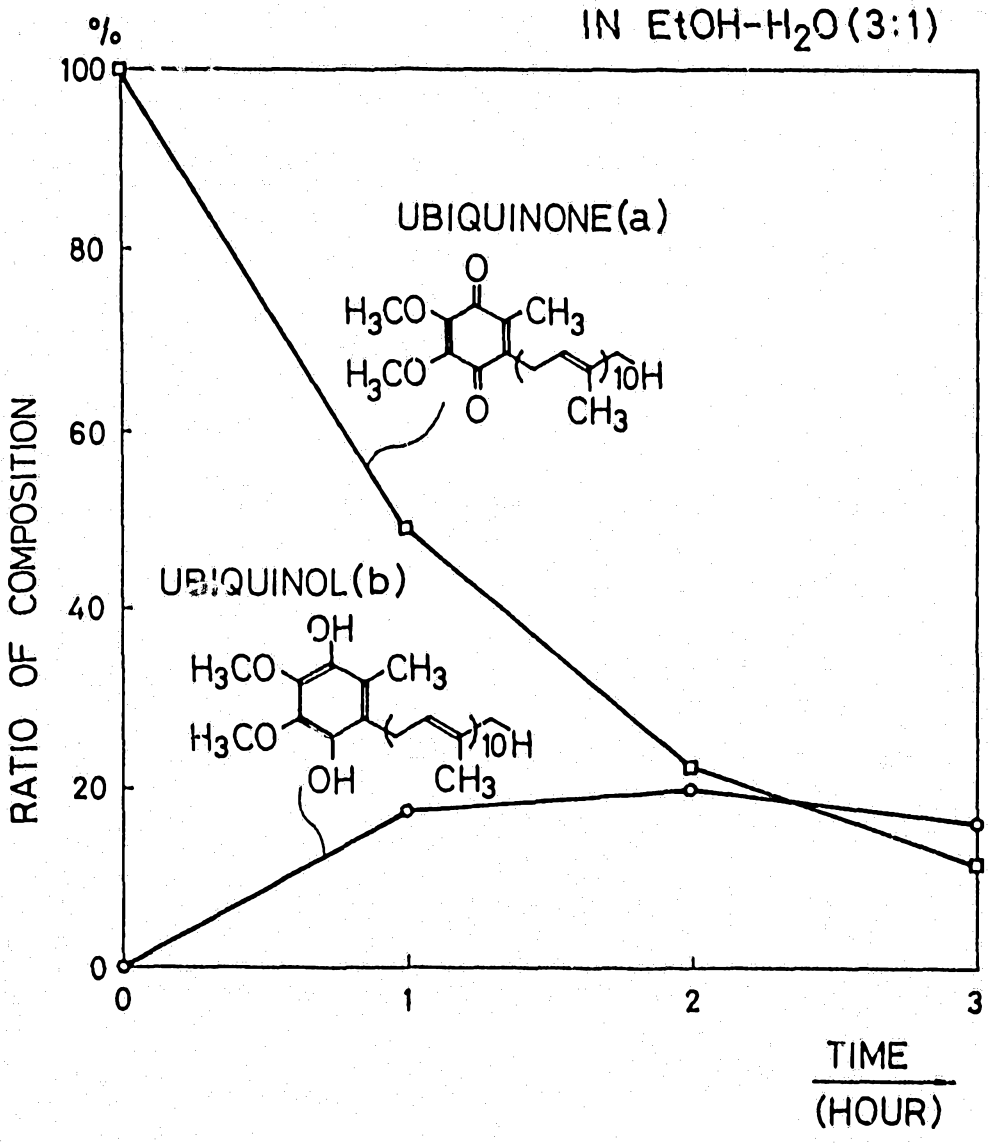
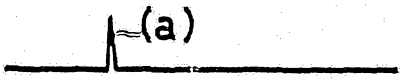

%
IN EtOH-H2O(3:1)
100
80
60
40
20
0
RATIO OF COMPOSITION
UBIQUINONE(a)
H3CO
CH3
H3CO
10H
O
O
CH3
UBIQUINOL(b)
OH
H3CO
CH3
H3CO
10H
OH
CH3
0
1
2
3
TIME
(HOUR)

FIG. 8A
START



CONDITIONS OF HPLC
COLUMN: LICHROSPHER Si 100(5μm)
MOBILE PHASE: 1% ISOPROPANOL
-n- HEXANE
FLOW RATE: 1.0 ml/min
DETECTION: UV 292nm

FIG. 8B
2HR